EPA Reporting - ORDER 93
- ORDER
- DMR 12-93

1961253 - R8 SEMS

BROHM MINING CORP.

January 28, 1993

Mr. Steve Burkett, Chief
NPDES Branch
Management Division
U.S. E.P.A.
999 18th St. Suite 500
Denver, CO 80202-2466

Mr. Burkett:

Enclosed are the monitoring results from December 1992 requested in the order "Docket No. CWA-V111-93-04-C."

If you have any further questions, please don't hesitate to call.

Sincerely,

BROHM MINING CORP.

Myron Andersen

Myron Andersen
Env. Affairs Manager

MA:sm

c: Steve Pirner, SDDENR
Dale Cockrell

South Dakota Office: P.O. Box 485, Deadwood, South Dakota 57732
Telephone: (605) 578-2107 Telecopier: (605) 578-1709

Brohm Mining Corp. is a wholly owned affiliate of Minven Gold Corporation

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

QUALITY ASSURANCE REPORT - BROHM MINING

Report Date: 12-30-92

ELI #'s: 92-47428/92-47429

| RADIOMETRIC: | METHOD | Dup #1 % | Dup #2 % | Spk #1 % | Spk #2 % | ANALYST | DATE SAMPLE ANALYZED |
|---|---|---|---|---|---|---|---|
| Gross Alpha | EPA-900.0 | 100 | --- | --- | --- | DB | 22-Dec-92 |

USEPA-ESML-LV INTERCOMPARISON STUDY RESULTS

| Radiometric | Method | ELI Value | Standard | Difference | Analyst | Date |
|---|---|---|---|---|---|---|
| Uranium | EPA-908.1 | 5.07 | 0.43 | 1.07 | DB | 14-Apr-92 |
| Ra226 | EPA-903.1 | 16.30 | 1.16 | 1.40 | DB | 14-Apr-92 |
| Ra228 | EPA-904.1 | 16.17 | 1.54 | 2.17 | DB | 14-Apr-92 |
| Gross Alpha | EPA-900.0 | 9.33 | -1.74 | -5.67 | DB | 15-May-92 |
| Gross Beta | EPA-900.0 | 35.00 | -2.70 | -9.00 | DB | 15-May-92 |

Report Approved By: R.A. Leaking

tld

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WATER ANALYSIS REPORT - BROHM MINING CORPORATION

| | | | |
|---|---|---|---|
| Sample I.D.: | Outfall A | Outfall B | |
| Date Sampled: | 12-17-92 | 12-17-92 | |
| Report Date: | 09-29-92 | 09-29-92 | |
| Sample Number: | 92-47428 | 92-47429 | |
| **RADIOMETRIC pCi/l:** | | | **Det.Limit** |
| Gross Alpha | 10.2 | 22.5 | 1.0 |
| Gross Alpha Prec. +/- | 0.9 | 1.2 | |

Report Approved By: R.O. Leading

kmk

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 11/30/92
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19921201101
DATE RECEIVED: 12/01/92
TIME RECEIVED: 06:40 AM
REPORT DATE: 12/03/92

FORM 106-A

FLOW: 9391/DAY TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.41 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 8.69 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .078 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .003 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .018 |
| Gold | . | . |
| Iron | . | .021 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .236 |

| SPECIAL TESTS | VALUE |
|---|---|
| OIL & GREASE | <5.0 |
| FIELD CONDUCT. | 860. |
| FIELD PH | 6.9 |
| FIELD TEMP | 2. |

APPROVED BY: [signature]

DATE: 12-9-92

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 12/07/92
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19921208107
DATE RECEIVED: 12/08/92
TIME RECEIVED: 06:50 AM
REPORT DATE: 12/11/92

FORM 106-A

FLOW 10080 G/DAY TOTAL REC METALS.

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.57 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 7.55 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 1.19 |
| Antimony | . | . |
| Arsenic | . | .002 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .002 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .043 |
| Gold | . | . |
| Iron | . | .304 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .140 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD TEMP | 1.C |
| FIELD COND. | 700. |
| FIELD PH | 6.2 |

APPROVED BY: [signature]
DATE: 12-11-92

MID-CONTINENT
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(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 12/16/92
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19921217101
DATE RECEIVED: 12/17/92
TIME RECEIVED: 07:30 AM
REPORT DATE: 12/21/92

FORM 106-A

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | 391. |
| PH | 7.47 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 7.39 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 294. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .112 |
| Antimony | . | . |
| Arsenic | . | <.001 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .007 |
| Calcium | 120. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .200 |
| Gold | . | . |
| Iron | . | .031 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | 22.1 | . |
| Manganese | . | <.050 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | .002 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .108 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 6.8 |
| FIELD EC | 730. |
| FIELD TEMP | 2.0 C |
| FIELD FLOW | 10440/D. |

APPROVED BY: [signature]

DATE: 12-21-92

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(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 12/21/92
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19921222104
DATE RECEIVED: 12/22/92
TIME RECEIVED: 07:15 AM
REPORT DATE: 12/23/92

FORM 106-A

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.51 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 6.85 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .304 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .003 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .017 |
| Gold | . | . |
| Iron | . | <.050 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .113 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 6.60 |
| FIELD EC | 650. |
| FIELD TEMP | 1.0 C |
| FIELD FLOW | 72.0 GPD |

APPROVED BY: Sherry Schaefer
DATE: 12/23/92

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(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 12/28/92
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19921229102
DATE RECEIVED: 12/29/92
TIME RECEIVED: 07:00 AM
REPORT DATE: 12/30/92

FORM 106-A

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.47 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 6.46 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .470 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .001 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .024 |
| Gold | . | . |
| Iron | . | .112 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .090 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 7.90 |
| FIELD EC | 700. |
| FIELD TEMP | 1.0 C |
| FIELD FLOW | 5040./DY |

APPROVED BY: Sherry Schaefer
DATE: 12/30/92

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MID-CONTINENT
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(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 11/30/92
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19921201102
DATE RECEIVED: 12/01/92
TIME RECEIVED: 06:40 AM
REPORT DATE: 12/03/92

FORM 106-A

FLOW: 1440/DAY TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 2.79 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | 2.30 |
| Nitrogen, Nitrate, mg/l | 6.59 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 87.6 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .038 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 11.6 |
| Gold | . | . |
| Iron | . | 31.6 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | .0004 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 3.09 |

| SPECIAL TESTS | VALUE |
|---|---|
| OIL & GREASE | <5.0 |
| FIELD CONDUCT. | 2000. |
| FIELD PH | 3.7 |
| FIELD TEMP | 2. |

APPROVED BY: [signature]

DATE: 12-03-92

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 12/07/92
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19921208108
DATE RECEIVED: 12/08/92
TIME RECEIVED: 06:50 AM
REPORT DATE: 12/11/92

FORM 106-A

## FLOW 1800 GAL/DAY TOTAL REC METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 2.89 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | 1.64 |
| Nitrogen, Nitrate, mg/l | 5.49 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 82.1 |
| Antimony | . | . |
| Arsenic | . | .113 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .075 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 11.9 |
| Gold | . | . |
| Iron | . | 24.5 |
| Lead | . | .002 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .387 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD TEMP | 3.C |
| FIELD COND. | 2000.+ |
| FIELD PH | 3.3 |

APPROVED BY: [signature]
DATE: 12-11-92

**MID-CONTINENT TESTING LABORATORIES, INC.**
HIGH TECHNOLOGY OIL ANALYSIS AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 12/21/92
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19921222105
DATE RECEIVED: 12/22/92
TIME RECEIVED: 07:15 AM
REPORT DATE: 12/23/92

FORM 106-A

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 2.89 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | 1.78 |
| Nitrogen, Nitrate, mg/l | 5.22 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 84.5 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .108 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 10.9 |
| Gold | . | . |
| Iron | . | 256. |
| Lead | . | .002 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 3.72 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.40 |
| FIELD EC | 2000.+ |
| FIELD TEMP | 1.0 C |
| FIELD FLOW | 864. GPD |

APPROVED BY: Sherry Schaefer
DATE: 12/23/92

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MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 12/21/92
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19921222105
DATE RECEIVED: 12/22/92
TIME RECEIVED: 07:15 AM
REPORT DATE: 12/30/92

FORM 106-A

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 2.89 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | 1.78 |
| Nitrogen, Nitrate, mg/l | 5.22 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 84.5 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .108 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 10.9 |
| Gold | . | . |
| Iron | . | 25.6 |
| Lead | . | .002 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 3.72 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.40 |
| FIELD EC | 2000.+ |
| FIELD TEMP | 1.0 C |
| FIELD FLOW | 864. GPD |

APPROVED BY: Sherry Schaefer
DATE: 12/30/92

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MID-CONTINENT
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AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 12/28/92
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19921229103
DATE RECEIVED: 12/29/92
TIME RECEIVED: 07:00 AM
REPORT DATE: 12/30/92

FORM 106-A

GRELIND PRINTING CENTER - RAPID CITY S.D.

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 2.92 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | 2.22 |
| Nitrogen, Nitrate, mg/l | 4.67 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 99.5 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .074 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 13.1 |
| Gold | . | . |
| Iron | . | 28.9 |
| Lead | . | .004 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | .0010 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 10.4 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.70 |
| FIELD EC | 2000.+ |
| FIELD TEMP | 0.0 C |
| FIELD FLOW | 1152./DY |

APPROVED BY: Sherry Schaefer
DATE: 12/30/92

## TEST CONDITIONS: *CERIODAPHNIA DUBIA* ACUTE TOXICITY TESTS

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 48 hours

Sample Collection procedure:

Sample collection date: 17 December 1992

Dilution water: BB Creek - receiving water; a separate reconstituted water control was also run

Age of organisms at start: <24h old

Feeding: none

End Point: mortality

Start date and time: 18 December 1992 at 1200

End date and time: 20 December 1992 at 1200

Type of exposure chamber: 50ml disposable plastic cups

Volume of exposure chamber: 25 ml

Number of Animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

## SUMMARY RESULTS OF *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST: Outfall A

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB

Start: 18 Dec. 1992 at 1200
End: 20 Dec. 1992 at 1200
Test substance: Outfall A
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. Control | Rcv $H_2O$ Control | 12.5% Eff. | 25% Eff. | 50% Eff. | 75% Eff. | 100% Eff. |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 |
| % Survival | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Diss.$O_2$ max. | 8.3 | 8.0 | 8.1 | 8.0 | 8.1 | 8.2 | 8.5 |
| min. | 7.8 | 7.8 | 7.8 | 7.6 | 7.6 | 7.5 | 7.6 |
| pH begin | 8.48 | 8.32 | 8.25 | 8.27 | 8.43 | 8.21 | 8.20 |
| end | 8.42 | 8.20 | 8.25 | 8.22 | 8.24 | 8.14 | 8.10 |
| Temp. °C max. | 21.0 | 21.0 | 21.0 | 21.0 | 21.0 | 21.0 | 21.0 |
| min. | 20.5 | 20.5 | 20.5 | 20.5 | 20.5 | 20.5 | 20.5 |

Statistical Analysis:

- 48h LC50 (Probit Analysis) = ND; lack of mortality did not allow calculation.
- NOEC (Dunnett's Method) = 100% effluent

## SUMMARY RESULTS OF *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST: Outfall B

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB

Start: 18 Dec. 1992 at 1200
End: 20 Dec. 1992 at 1200
Test substance: Outfall B - pH treated
Client/Project: Brohm Mining

Test results: pH treated effluent

| Treatment | Recon. Control | Rcv $H_2O$ Control | 12.5% Eff. | 25% Eff. | 50% Eff. | 75% Eff. | 100% Eff. |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 20/20 | 19/20 | 20/20 | 18/20 | 16/20 |
| % Survival | 100 | 100 | 100 | 95 | 100 | 90 | 80 |
| Diss. $O_2$ max. / min. | 8.3 / 7.8 | 8.2 / 7.5 | 8.3 / 7.6 | 8.2 / 7.5 | 8.1 / 7.5 | 8.0 / 7.5 | 8.0 / 7.4 |
| pH begin / end | 8.42 / 8.48 | 8.37 / 8.18 | 8.36 / 8.15 | 8.30 / 8.10 | 8.22 / 8.01 | 8.17 / 7.97 | 8.19 / 7.96 |
| Temp. °C max. / min. | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 |

Test results: untreated effluent

| Treatment | Rcv. $H_2O$ | 50% effluent | 100% effluent |
|---|---|---|---|
| # alive/exposed | 20/20 | 0/10 | 0/10 |
| % Survival | 100 | 0 | 0 |

Statistical Analysis: performed on results of treated effluent test

- 48h LC50 (Probit Analysis) = ND; lack of significant mortality did not allow calculation.
- NOEC (Dunnett's Method) = 50% effluent

## TEST CONDITIONS: *PIMEPHALES PROMELAS* ACUTE TOXICITY TESTS

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 96 hours

Sample Collection procedure: grab

Sample collection date: 17 December 1992

Dilution water: BB Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <5 days old

Feeding: 0.1 mL *Artemia* nauplii prior to test initiation and prior to the 48h renewal

End Point(s): mortality

Start date and time: 18 December 1992 at 1200

End date and time: 22 December 1992 at 1200

Type of exposure chamber: 400 ml glass beakers

Volume of exposure solution: 300 ml

Number of Animals exposed/chamber: 10

Number of replicates/treatment: 2

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

Aeration: 100 bubbles/min.

## SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TOXICITY TEST: Outfall A

TEST: Acute 96h with fathead minnow larvae OPERATORS: DD, CB

Start: 18 Dec. 1992 at 1500
End: 22 Dec. 1992 at 1500
Test substance: Outfall A
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. Control | 12.5% Effluent | 25% Effluent | 50% Effluent | 75% Effluent | 100% Effluent |
|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 |
| % Survival | 100 | 100 | 100 | 100 | 100 | 100 |
| Diss. $O_2$ max. | 7.7 | 7.9 | 8.1 | 8.1 | 8.3 | 8.3 |
| min. | 7.6 | 7.3 | 7.6 | 7.6 | 7.7 | 7.6 |
| pH begin | 8.19 | 8.22 | 8.20 | 8.16 | 8.12 | 8.11 |
| end | 8.05 | 8.01 | 8.02 | 7.97 | 7.93 | 7.88 |
| Temp.(°C) max. | 21.0 | 21.0 | 21.0 | 21.0 | 21.0 | 21.0 |
| min. | 19.8 | 19.8 | 19.8 | 19.8 | 19.8 | 19.8 |

Statistical Analysis:

- 96h LC50 (Probit Method) = ND; lack of mortality did not allow calculation.
- NOEC (Dunnett's Method) = 100% effluent

## SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TOXICITY TEST: Outfall B

TEST: Acute 96h with fathead minnow larvae OPERATORS: DD, CB

Start: 18 Dec. 1992 at 1500
End: 22 Dec. 1992 at 1500
Test substance: Outfall B - pH treated
Client/Project: Brohm Mining

Test results: pH treated effluent

| Treatment | Recon. Control | Rcv $H_2O$ Control | 12.5% Eff. | 25% Eff. | 50% Eff. | 75% Eff. | 100% Eff. |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 15/20 | 20/20 | 13/20 | 18/20 | 15/20 |
| % Survival | 100 | 100 | 75 | 100 | 65 | 90 | 75 |
| Diss.$O_2$ max. | 8.1 | 8.0 | 8.0 | 8.1 | 8.0 | 8.1 | 8.2 |
| min. | 7.7 | 7.6 | 7.9 | 7.8 | 7.9 | 7.8 | 7.8 |
| pH begin | 8.39 | 8.35 | 8.22 | 8.18 | 8.07 | 7.97 | 8.01 |
| end | 8.18 | 7.87 | 7.94 | 7.98 | 7.93 | 7.84 | 7.80 |
| Temp. °C max. | 21.0 | 21.0 | 21.0 | 21.0 | 21.0 | 21.0 | 21.0 |
| min. | 19.8 | 19.8 | 19.8 | 19.8 | 19.8 | 19.8 | 19.8 |

Test results: untreated effluent

| Treatment | Rcv. $H_2O$ | 50% effluent | 100% effluent |
|---|---|---|---|
| # alive/exposed | 20/20 | 0/10 | 0/10 |
| % Survival | 100 | 0 | 0 |

Statistical Analysis:

- 96h LC50 = ND; significant heterogeneity did not permit either calculation of an LC50 using either Probit or Spearman-Karber statistical procedures
- NOEC (Dunnett's Method) = 25% effluent

## WET CHEMISTRY RESULTS ON SAMPLES RECEIVED 18 DECEMBER 1992

Samples were taken on 17 December 1992 by Brohm Mining and delivered by courier to Chadwick & Associates, Inc.

| Measurement | Recon. $H_2O$ | Rcv. $H_2O$ | Outfall A | Outfall B |
|---|---|---|---|---|
| Total Hardness ($mgCaCO_3/L$) | 196 | 122 | 406 | 652 |
| pH | 8.28 | 8.00 | 7.67 | 3.30* |
| Alkalinity ($mgCaCO_3/L$) | 116 | 94 | 72 | 170# |
| Conductivity ($\mu$mho) | 632 | 252 | 790 | 2220 |
| Dissolved Oxygen ($mgO_2/L$) | 6.9 | 13.2 | 13.0 | 11.4 |
| Ammonia (mg $NH_3/L$) | 0 | 0.11 | 0 | 1.07 |
| Total Residual Chlorine (mg/L) | 0 | 0 | 0.05 | 0.10 |

* The pH was raise to 8.0 with 1 N NaOH before test initiation. A separate test was also performed with the available untreated effluent at pH 3.0.

\# The alkalinity was determined after adjusting pH to 8.0.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON *CERIODAPHNIA DUBIA*

Test date: 1 to 3 Dec., 1992.

| g NaCl/L | control | 2.0 | 2.5 | 3.0 | 4.0 | 5.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 20/20 | 20/20 | 9/20 | 0/20 | 0/20 | 0/20 |
| % survival | 100 | 100 | 45 | 0 | 0 | 0 |

LC50 (Probit Analysis) = 2.45 g NaCl/L (95% CI, 2.34 to 2.56)

Note: This is within our accepted performance range ( 1.3 to 3.0) determined by 12 previous reference tests performed.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON FATHEAD MINNOW LARVAE

Test date: 22 to 26 Dec., 1992

| g NaCl/L | control | 6.0 | 7.0 | 7.5 | 8.0 | 9.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 20/20 | 18/20 | 12/20 | 1/20 | 0/20 | 0/20 |
| % survival | 100 | 90 | 60 | 5 | 0 | 100 |

96h LC50 (Probit Analysis) = 6.86g NaCl/L (95% CI, 6.60 to 7.06)

Note: This is within our accepted performance range (5.4 to 9.0) determined by 12 previous reference tests performed.

**LITERATURE CITED:**

Hamilton, M.A., R.C. Russo, and R.V. Thurston. 1977. Trimmed Spearman-Karber method for estimating median lethal concentrations in toxicity bioassays. Environmental Science & Technology. 11:714-719; correction 12:417 (1978).

USEPA Region VIII. 1992. NPDES whole effluent toxics control program March, 1992. Denver, Colorado.

Weber, C.I., M. Heber, J. Lazorchak, T. Norber-King, G. Morrison, W. Peltier, F. Fulk, C. Poore, P. Lewis, J. Lazorchak, S. Ward, D. Bengtson, D. Klemm, Q. Pickering, M. Smith, D. Middaugh, D. Klemm. 1991. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms. 4th Edition. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. EPA/600/4-90/027.

BROHM MINING CORP.

February 24, 1993

Mr. Steve Burkett, Chief
NPDES Branch
Management Division
U.S.E.P.A.
999 18th St., Suite 500
Denver, CO 80202-2466

Mr. Burkett:

Enclosed are the monitoring results from January 1993 requested in the order "Docket No. CWA-V111-93-04-C."

If you have any further questions, please don't hesitate to call.

Sincerely,

BROHM MINING CORPORATION

Stan Michals
Compliance Specialist

SM:vhc

c: Steve Pirner, SDDENR
Dale Cockrell

South Dakota Office: P.O. Box 485, Deadwood, South Dakota 57732
Telephone: (605) 578-2107 Telecopier: (605) 578-1709

Brohm Mining Corp. is a wholly owned affiliate of Minven Gold Corporation

BROHM MINING CORP.
MONITORING RESULTS FROM JANUARY 1993
"DOCKET NO. CWA-V111-93-04-C"

| OUTFALL "B" | FLOW GPD | FIELD pH |
|---|---|---|
| 01-04-93 | 0 | N/A |
| 01-08-93 | 0 | N/A |
| 01-11-93 | 0 | N/A |
| 01-15-93 | 0 | N/A |
| 01-18-93 | 0 | N/A |
| 01-22-93 | 0 | N/A |
| 01-25-93 | 0 | N/A |
| 01-29-93 | 0 | N/A |

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

WATER ANALYSIS REPORT - BROHM MINING

| | | |
|---|---|---|
| SAMPLE I.D.: | Outfall "A" Ruby | |
| Sample Date: | 01-20-93 | |
| Report Date: | 02-01-93 | |
| Sample Number: | 93-0657 | Det.Limit |
| RADIOMETRIC pCi/l: | | |
| Gross Alpha | <1.0 | 1.0 |
| Gross Alpha Prec. +/- | | |

Report Approved By: R. A. Gearing
kmk

BROHM MINING CORP.
MONITORING RESULTS FROM JANUARY 1993
"DOCKET NO. CWA-V111-93-04-C"

| OUTFALL "B" | FLOW GPD | FIELD pH |
|---|---|---|
| 01-04-93 | 0 | N/A |
| 01-08-93 | 0 | N/A |
| 01-11-93 | 0 | N/A |
| 01-15-93 | 0 | N/A |
| 01-18-93 | 0 | N/A |
| 01-22-93 | 0 | N/A |
| 01-25-93 | 0 | N/A |
| 01-29-93 | 0 | N/A |

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AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 01/07/93
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930108101
DATE RECEIVED: 01/08/93
TIME RECEIVED: 06:00 AM
REPORT DATE: 01/11/93

FORM 106-A

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.63 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 6.00 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .252 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .003 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .077 |
| Gold | . | . |
| Iron | . | .078 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .137 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 8.0 |
| FIELD EC | 460. |
| FIELD TEMP | 0. |
| FIELD FLOW | 4.5 6480/day SM |

APPROVED BY: Verna Hutton

DATE: 1-11-93

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HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 01/14/93
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930118121
DATE RECEIVED: 01/15/93
TIME RECEIVED: 12:00 PM
REPORT DATE: 01/20/93

TOTAL RECOVERABLE METALS,O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 8.14 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 25.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 3.56 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .374 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | <.001 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .027 |
| Gold | . | . |
| Iron | . | <.050 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .155 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 8.40 |
| FIELD EC | 700. |
| FIELD TEMP | 0.0 |
| FIELD FLOW | <1440./D |

APPROVED BY: K. Henderson

DATE: 1/20/93

FORM 106-A
GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 01/20/93
SAMPLE TIME:
SAMPLED BY:

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930121104
DATE RECEIVED: 01/21/93
TIME RECEIVED: 07:15 AM
REPORT DATE: 01/22/93

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

FORM 106-A

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | 392. |
| PH | 7.24 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | <.050 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 282. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .377 |
| Antimony | . | . |
| Arsenic | . | <.001 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | <.001 |
| Calcium | 125. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .021 |
| Gold | . | . |
| Iron | . | .119 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | 19.6 | . |
| Manganese | . | .057 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | .003 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .110 |

APPROVED BY: K Herdon
DATE: 1/22/93

GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 01/26/93
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930127106
DATE RECEIVED: 01/27/93
TIME RECEIVED: 08:30 AM
REPORT DATE: 01/28/93

TOTAL RECOVERABLE METAL, O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.46 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 15.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 5.25 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .067 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .002 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .008 |
| Gold | . | . |
| Iron | . | <.050 |
| Lead | . | .002 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .099 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 8.10 |
| FIELD EC | 650. |
| FIELD TEMP | 2.0 C |
| FIELD FLOW | 1152./DY |

APPROVED BY: Hazel McLaughlin
DATE: 01-28-93

FORM 1067A
GRELIND PRINTING CENTER · RAPID CITY S.D.

## TEST CONDITIONS: *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 48 hours

Sample Collection procedure: grab

Sample collection date: 20 January 1993

Dilution water: Bear Butte Creek - receiving water

Age of organisms at start: <24h old

Feeding: none

End Point: mortality

Start date and time: 21 January 1993 at 1400

End date and time: 23 January 1993 at 1300

Type of exposure chamber: 50ml disposable plastic cups

Volume of exposure chamber: 25 ml

Number of Animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

## SUMMARY RESULTS OF *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST: Outfall A

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB

Start: 21 Jan. 1993 at 1400
End: 23 Jan. 1993 at 1300
Test substance: Outfall A
Client/Project: Brohm Mining

Test results:

| Treatment | Rcv $H_2O$ Control | 12.5% outfall A | 25% outfall A | 50% outfall A | 75% outfall A | 100% outfall A |
|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 |
| % Survival | 100 | 100 | 100 | 100 | 100 | 100 |
| Diss.$O_2$ max. / min. | 7.4 / 7.3 | 7.3 / 7.1 | 7.4 / 7.1 | 7.3 / 7.1 | 7.2 / 7.1 | 7.1 / 7.0 |
| pH begin / end | 8.00 / 8.15 | | | | | 7.82 / 8.08 |
| Conductance max. / $\mu$mho min. | 355 / 353 | | | | | 904 / 873 |
| Temp. °C max. / min. | 20.5 / 20.5 | 20.5 / 20.5 | 20.5 / 20.5 | 20.5 / 20.5 | 20.5 / 20.5 | 20.5 / 20.5 |

Statistical Analysis:

- 48h LC50 (Probit Analysis) = ND; lack of mortality did not allow calculation.
- NOEC (Dunnett's Method) = 100% effluent

## TEST CONDITIONS: *PIMEPHALES PROMELAS* ACUTE TOXICITY TESTS

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 96 hours

Sample Collection procedure: grab

Sample collection date: 20 January 1993

Dilution water: Bear Butte Creek receiving water

Age of organisms at start: <5 days old

Feeding: 0.1 mL *Artemia* nauplii prior to test initiation and prior to the 48h renewal

End Point(s): mortality

Start date and time: 22 January 1993 at 1330*

End date and time: 26 January 1993 at 1430

Type of exposure chamber: 400 ml glass beakers

Volume of exposure solution: 300 ml

Number of Animals exposed/chamber: 10

Number of replicates/treatment: 2

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

Aeration: none

* The start date of the fathead minnow test was delayed by one day because the arrival of the samples was unexpected and the fish were not immediately on hand.

**SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TOXICITY TEST: Outfall A**

TEST: Acute 96h with fathead minnow larvae OPERATORS: DD, CB

Start: 22 Jan. 1993 at 1330
End: 26 Jan. 1993 at 1430
Test substance: Outfall A
Client/Project: Brohm Mining

Test results:

| Treatment | Rcv. $H_2O$ Control | 12.5% outfall A | 25% outfall A | 50% outfall A | 75% outfall A | 100% outfall A |
|---|---|---|---|---|---|---|
| alive/exposed | 19/20 | 18/20 | 19/20 | 19/20 | 19/20 | 19/20 |
| % Survival | 95 | 90 | 95 | 95 | 95 | 95 |
| Diss.$O_2$ max.<br>min. | 6.8<br>6.4 | 6.7<br>6.0 | 6.7<br>6.6 | 6.8<br>6.0 | 6.8<br>6.0 | 6.9<br>6.7 |
| pH begin<br>end | 8.32<br>8.15 | 8.30<br>8.15 | 8.30<br>8.15 | 8.25<br>8.13 | 8.22<br>8.08 | 8.40<br>8.28 |
| Conductance max.<br>$\mu$mho min. | 375<br>305 | | | | | 840<br>828 |
| Temp.(°C) max.<br>min. | 20.8<br>19.9 | 20.8<br>19.9 | 20.8<br>19.9 | 20.8<br>19.9 | 20.8<br>19.9 | 20.8<br>19.9 |

Statistical Analysis:

- 96h LC50 (Probit Method) = ND; lack of significant mortality did not allow calculation.
- NOEC (Dunnett's Method) = 100% effluent

## WET CHEMISTRY RESULTS ON SAMPLES RECEIVED 18 DECEMBER 1992

Samples were taken on 20 January and received on 21 January 1993.

| Measurement | Rcv. $H_2O$ | Outfall A |
|---|---|---|
| Temperature (°C) | 24 | 24 |
| Total Hardness ($mgCaCO_3/L$) | 128 | 386 |
| pH | 8.00 | 7.82 |
| Alkalinity ($mgCaCO_3/L$) | 102 | 82 |
| Conductivity ($\mu$mho) | 301 | 836 |
| Dissolved Oxygen ($mgO_2/L$) | 8.8 | 8.0 |
| Ammonia (mg $NH_3/L$) | 0 | 0 |
| Total Residual Chlorine (mg/L) | 0 | 0 |

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON *CERIODAPHNIA DUBIA*

Test date: 5 to 7 Jan., 1993

| g NaCl/L | control | 0.19 | 0.38 | 0.75 | 1.5 | 3.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 10/10 | 10/10 | 10/10 | 9/10 | 10/10 | 0/20 |
| % survival | 100 | 100 | 10 | 90 | 100 | 0 |

LC50 (trimmed Speaman-Karber) = 1.98g NaCl/L (95% CI, 1.73 to 2.26)

Note: This is within our accepted performance range (1.3 to 2.9) determined by 12 previous reference tests performed.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON FATHEAD MINNOW LARVAE

Test date: 22 to 26 Jan., 1993

| g NaCl/L | control | 6.0 | 7.0 | 7.5 | 8.0 | 9.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 19/20 | 19/20 | 20/20 | 19/20 | 13/20 | 7/20 |
| % survival | 95 | 95 | 100 | 95 | 65 | 35 |

96h LC50 (trimmed Spearman-Karber) = 8.49g NaCl/L (95% CI, 6.60 to 7.06)

Note: This is within our accepted performance range (6.8 to 8.5) determined by 12 previous reference tests performed.

**LITERATURE CITED:**

Hamilton, M.A., R.C. Russo, and R.V. Thurston. 1977. Trimmed Spearman-Karber method for estimating median lethal concentrations in toxicity bioassays. Environmental Science & Technology. 11:714-719; correction 12:417 (1978).

USEPA Region VIII. 1992. NPDES whole effluent toxics control program March, 1992. Denver, Colorado.

Weber, C.I., M. Heber, J. Lazorchak, T. Norber-King, G. Morrison, W. Peltier, F. Fulk, C. Poore, P. Lewis, J. Lazorchak, S. Ward, D. Bengtson, D. Klemm, Q. Pickering, M. Smith, D. Middaugh, D. Klemm. 1991. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms. 4th Edition. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. EPA/600/4-90/027.

BROHM MINING CORP.

March 12, 1993

Mr. Steve Burkett, Chief
NPDES Branch
Management Division
U.S.E.P.A.
999 18th St., Suite 500
Denver, CO 80202-2466

Mr. Burkett:

Enclosed are the monitoring results from February 1993 requested in the order "Docket No. CWA-V111-93-04-C."

If you have any further questions, please don't hesitate to call.

Sincerely,
Brohm Mining Corporation

Stan Michals
Compliance Specialist

SM/vhc

cc: Steve Pirner, SDDENR
Dale Cockrell

South Dakota Office: P.O. Box 485, Deadwood, South Dakota 57732
Telephone: (605) 578-2107 Telecopier: (605) 578-1709

Brohm Mining Corp. is a wholly owned affiliate of Minven Gold Corporation

BROHM MINING CORPORATION
MONITORING RESULTS FROM FEBRUARY 1993
"DOCKET NO. CWA-V111-93-04-C"

| OUTFALL "B" | FLOW GPD | FIELD pH |
|---|---|---|
| 02-01-93 | 0 | N/A |
| 02-05-93 | 0 | N/A |
| 02-08-93 | 0 | N/A |
| 02-12-93 | 0 | N/A |
| 02-15-93 | 0 | N/A |
| 02-19-93 | 0 | N/A |
| 02-22-93 | 0 | N/A |
| 02-26-93 | 0 | N/A |

ELI

QUALITY ASSURANCE REPORT - BROHM MINING

Report Date: 03-01-93

Project: RUBY GULCH

ELI #'s: 93-1580

| RADIOMETRIC: | METHOD | Dup #1 % | Dup #2 % | Spk #1 % | Spk #2 % | ANALYST | DATE SAMPLE ANALYZED |
|---|---|---|---|---|---|---|---|
| Gross Alpha | EPA-900.0 | 100 | --- | --- | --- | DB | 23-Feb-93 |

USEPA-ESML-LV INTERCOMPARISON STUDY RESULTS

| Radiometric | Method | ELI Value | Standard | Difference | Analyst | Date |
|---|---|---|---|---|---|---|
| Uranium | EPA-908.1 | 5.07 | 4.00 | 1.07 | DB | 14-Apr-92 |
| Ra226 | EPA-903.1 | 16.30 | 14.90 | 1.40 | DB | 14-Apr-92 |
| Ra228 | EPA-904.1 | 16.17 | 14.00 | 2.17 | DB | 14-Apr-92 |
| Gross Alpha | EPA-900.0 | 9.33 | 15.00 | -5.67 | DB | 15-May-92 |
| Gross Beta | EPA-900.0 | 35.00 | 44.00 | -9.00 | DB | 15-May-92 |

Report Approved By: R.O. Lanting

tld 1580qa.qc

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

**WATER ANALYSIS REPORT - BROHM MINING**

| | |
|---|---|
| SAMPLE I.D.: | Outfall "A" |
| Sample Date: | 02-17-93 |
| Report Date: | 02-24-93 |
| Sample Number: | 93-1580 |

| RADIOMETRIC pCi/l: | | Det.Limit |
|---|---|---|
| Gross Alpha | 10.7 | 1.0 |
| Gross Alpha Prec. +/- | 1.2 | |

Report Approved By: R.A. Starling
kmk

MID-CONTINENT TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 02/03/93
SAMPLE TIME:
SAMPLED BY:

MYRON ANDERSEN
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930204104
DATE RECEIVED: 02/04/93
TIME RECEIVED: 09:30 AM
REPORT DATE: 02/05/93

FORM 106-A

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.53 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 5.41 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .096 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | <.001 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .013 |
| Gold | . | . |
| Iron | . | <.050 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .069 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 7.90 |
| FIELD EC | 550. |
| FIELD TEMP | 2.0 |
| FIELD FLOW | 5760. |

APPROVED BY: [signature]
DATE: 02-05-93

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MID-CONTINENT TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 02/09/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930210101
DATE RECEIVED: 02/10/93
TIME RECEIVED: 06:15 AM
REPORT DATE: 02/11/93

TOTAL RECOVERABLE, O & G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.46 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 5.21 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | <.050 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .001 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .007 |
| Gold | . | . |
| Iron | . | <.050 |
| Lead | . | .001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .073 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD TEMP | 3.0 |
| FIELD EC | 610. |
| FIELD pH | 7.8 |
| FIELD FLOW | 7200/day SM |

APPROVED BY: K Lybydon
DATE: 2/11/93

FORM 106-A
GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 02/17/93
SAMPLE TIME: :
SAMPLED BY:

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930218106
DATE RECEIVED: 02/18/93
TIME RECEIVED: 06:45 AM
REPORT DATE: 02/19/93

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

FORM 106-A

## TOTAL RECOVERABLE METALS,O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | 476. |
| PH | 7.57 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 5.78 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 356. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .129 |
| Antimony | . | . |
| Arsenic | . | <.001 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | <.001 |
| Calcium | 152. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .010 |
| Gold | . | . |
| Iron | . | .154 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | 23.5 | . |
| Manganese | . | <.050 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | .001 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .069 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 7.40 |
| FIELD EC | 400. |
| FIELD TEMP | 0.0 |
| DISCHARGE | 4320./DY |

APPROVED BY: Verna Merton
DATE: 2-19-93

GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 02/23/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930224102
DATE RECEIVED: 02/24/93
TIME RECEIVED: 06:15 AM
REPORT DATE: 02/25/93

TOTAL RECOVERABLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.71 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 4.25 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .064 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .002 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .007 |
| Gold | . | . |
| Iron | . | .159 |
| Lead | . | .002 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .095 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD TEMP | 1.0 |
| FIELD EC | 620. |
| FIELD pH | 7.80 |
| FLOW | 2880./DY |

APPROVED BY: Amy M. Pryce
DATE: 02-25-93

FORM 1067A
GRELUND PRINTING CENTER - RAPID CITY S.D.

## TEST CONDITIONS: *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 48 hours

Sample Collection procedure: grab

Sample collection date: 17 February 1993

Dilution water: Bear Butte Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <24h old

Feeding: none

End Point: mortality

Start date and time: 18 February 1993 at 1130

End date and time: 20 February 1993 at 1130

Type of exposure chamber: 50ml disposable plastic cups

Volume of exposure chamber: 25 ml

Number of Animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

**SUMMARY RESULTS OF *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST: Outfall A**

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB

Start: 18 Feb. 1993 at 1130
End: 20 Feb. 1993 at 1130
Test substance: Outfall A
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 12.5% outfall A | 25% outfall A | 50% outfall A | 75% outfall A | 100% outfall A |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 |
| % Survival | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Diss. $O_2$ max. min. | 6.5 / 6.3 | 7.0 / 6.6 | 7.0 / 6.6 | 7.0 / 6.5 | 6.9 / 6.5 | 6.9 / 6.5 | 6.8 / 6.5 |
| pH begin end | 8.21 / 8.66 | 8.05 / 8.07 | | | | | 7.59 / 8.41 |
| Conduct max. µmho min. | 802 / 746 | 420 / 361 | | | | | 904 / 873 |
| Temp. °C max. min. | 20.8 / 20.1 | 20.8 / 20.1 | 20.8 / 20.1 | 20.8 / 20.1 | 20.8 / 20.1 | 20.8 / 20.1 | 20.8 / 20.1 |

Statistical Analysis:

- 48h LC50 = ND; lack of mortality did not allow calculation
- NOEC (Dunnett's Method) = ≥100% effluent

## TEST CONDITIONS: *PIMEPHALES PROMELAS* ACUTE TOXICITY TESTS

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 96 hours

Sample Collection procedure: grab

Sample collection date: 17 February 1993

Dilution water: Bear Butte Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <7 days old

Feeding: 0.1 mL *Artemia* nauplii prior to test initiation and prior to the 48h renewal

End Point(s): mortality

Start date and time: 18 February 1993 at 1200

End date and time: 22 February 1993 at 1200

Type of exposure chamber: 400 ml glass beakers

Volume of exposure solution: 300 ml

Number of Animals exposed/chamber: 10

Number of replicates/treatment: 2

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

Aeration: none

**SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TOXICITY TEST: Outfall A**

TEST: Acute 96h with fathead minnow larvae OPERATORS: DD, CB

Start: 18 Feb. 1993 at 1200
End: 22 Feb. 1993 at 1200
Test substance: Outfall A
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 12.5% outfall A | 25% outfall A | 50% outfall A | 75% outfall A | 100% outfall A |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 19/20 |
| % Survival | 100 | 100 | 100 | 100 | 100 | 100 | 95 |
| Diss.$O_2$ max.<br>min. | 6.3<br>6.1 | 6.3<br>5.8 | 6.1<br>5.8 | 6.7<br>6.6 | 6.8<br>6.0 | 6.8<br>6.0 | 6.9<br>6.7 |
| pH begin<br>end | 8.21<br>8.22 | 8.05<br>8.25 | | | | | 7.59<br>8.04 |
| Conduct. max.<br>µmho min. | 720<br>700 | 369<br>305 | | | | | 970<br>935 |
| Temp.(°C) max.<br>min. | 21.0<br>20.1 | 21.0<br>20.1 | 21.0<br>20.1 | 21.0<br>20.1 | 21.0<br>20.1 | 21.0<br>20.1 | 21.0<br>20.1 |

Statistical Analysis:

- 96h LC50 = ND; lack of mortality did not allow calculation.
- NOEC (Dunnett's Method) = 100% effluent

## WET CHEMISTRY RESULTS ON SAMPLES RECEIVED

Samples were taken on 17 February and received on 18 February 1993: Outfall B was not received.

| Measurement | Rcv. $H_2O$ | Outfall A |
|---|---|---|
| Temperature (°C) | 19.0 | 19.0 |
| Total Hardness ($mgCaCO_3/L$) | 118 | 440 |
| pH | 8.05 | 7.59 |
| Alkalinity ($mgCaCO_3/L$) | 98 | 78 |
| Conductivity ($\mu$mho) | 312 | 862 |
| Dissolved Oxygen ($mgO_2/L$) | 11.0 | 10.7 |
| Ammonia (mg $NH_3/L$) | 0 | 0 |
| Total Residual Chlorine (mg/L) | 0 | 0.05 |

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON *CERIODAPHNIA DUBIA*

Test date: 23 to 25 Feb., 1993

| g NaCl/L | control | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 10/10 | 10/10 | 19/10 | 18/20 | 9/10 | 6/20 |
| % survival | 100 | 100 | 95 | 90 | 90 | 30 |

LC50 (Probit Analysis) = 2.56g NaCl/L (95% CI, 2.34 to 2.88)

Note: This is within our accepted performance range (1.5 to 2.9) determined by 12 previous reference tests performed.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON FATHEAD MINNOW LARVAE

Test date: 19 to 23 Feb., 1993

| g NaCl/L | control | 6.0 | 7.0 | 7.5 | 8.0 | 9.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 19/20 | 19/20 | 20/20 | 19/20 | 13/20 | 7/20 |
| % survival | 95 | 95 | 100 | 95 | 65 | 35 |

96h LC50 (Probit Analysis) = 8.38g NaCl/L (95% CI, 8.10 to 8.78)

Note: This is within our accepted performance range (6.8 to 8.5) determined by 12 previous reference tests performed.

BROHM MINING CORP.

April 19, 1993

Mr. Steve Burkett, Chief
NPDES Branch
Management Division
U.S.E.P.A.
999 18th St., Suite 500
Denver, CO 80202-2466

Mr. Burkett:

Enclosed are the monitoring results from March 1993 requested in the order "Docket No. CWA-V111-93-04-C."

If you have any further questions, please don't hesitate to call.

Sincerely,
Brohm Mining Corporation

Stan Michals
Compliance Specialist

SM:sm

ENVI\EPAMARRP.SM

cc: Steve Pirner, SDDENR
Dale Cockrell

South Dakota Office: P.O. Box 485, Deadwood, South Dakota 57732
Telephone: (605) 578-2107 Telecopier: (605) 578-1709

Brohm Mining Corp. is a wholly owned affiliate of Minven Gold Corporation

MID-CONTINENT TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 03/02/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930303101
DATE RECEIVED: 03/03/93
TIME RECEIVED: 06:40 AM
REPORT DATE: 03/04/93

TOTAL RECOVERABLE METALS,O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.50 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .055 |
| Nitrogen, Nitrate, mg/l | 4.60 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .149 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .002 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .005 |
| Gold | . | . |
| Iron | . | .120 |
| Lead | . | .001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .321 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 7.10 |
| FIELD EC | 210. |
| FIELD TEMP | 2.0 C |
| FLOW | 1296./DY |

APPROVED BY: Sherry Schaefer
DATE: 3/4/93

FORM 106-A
GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 03/09/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930310101
DATE RECEIVED: 03/10/93
TIME RECEIVED: 07:10 AM
REPORT DATE: 03/11/93

TOTAL RECOVERABLE METALS,O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 6.79 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .079 |
| Nitrogen, Nitrate, mg/l | 5.46 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .290 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .010 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .143 |
| Gold | . | . |
| Iron | . | <.050 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .416 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 6.40 |
| FIELD EC | 430. |
| FIELD TEMP | 2.0 |
| DISCHARGE | 7200.GPD |

APPROVED BY: Dean Quinn

DATE: 3/11/93

FORM 106-A
GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 03/16/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930317101
DATE RECEIVED: 03/17/93
TIME RECEIVED: 08:00 AM
REPORT DATE: 03/18/93

TOTAL REC....OIL & GREASE-NONE VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | 421. |
| PH | 7.24 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 8.66 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 300. |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD TEMP | 1.0 |
| FIELD EC | 650. |
| FIELD pH | 7.6 |
| FLOW | 7560. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | <.050 |
| Antimony | . | . |
| Arsenic | . | <.001 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .002 |
| Calcium | 132. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .011 |
| Gold | . | . |
| Iron | . | <.050 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | 22.2 | . |
| Manganese | . | .084 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | <.001 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .096 |

APPROVED BY: Verna Merton
DATE: 3-18-93

FORM 106-A
GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 03/22/93
SAMPLE TIME:
SAMPLED BY:

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930323102
DATE RECEIVED: 03/23/93
TIME RECEIVED: 06:00 AM
REPORT DATE: 03/24/93

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

FORM 106-A

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 6.92 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 13.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 9.07 |
| Nitrogen, Nitrite, mg/l | .057 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 1.13 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .002 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .020 |
| Gold | . | . |
| Iron | . | .847 |
| Lead | . | .002 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .114 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 6.00 |
| FIELD EC | 550. |
| FIELD TEMP | 1.0 C |
| DISCHARGE | 15840.DY |

APPROVED BY: [signature]
DATE: 03-24-93

GRELIND PRINTING CENTER - RAPID CITY S.D.

## TEST CONDITIONS: *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 48 hours

Sample Collection procedure: grab

Sample collection date: 16 March 1993

Dilution water: BB Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <24h old

Feeding: none

End Point: mortality

Start date and time: 17 March 1993 at 1315

End date and time: 19 March 1993 at 1300

Type of exposure chamber: 50ml disposable plastic cups

Volume of exposure chamber: 25 ml

Number of Animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

## SUMMARY RESULTS OF *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST: Outfall A

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB

Start: 17 Mar. '1993 at 1315
End: 19 Mar. 1993 at 1300
Test substance: Outfall A
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 12.5% Outfall A | 25% Outfall A | 50% Outfall A | 75% Outfall A | 100% Outfall A |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 |
| % Survival | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Diss. $O_2$ max. / min. | 6.9 / 6.3 | 7.3 / 6.4 | 7.2 / 6.4 | 7.2 / 6.3 | 7.1 / 6.3 | 7.2 / 6.3 | 7.2 / 6.4 |
| pH begin / end | 8.48 / 8.42 | 8.09 / 8.36 | | | | | 7.69 / 7.92 |
| Conduct µmho max./min. | 629 / 611 | 311 / 286 | | | | | 831 / 842 |
| Temp. °C max. / min. | 20.0 / 20.0 | 20.0 / 20.0 | 20.0 / 20.0 | 20.0 / 20.0 | 20.0 / 20.0 | 20.0 / 20.0 | 20.0 / 20.0 |

Statistical Analysis:

- 48h LC50 = ND; lack of mortality did not allow calculation
- NOEC (Dunnett's Method) = ≥100% Outfall A

## TEST CONDITIONS: *PIMEPHALES PROMELAS* ACUTE TOXICITY TESTS

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 96 hours

Sample Collection procedure: grab

Sample collection date: 16 March 1993

Dilution water: BB Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <7 days old

Feeding: 0.1 mL *Artemia* nauplii prior to test initiation and prior to the 48h renewal

End Point(s): mortality

Start date and time: 17 March 1993 at 1330

End date and time: 21 March 1993 at 1300

Type of exposure chamber: 400 ml glass beakers

Volume of exposure solution: 300 ml

Number of Animals exposed/chamber: 10

Number of replicates/treatment: 3

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

Aeration: none

**SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TOXICITY TEST: Outfall A**

TEST: Acute 96h with fathead minnow larvae OPERATORS: DD, CB, MS

Start: 17 Mar. 1993 at 1330
End: 21 Mar. 1993 at 1300
Test substance: Outfall A
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 12.5% Outfall A | 25% Outfall A | 50% Outfall A | 75% Outfall A | 100% Outfall A |
|---|---|---|---|---|---|---|---|
| alive/exposed | 30/30 | 30/30 | 29/30 | 30/30 | 29/30 | 30/30 | 30/30 |
| % Survival | 100 | 100 | 97 | 100 | 97 | 100 | 100 |
| Diss.$O_2$ max. / min. | 6.4 / 6.2 | 6.7 / 6.2 | 6.4 / 6.2 | 6.3 / 6.1 | 6.4 / 6.2 | 6.3 / 6.2 | 6.5 / 6.2 |
| pH begin / end | 8.48 / 8.36 | 8.09 / 8.14 | | | | | 7.69 / 7.78 |
| Conduct. µmho max./min. | 645 / 622 | 316 / 298 | | | | | 887 / 856 |
| Temp.(°C) max. / min. | 20.4 / 20.0 | 20.4 / 20.0 | 20.4 / 20.0 | 20.4 / 20.0 | 20.4 / 20.0 | 20.4 / 20.0 | 20.4 / 20.0 |

Statistical Analysis:

- 96h LC50 = ND; lack of mortality did not allow calculation.
- NOEC (Dunnett's Method) = ≥100% Outfall A

## WET CHEMISTRY RESULTS ON SAMPLES RECEIVED 17 MARCH 1993

Samples were taken on 16 March 1993: Outfall B was sampled on 23 March and received on 24 March.

| Measurement | Recon. $H_2O$ | BB Crk. Rcv. $H_2O$ | Outfall A |
|---|---|---|---|
| Temperature (°C) | 23.0 | 20.0 | 20.0 |
| Total Hardness ($mgCaCO_3/L$) | 94 | 104 | 390 |
| pH | 8.48 | 8.09 | 7.69 |
| Alkalinity ($mgCaCO_3/L$) | 94 | 88 | 54 |
| Conductivity ($\mu$mho) | 602 | 299 | 839 |
| Dissolved Oxygen ($mgO_2/L$) | 6.7 | 9.9 | 8.5 |
| Ammonia (mg $NH_3$-N/L | 0 | 0.16 | 0.20 |
| Unionized Ammonia (mg $NH_3$) | 0 | <0.01 | 0.01 |
| Total Residual Chlorine (mg/L) | 0 | 0 | 0 |

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON *CERIODAPHNIA DUBIA*

Test date: 16 to 18 Mar. 1993

| g NaCl/L | control | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 10/10 | 10/10 | 19/10 | 18/20 | 17/20 | 8/20 |
| % survival | 100 | 100 | 95 | 90 | 85 | 40 |

LC50 (Probit Analysis) = 3.03g NaCl/L (95% CI, 2.67 to 4.08)

Note: This is within our accepted performance range (1.2 to 3.2) determined by 12 previous reference tests performed.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON FATHEAD MINNOW LARVAE

Test date: 17 to 21 Mar. 1993

| g NaCl/L | control | 6.0 | 7.0 | 7.5 | 8.0 | 9.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 20/20 | 19/20 | 17/20 | 14/20 | 9/20 | 6/20 |
| % survival | 100 | 95 | 85 | 70 | 45 | 30 |

96h LC50 (Probit Analysis) = 8.12g NaCl/L (95% CI, 7.74 to 8.71)

Note: This is within our accepted performance range (7.0 to 8.8) determined by 12 previous reference tests performed.

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

**WATER ANALYSIS REPORT - BROHM MINING**

| | |
|---|---|
| SAMPLE I.D.: | Outfall "A" |
| Sample Date: | 03-18-93 |
| Report Date: | 04-01-93 |
| Sample Number: | 93-7977 |

| RADIOMETRIC pCi/l: | | Det.Limit |
|---|---|---|
| Gross Alpha | 1.3 | 1.0 |
| Gross Alpha Prec. +/- | 0.5 | |

Report Approved By: R.A. Hartling
kmk

BROHM MINING CORPORATION
MONITORING RESULTS FROM MARCH 1993
"DOCKET NO. CWA-V111-93-04-C"

| OUTFALL "B" | FLOW GPD | FIELD pH |
|---|---|---|
| 03-01-93 | 0 | N/A |
| 03-05-93 | 0 | N/A |
| 03-08-93 | 0 | N/A |
| 03-12-93 | 0 | N/A |
| 03-15-93 | 0 | N/A |
| 03-19-93 | 0 | N/A |
| 03-22-93 | 56880 | 3.4 |
| 03-26-93 | 284040 | 3.4 |
| 03-29-93 | 254880 | 3.5 |

ENV\EPAMARRP.SM

MID-CONTINENT TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS AND ENVIRONMENTAL TESTING
2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 03/22/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930323103
DATE RECEIVED: 03/23/93
TIME RECEIVED: 06:00 AM
REPORT DATE: 03/24/93

## TOTAL RECOVERABLE METALS,O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | 668. |
| PH | 3.02 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 98.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .743 |
| Nitrogen, Nitrate, mg/l | 1.46 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 1174. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 55.5 |
| Antimony | . | . |
| Arsenic | . | .225 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .058 |
| Calcium | 189. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 4.41 |
| Gold | . | . |
| Iron | . | 53.3 |
| Lead | . | .010 |
| Lithium | . | . |
| Magnesium | 47.7 | . |
| Manganese | . | 14.8 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | .005 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 4.00 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.40 |
| FIELD EC | 1650. |
| FIELD TEMP | 3.0 C |
| DISCHARGE | 56880.GD. |

APPROVED BY: [signature]
DATE: 03-24-93

FORM 106-A
CARELINO PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 04/01/93
SAMPLE TIME:
SAMPLED BY:

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930402114
DATE RECEIVED: 04/02/93
TIME RECEIVED: 06:00 AM
REPORT DATE: 04/06/93

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

TOTAL RECOVERABLE METALS,O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.33 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 175. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .265 |
| Nitrogen, Nitrate, mg/l | 2.32 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 19.6 |
| Antimony | . | . |
| Arsenic | . | .031 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .040 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 1.44 |
| Gold | . | . |
| Iron | . | 14.9 |
| Lead | . | .006 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .143 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.7 |
| FIELD EC | 1150. |
| FIELD TEMP | 5.C |
| DISCHARGE | 113760. |

APPROVED BY: [signature]

DATE: 04-06-93

FORM 106-A
GRELUND PRINTING CENTER · RAPID CITY S.D.

**LITERATURE CITED:**

USEPA Region VIII. 1992. NPDES whole effluent toxics control program March, 1992. Denver, Colorado.

Weber, C.I. ed. 1991. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms. 4th Edition. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. EPA/600/4-90/027.

## TEST CONDITIONS: *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST: Outfall B

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 48 hours

Sample Collection procedure: grab

Sample collection date: 23 March 1993

Dilution water: BB Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <24h old

Feeding: none

End Point: mortality

Start date and time: Untreated -- 24 March 1993 at 1230 pH treated -- 24 March 1993 at 1300

End date and time: Untreated -- 26 March 1993 at 1230 pH treated -- 26 March 1993 at 1245

Type of exposure chamber: 50ml disposable plastic cups

Volume of exposure chamber: 25 ml

Number of Animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

**SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: Untreated Outfall B**

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB

Start: 24 Mar. 1993 at 1230
End: 26 Mar. 1993 at 1230
Test substance: Untreated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 75% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 0/20 | 0/20 | 0/20 | 0/20 | 0/20 |
| % Survival | 100 | 100 | 0 | 0 | 0 | 0 | 0 |
| Diss.$O_2$ max. min. | 7.0 6.2 | 7.1 6.2 | 7.2 | 7.2 | 7.1 | 7.0 | 7.2 |
| pH begin end | 8.53 8.20 | 8.13 7.74 | 7.73 | 4.94 | 3.99 | 3.42 | 3.36 3.27 |
| Conduct µmho max./min. | 671 642 | 302 277 | | | | | 1931 |
| Temp. °C max. min. | 20.8 20.5 | 20.5 20.8 | 20.5 | 20.5 | 20.5 | 20.5 | 20.5 |

Statistical Analysis: recorded as % untreated Outfall B

- 48h LC50 = <12.5% – A precise LC50 could not be found since no partial mortalities occurred.
- NOEC (Dunnett's Method) = <12.5% Untreated Outfall B

## SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: pH treated Outfall B

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB

Start: 24 Mar. 1993 at 1300
End: 26 Mar. 1993 at 1245
Test substance: pH treated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 75% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 18/20 | 19/20 | 15/20 | 16/20 | 0/20 |
| % Survival | 100 | 100 | 90 | 95 | 75 | 80 | 0 |
| Diss.$O_2$ max. / min. | 7.0 / 6.2 | 7.3 / 6.4 | 7.0 / 6.3 | 6.9 / 6.4 | 6.9 / 6.4 | 6.8 / 6.3 | 6.8 / 6.3 |
| pH begin / end | 8.53 / 8.20 | 7.99 / 8.00 | 7.89 to 7.92[x] | 7.81 to 7.82[x] | 7.59 to 7.76[x] | 7.32 to 7.57[x] | 7.25 / 7.03 |
| Conduct µmho max./min. | 671 / 642 | 302 / 300 | | | | | 2060 / 2300 |
| Temp. °C max. / min. | 20.8 / 20.5 | 20.8 / 20.5 | 20.8 / 20.5 | 20.8 / 20.5 | 20.8 / 20.5 | 20.8 / 20.5 | 20.8 / 20.5 |

Statistical Analysis: recorded as % pH treated Outfall B

- 48h LC50 (trimmed Spearman/Karber method) = 73.1% (95% CI, 62.9 to 85.0)
- NOEC (Dunnett's Method) = ≥25%

[x] The pH measurements of the middle ranges of the Outfall dilutions are given as a range. Initial pH's were recorded for the controls and the 100% only.

## TEST CONDITIONS: *PIMEPHALES PROMELAS* ACUTE TOXICITY TESTS: Outfall B

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 96 hours

Sample Collection procedure: grab

Sample collection date: 23 March 1993

Dilution water: BB Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <4 days old

Feeding: 0.1 mL *Artemia* nauplii prior to test initiation and prior to the 48h renewal

End Point(s): mortality

Start date and time: untreated -- 24 March 1993 at 1300 pH treated -- 24 March 1993 at 1330

End date and time: untreated -- 28 March 1993 at 1230 pH treated -- 28 March 1993 at 1200

Type of exposure chamber: 400 ml glass beakers

Volume of exposure solution: 250 ml

Number of Animals exposed/chamber: 10

Number of replicates/treatment: 4

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

Aeration: none

**SUMMARY RESULTS OF FATHEAD MINNOW ACUTE TEST: Untreated Outfall B**

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, MS

Start: 24 Mar. 1993 at 1300
End: 28 Mar. 1993 at 1230
Test substance: untreated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 75% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 40/40 | 0/40 | 0/40 | 0/40 | 0/40 | 0/40 |
| % Survival | 100 | 100 | 0 | 0 | 0 | 0 | 0 |
| Diss. $O_2$ max. / min. | 6.2 / 5.8 | 6.7 / 6.2 | 6.6 | 6.8 | 6.9 | 6.9 | 6.9 |
| pH begin / end | 8.53 / 8.30 | 7.99 / 8.31 | 7.25 | 4.87 | 4.00 | 3.37 | 3.36 / 3.27 |
| Conduct. µmho max./min. | 671 / 625 | 303 / 257 | | | | | 1805 |
| Temp. (°C) max. / min. | 20.8 / 20.2 | 20.8 / 20.2 | 20.5 | 20.5 | 20.5 | 20.5 | 20.5 |

Statistical Analysis: recorded as % untreated Outfall B

- 96h LC50 = <12.5% – A precise LC50 could not be found since no partial mortalities occurred.
- NOEC (Dunnett's Method) = <12.5% untreated Outfall B

## SUMMARY RESULTS OF FATHEAD MINNOW ACUTE TEST: pH treated Outfall B

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, MS

Start: 24 Mar. 1993 at 1400
End: 28 Mar. 1993 at 1330
Test substance: pH treated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 75% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 40/40 | 40/40 | 38/40 | 39/40 | 37/40 | 39/40 |
| % Survival | 100 | 100 | 100 | 95 | 98 | 93 | 98 |
| Diss.$O_2$ max. / min. | 6.2 / 5.8 | 6.3 / 6.0 | 6.5 / 6.1 | 6.5 / 6.0 | 6.4 / 6.1 | 6.3 / 6.0 | 6.4 / 6.0 |
| pH begin / end | 8.53 / 8.30 | 7.99 / 8.04 | 7.82 to 8.21[x] | 7.70 to 8.13[x] | 7.37 to 7.96[x] | 7.10 to 7.76[x] | 7.25 / 7.59 |
| Conduct. µmho max./min. | 671 / 625 | 316 / 298 | | | | | 887 / 856 |
| Temp.(°C) max. / min. | 20.8 / 20.2 | 20.8 / 20.2 | 20.8 / 20.2 | 20.8 / 20.2 | 20.8 / 20.2 | 20.8 / 20.2 | 20.8 / 20.2 |

Statistical Analysis: recorded as % pH treated Outfall B

- 96h LC50 = ND; lack of mortality did not allow calculation.
- NOEC (Dunnett's Method) = ≥100%

[x] The pH measurements of the middle ranges of the Outfall dilutions are given as a range. Initial pH's were recorded for the controls and the 100% only.

## WET CHEMISTRY RESULTS ON SAMPLES RECEIVED 24 MARCH 1993

Samples were taken on 23 March 1993: Outfall A was sampled on 16 and tested on 17 to 21 March.

| Measurement | Reconstituted $H_2O$[¤] | BB Creek[¤] Receiving $H_2O$ | Untreated Outfall B | pH treated Outfall B[¤] |
|---|---|---|---|---|
| Temperature (°C) | 24.0 / 23.0 | 20.0 / 20.0 | 20.0 | 20.0 / 20.0 |
| Total Hardness ($mgCaCO_3/L$) | 202 / 198 | 106 / 108 | 700 | 740 / 720 |
| pH | 8.53 / 8.50 | 7.99 / 8.00 | 3.36 | 7.25[#] / 7.13[#] |
| Alkalinity ($mgCaCO_3/L$) | 136 / 130 | 80 / 84 | ND[°] | 76 / 68 |
| Conductivity (μmho) | 610 / 621 | 287 / 373 | 1442 | 2010 / 1948 |
| Dissolved Oxygen ($mgO_2/L$) | 7.5 / 6.9 | 11.2[△] / 7.8 | 11.7[△] | 7.5 / 6.2 |
| Ammonia (mg $NH_3$-N/L | 0 | 0.22 / 0.35 | 2.11 | 2.49 / 1.57 |
| Unionized Ammonia (mg $NH_3^+$) | 0 | 0.01 / 0.01 | 0.00 | 0.02 / 0.01 |
| Total Residual Chlorine (mg/L) | 0 | 0.05 / 0 | 0.08 | 0.52 / 0.48[c] |

¤ For these samples, two batches were prepared. They are recorded as 1st batch/2nd batch. The first set was prepared on 24 March and the second set was prepared on 26 March, 1993.

° Alkalinity for the untreated Outfall B could not be determined because the methodology requires that the pH be > 4.5.

△ Samples arrived supersaturated and were aerated for 1 to 1½ hours to bring the saturation to a near normal level to begin the test.

# The pH was artificially raised with 1N NaOH to achieve a pH of 7 to 8 for use as pH treated Outfall B.

c A large increase in total residual chlorine was detected following pH treatment. Because chlorine was not detected in the untreated sample, we suspected that an interference to our Hach Colorimeter was created after raising the pH. To prove this, we tried to remove the chlorine from 100 mL sample of the pH treated Outfall with sodium thiosulfate. After adding 10X the recommended amount of sodium thiosulfate for removal of 0.5 mg TRC/L and not detecting a decrease in TRC with the meter, we concluded that the readings were being influenced by some other constituent released with the increase in pH.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON *CERIODAPHNIA DUBIA*

Test date: 16 to 18 Mar. 1993

| g NaCl/L | control | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 10/10 | 10/10 | 19/10 | 18/20 | 17/20 | 8/20 |
| % survival | 100 | 100 | 95 | 90 | 85 | 40 |

LC50 (Probit Analysis) = 3.03g NaCl/L (95% CI, 2.67 to 4.08)

Note: This is within our accepted performance range (1.2 to 3.2) determined by 12 previous reference tests performed.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON FATHEAD MINNOW LARVAE

Test date: 24 to 28 Mar. 1993

| g NaCl/L | control | 6.0 | 7.0 | 7.5 | 8.0 | 9.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 20/20 | 20/20 | 19/20 | 15/20 | 13/20 | 1/20 |
| % survival | 100 | 100 | 95 | 75 | 65 | 5 |

96h LC50 (Probit Analysis) = 8.05g NaCl/L (95% CI, 7.83 to 8.33)

Note: This is within our accepted performance range (7.0 to 8.8) determined by 12 previous reference tests performed.

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

**WATER ANALYSIS REPORT - BROHM MINING**

| | |
|---|---|
| SAMPLE I.D.: | Outfall "B" |
| Sample Date: | 03-23-93 |
| Report Date: | 04-01-93 |
| Sample Number: | 93-8207 |

| RADIOMETRIC pCi/l: | | Det.Limit |
|---|---|---|
| Gross Alpha | 16.4 | 1.0 |
| Gross Alpha Prec. +/- | 0.9 | |

Report Approved By: R.A. Barking
kmk

ELI

QUALITY ASSURANCE REPORT - BROHM MINING

Report Date: 04-05-93

ELI #'s: 93-8207 & 93-7977

| RADIOMETRIC: | METHOD | Dup #1 % | Dup #2 % | Spk #1 % | Spk #2 % | ANALYST | DATE SAMPLE ANALYZED |
|---|---|---|---|---|---|---|---|
| Gross Alpha | EPA-900.0 | 100 | 100 | --- | --- | DB | 30-Mar-93 |

USEPA-ESML-LV INTERCOMPARISON STUDY RESULTS

| Radiometric | Method | ELI Value | Standard | Difference | Analyst | Date |
|---|---|---|---|---|---|---|
| Uranium | EPA-908.1 | 5.07 | 4.00 | 1.07 | DB | 14-Apr-92 |
| Ra226 | EPA-903.1 | 16.30 | 14.90 | 1.40 | DB | 14-Apr-92 |
| Ra228 | EPA-904.1 | 16.17 | 14.00 | 2.17 | DB | 14-Apr-92 |
| Gross Alpha | EPA-900.0 | 9.33 | 15.00 | -5.67 | DB | 15-May-92 |
| Gross Beta | EPA-900.0 | 35.00 | 44.00 | -9.00 | DB | 15-May-92 |

Report Approved By: R.A. Warburg

tld 8207qa.qc

BROHM MINING CORP.

May 20, 1993

Mr. Steve Burkett, Chief
NPDES Branch
Management Division
U.S.E.P.A.
999 18th St., Suite 500
Denver, CO 80202-2466

Mr. Burkett:

Enclosed are the monitoring results from April 1993 requested in the order "Docket No. CWA-V111-93-04-C."

If you have any further questions, please don't hesitate to call.

Sincerely,

BROHM MINING CORP.

Stan Michals
Compliance Specialist

SM:sm

ENVI\EPAMARRP.SM

cc: Steve Pirner, SDDENR
Dale Cockrell

South Dakota Office: P.O. Box 485, Deadwood, South Dakota 57732
Telephone: (605) 578-2107 Telecopier: (605) 578-1709

Brohm Mining Corp. is a wholly owned affiliate of Minven Gold Corporation

BROHM MINING CORPORATION
MONITORING RESULTS FROM MARCH 1993
DOCKET NO. CWA-VIII-93-04-C"

| OUTFALL "A" | FLOW GPD | FIELD PH |
|---|---|---|
| 4-1-93 | 69120 | 4.6 |
| 4-6-93 | 77760 | 5.5 |
| 4-12-93 | 126720 | 6.4 |
| 4-19-93 | 64800 | 6.4 |
| 4-27-93 | 86400 | 6.5 |

| OUTFALL "B" | FLOW GPD | FIELD PH |
|---|---|---|
| 4-1-93 | 113760 | 3.7 |
| 4-5-93 | 206784 | 3.5 |
| 4-8-93 | 564480 | 4.2 |
| 4-13-93 | 420480 | 4 |
| 4-16-93 | 332867 | 3.7 |
| 4-19-93 | 388800 | 4.2 |
| 4-23-93 | 461281 | 4.3 |
| 4-27-93 | 309600 | 3.2 |
| 4-30-93 | 374400 | 3.75 |

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 04/01/93
SAMPLE TIME:
SAMPLED BY:

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930402113
DATE RECEIVED: 04/02/93
TIME RECEIVED: 06:00 AM
REPORT DATE: 04/06/93

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

TOTAL RECOVERABLE METAL, O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 4.03 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 18.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .108 |
| Nitrogen, Nitrate, mg/l | 11.1 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 23.4 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .056 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 6.27 |
| Gold | . | . |
| Iron | . | 3.35 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.33 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 4.6 |
| FIELD EC | 970. |
| FIELD TEMP | 3.C |
| DISCHARGE | 69120. |

APPROVED BY: [signature]

DATE: 04-06-93

FORM 106-A
GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 04/06/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930407106
DATE RECEIVED: 04/07/93
TIME RECEIVED: 08:30 AM
REPORT DATE: 04/08/93

FORM 1067A

TOTAL RECOVERABLE METALS,O&G NON-VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 5.10 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 30.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .126 |
| Nitrogen, Nitrate, mg/l | 10.2 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 7.87 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .050 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 2.76 |
| Gold | . | . |
| Iron | . | 1.05 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.09 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD TEMP | 3.C |
| FIELD EC | 850. |
| FIELD PH | 5.5 |
| DISCHARGE | 54.0 GPM |

APPROVED BY: Dena Peterson
DATE: 4/8/93

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MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 04/12/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930413201
DATE RECEIVED: 04/12/33
TIME RECEIVED: 06:25 AM
REPORT DATE: 04/14/93

FORM 106-A

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | 1720. |
| Hardness | 901. |
| PH | 6.13 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 594. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .109 |
| Nitrogen, Nitrate, mg/l | 10.6 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 902. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 40.2 |
| Antimony | . | . |
| Arsenic | . | .043 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .073 |
| Calcium | | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 3.53 |
| Gold | . | . |
| Iron | . | 25.9 |
| Lead | . | .019 |
| Lithium | . | . |
| Magnesium | | . |
| Manganese | . | 7.56 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | .002 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.90 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD TEMP | 3.C |
| FIELD PH | 6.4 |
| DISCHARGE | 88.GPM |

APPROVED BY: [signature]

DATE: 04-14-93

GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 04/19/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930420125
DATE RECEIVED: 04/20/93
TIME RECEIVED: 07:10 AM
REPORT DATE: 04/21/93

FORM 106-A

GRELIND PRINTING CENTER - RAPID CITY S.D.

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 6.63 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 11. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .131 |
| Nitrogen, Nitrate, mg/l | 9.50 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 8.07 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .027 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 1.88 |
| Gold | . | . |
| Iron | . | 4.10 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .765 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 6.40 |
| FIELD EC | 700. |
| FIELD TEMP | 3.4 |
| DISCHARGE | 45.0 GPM |

APPROVED BY: Amy M. Fogel

DATE: 04-21-93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 04/27/93
SAMPLE TIME: 12:00 PM
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930429101
DATE RECEIVED: 04/28/93
TIME RECEIVED: 05:30 AM
REPORT DATE: 04/30/93

FORM 106-A

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.10 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 186. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .121 |
| Nitrogen, Nitrate, mg/l | 10.3 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 21.0 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .055 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 3.98 |
| Gold | . | . |
| Iron | . | 23.7 |
| Lead | . | .005 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | .0003 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.26 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 6.50 |
| FIELD EC | 2000.+ |
| FIELD TEMP | 6.8 |
| DISCHARGE | 60.0 GPM |

APPROVED BY: Dean Chenard

DATE: 5/1/93

GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 04/01/93
SAMPLE TIME:
SAMPLED BY:

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930402114
DATE RECEIVED: 04/02/93
TIME RECEIVED: 06:00 AM
REPORT DATE: 04/06/93

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

TOTAL RECOVERABLE METALS,O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.33 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 175. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .265 |
| Nitrogen, Nitrate, mg/l | 2.32 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 19.6 |
| Antimony | . | . |
| Arsenic | . | .031 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .040 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 1.44 |
| Gold | . | . |
| Iron | . | 14.9 |
| Lead | . | .006 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .143 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.7 |
| FIELD EC | 1150. |
| FIELD TEMP | 5.C |
| DISCHARGE | 113760. |

APPROVED BY: [signature]
DATE: 04-06-93

FORM 1067A
GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 04/06/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930407107
DATE RECEIVED: 04/07/93
TIME RECEIVED: 08:30 AM
REPORT DATE: 04/08/93

FORM 106-A

GRELIND PRINTING CENTER - RAPID CITY S.D.

## TOTAL RECOVERABLE METALS,O&G NON-VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.60 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 141. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .205 |
| Nitrogen, Nitrate, mg/l | 1.72 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 19.2 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .021 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 1.50 |
| Gold | . | . |
| Iron | . | 14.9 |
| Lead | . | .083 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.28 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD TEMP | 1.C |
| FIELD EC | 670. |
| FIELD PH | 4.1 |

APPROVED BY: Verna Peterson
DATE: 4/8/93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 04/13/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930414106
DATE RECEIVED: 04/14/93
TIME RECEIVED: 05:50 AM
REPORT DATE: 04/15/93

FORM 1067A

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | 432. |
| PH | 3.32 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 40.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .114 |
| Nitrogen, Nitrate, mg/l | 1.85 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 594. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 18.2 |
| Antimony | . | . |
| Arsenic | . | .097 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .021 |
| Calcium | 120. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 1.60 |
| Gold | . | . |
| Iron | . | 19.0 |
| Lead | . | .006 |
| Lithium | . | . |
| Magnesium | 32.1 | . |
| Manganese | . | 4.57 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | <.001 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.26 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 4.00 |
| FIELD EC | 980. |
| FIELD TEMP | 3.0 |
| DISCHARGE | 292. GPM |

APPROVED BY: [signature]

DATE: 04-15-93

GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 04/19/93
SAMPLE TIME: 11:00 AM
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930420126
DATE RECEIVED: 04/20/93
TIME RECEIVED: 07:10 AM
REPORT DATE: 04/21/93

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.48 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 39. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .106 |
| Nitrogen, Nitrate, mg/l | 1.70 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 17.4 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .024 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 1.96 |
| Gold | . | . |
| Iron | . | 14.4 |
| Lead | . | .002 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.10 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 4.20 |
| FIELD EC | 710. |
| FIELD TEMP | 4.0 C |
| DISCHARGE | 270.6GPM |

APPROVED BY: [signature]

DATE: 04-21-93

FORM 106-A
GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 04/27/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930429103
DATE RECEIVED: 04/28/93
TIME RECEIVED: 05:30 AM
REPORT DATE: 04/30/93

FORM 106-A

GRELIND PRINTING CENTER - RAPID CITY S.D.

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.19 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 38. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .134 |
| Nitrogen, Nitrate, mg/l | 1.50 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 18.6 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .023 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 2.89 |
| Gold | . | . |
| Iron | . | 18.9 |
| Lead | . | .002 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | .0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.25 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.20 |
| FIELD EC | 500. |
| FIELD TEMP | 13.1 |
| DISCHARGE | 215. GPM |

APPROVED BY: Dean Durand

DATE: 5/1/93

**LITERATURE CITED:**

USEPA Region VIII. 1992. NPDES whole effluent toxics control program March, 1992. Denver, Colorado.

Weber, C.I. ed. 1991. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms. 4th Edition. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. EPA/600/4-90/027.

## TEST CONDITIONS: *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST: Outfall B

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 48 hours

Sample Collection procedure: grab

Sample collection date: 13 April 1993

Dilution water: BB Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <24h old

Feeding: none

End Point: mortality

Start date and time: Untreated -- 14 April 1993 at 1500 pH treated -- 14 April 1993 at 1530

End date and time: Untreated -- 16 April 1993 at 1430 pH treated -- 16 April 1993 at 1430

Type of exposure chamber: 50ml disposable plastic cups

Volume of exposure chamber: 25 ml

Number of Animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

**SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: Untreated Outfall B**

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB, JR

Start: 14 Apr. 1993 at 1500
End: 16 Apr. 1993 at 1430
Test substance: Untreated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 75% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 0/20 | 0/20 | 0/20 | 0/20 | 0/20 |
| % Survival | 100 | 100 | 0 | 0 | 0 | 0 | 0 |
| Diss.$O_2$ max. / min. | 7.2 / 6.5 | 7.2 / 6.6 | 7.2 | 7.2 | 7.2 | 7.2 | 7.2 |
| pH begin / end | 8.32 / 8.63 | 7.81 / 8.11 | 7.69 | 6.25 | 4.62 | 3.74 | 3.57 / 3.45 |
| Conduct µmho max./min. | 740 / 644 | 237 / 192 | | | | | 1193 |
| Temp.°C max. / min. | 19.5 / 19.4 | 19.5 / 19.4 | 19.5 | 19.5 | 19.5 | 19.5 | 19.5 |

Statistical Analysis: recorded as % untreated Outfall B

- 48h LC50 (graph. method) = 4.1%
- NOEC (Dunnett's Method) = <12.5%

**SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: pH treated Outfall B**

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB, JR

Start: 14 Apr. 1993 at 1530
End: 16 Apr. 1993 at 1430
Test substance: pH treated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 75% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 15/20 | 7/20 | 1/20 | 1/20 | 0/20 |
| % Survival | 100 | 100 | 75 | 35 | 5 | 5 | 0 |
| Diss.$O_2$ max. / min. | 7.2 / 6.5 | 7.2 / 6.8 | 7.2 / 6.7 | 6.9 / 6.4 | 6.9 / 6.4 | 6.8 / 6.3 | 6.8 / 6.3 |
| pH begin / end | 8.32 / 8.63 | 7.81 / 8.09 | 7.94 to 8.15[x] | 7.80 to 8.04[x] | 7.52 to 8.00[x] | 7.44 to 7.96[x] | 7.52 / 7.11 |
| Conduct µmho max./min. | 740 / 644 | 180 / 171 | | | | | 1182 / 1180 |
| Temp. °C max. / min. | 19.5 / 19.4 | 19.5 / 19.4 | 19.5 / 19.4 | 19.5 / 19.4 | 19.5 / 19.4 | 19.5 / 19.4 | 19.5 / 19.4 |

Statistical Analysis: recorded as % pH treated Outfall B

- 48h LC50 (Probit Analysis) = 19.4% (95% CI, 14.1 to 24.4)
- NOEC (Dunnett's Method) = 12.5%

[x] The pH measurements of the middle ranges of the Outfall dilutions are given as a range. Initial pH's were recorded for the controls and the 100% only.

## TEST CONDITIONS: *PIMEPHALES PROMELAS* ACUTE TOXICITY TESTS: Outfall B

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 96 hours

Sample Collection procedure: grab

Sample collection date: 13 April 1993

Dilution water: BB Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <4 days old

Feeding: 0.1 mL *Artemia* nauplii prior to test initiation and prior to the 48h renewal

End Point(s): mortality

Start date and time: untreated -- 14 April 1993 at 1430 pH treated -- 14 April 1993 at 1600

End date and time: untreated -- 18 April 1993 at 1345 pH treated -- 18 April 1993 at 1500

Type of exposure chamber: 400 ml glass beakers

Volume of exposure solution: 250 ml

Number of Animals exposed/chamber: 10

Number of replicates/treatment: 4

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

Aeration: none

**SUMMARY RESULTS OF FATHEAD MINNOW ACUTE TEST: Untreated Outfall B**

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, JR

Start: 14 Apr. 1993 at 1430
End: 18 Apr. 1993 at 1345
Test substance: untreated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 75% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 40/40 | 1/40 | 0/40 | 0/40 | 0/40 | 0/40 |
| % Survival | 100 | 100 | 5 | 0 | 0 | 0 | 0 |
| Diss.$O_2$ max. / min. | 7.0 / 5.8 | 7.3 / 5.5 | 7.3 / 6.2 | 7.3 | 7.3 | 7.5 | 7.4 |
| pH begin / end | 8.32 / 8.40 | 7.81 / 7.85 | 7.85 to 7.43[x] | 5.78 | 4.57 | 3.77 | 3.57 / 3.48 |
| Conduct. µmho max./min. | 801 / 625 | 246 / 162 | | | | | 1228 |
| Temp.(°C) max. / min. | 19.9 / 19.4 | 19.9 / 19.4 | 19.9 / 19.4 | 19.5 | 19.5 | 19.5 | 19.5 |

Statistical Analysis: recorded as % untreated Outfall B

- 96h LC50 (graph. method) = 4.1%
- NOEC (Dunnett's method) = <12.5%

[x] The pH measurements of the middle ranges of the Outfall dilutions are given as a range. Initial pH's were recorded for the controls and the 100% only.

## SUMMARY RESULTS OF FATHEAD MINNOW ACUTE TEST: pH treated Outfall B

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, JR

Start: 14 Apr. 1993 at 1600
End: 18 Apr. 1993 at 1500
Test substance: pH treated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 75% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 39/40 | 38/40 | 39/40 | 33/40 | 33/40 | 35/40 |
| % Survival | 100 | 95 | 90 | 95 | 83 | 83 | 88 |
| Diss.$O_2$ max. / min. | 7.0 / 5.8 | 6.9 / 6.1 | 6.9 / 6.0 | 6.9 / 6.2 | 6.9 / 6.4 | 7.0 / 6.4 | 7.0 / 6.4 |
| pH begin / end | 8.32 / 8.40 | 7.81 / 8.09 | 7.65 to 7.98[x] | 7.60 to 7.95[x] | 7.50 to 7.83[x] | 7.28 to 7.80[x] | 7.20 / 7.52 |
| Conduct. µmho max./min. | 801 / 625 | 243 / 166 | | | | | 1301 / 1233 |
| Temp.(°C) max. / min. | 19.9 / 19.4 | 19.9 / 19.4 | 19.9 / 19.4 | 19.9 / 19.4 | 19.9 / 19.4 | 19.9 / 19.4 | 19.9 / 19.4 |

Statistical Analysis: recorded as % pH treated Outfall B

- 96h LC50 = ND; lack of sufficient mortality did not allow calculation.
- NOEC (Dunnett's Method) = 25%

[x] The pH measurements of the middle ranges of the Outfall dilutions are given as a range. Initial pH's were recorded for the controls and the 100% only.

## WET CHEMISTRY RESULTS ON SAMPLES RECEIVED 24 MARCH 1993

Samples were taken on 23 March 1993: Outfall A was sampled on 16 and tested on 17 to 21 March.

| Measurement | Reconstituted $H_2O$[¤] | BB Creek[¤] Receiving $H_2O$ | Untreated Outfall B | pH treated Outfall B[¤] |
|---|---|---|---|---|
| Temperature (°C) | 21.0 | 15 | 15.0 | 21.0 |
| Total Hardness ($mgCaCO_3/L$) | 210 | 66 | 700 | 560 |
| pH | 8.32 | 7.81 | 3.57 | 7.52[#] |
| Alkalinity ($mgCaCO_3/L$) | 136 | 42 | ND[°] | 48 |
| Conductivity (μmho) | 604 | 149 | 848 | 1165 |
| Dissolved Oxygen ($mgO_2/L$) | 7.7 | 12.2[△] | 11.5[△] | 7.1 |
| Ammonia (mg $NH_3$-N/L | 0 | 0 | 0.45 | 0.54 |
| Unionized Ammonia (mg $NH_3^+$) | 0 | 0 | 0.00 | 0.02 |
| Total Residual Chlorine (mg/L) | 0 | 0.04 | 0.04 | 0.54[c] |

¤ For these samples, two batches were prepared. They are recorded as 1st batch/2nd batch. The first set was prepared on 24 March and the second set was prepared on 26 March, 1993.

° Alkalinity for the untreated Outfall B could not be determined because the methodology requires that the pH be > 4.5.

△ Samples arrived supersaturated and were aerated for 1 to 1½ hours to bring the saturation to a near normal level to begin the test.

# The pH was artificially raised with 1N NaOH to achieve a pH of 7 to 8 for use as pH treated Outfall B.

c As in the March Outfall B tests, an increase in total residual chlorine was detected following pH treatment. After treatment with 1/70 N thiosulfate to remove any free chlorine, we again concluded that the readings were being influenced by some other constituent released with the increase in pH.

ELI

QUALITY ASSURANCE REPORT - BROHM MINING

Report Date: 04-14-93

ELI #'s: 93-8997/93-8998

| RADIOMETRIC: | METHOD | Dup #1 % | Dup #2 % | Spk #1 % | Spk #2 % | ANALYST | DATE SAMPLE ANALYZED |
|---|---|---|---|---|---|---|---|
| Gross Alpha | EPA-900.0 | 100 | --- | --- | --- | DB | 21-Apr-93 |

USEPA-ESML-LV INTERCOMPARISON STUDY RESULTS

| Radiometric | Method | ELI Value | Standard | Difference | Analyst | Date |
|---|---|---|---|---|---|---|
| Uranium | EPA-908.1 | 5.07 | 4.00 | 1.07 | DB | 14-Apr-92 |
| Ra226 | EPA-903.1 | 16.30 | 14.90 | 1.40 | DB | 14-Apr-92 |
| Ra228 | EPA-904.1 | 16.17 | 14.00 | 2.17 | DB | 14-Apr-92 |
| Gross Alpha | EPA-900.0 | 9.33 | 15.00 | -5.67 | DB | 15-May-92 |
| Gross Beta | EPA-900.0 | 35.00 | 44.00 | -9.00 | DB | 15-May-92 |

Report Approved By: R.A. Leahing

tld 8997qa.qc

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

**WATER ANALYSIS REPORT - BROHM MINING**

| SAMPLE I.D.: | Outfall A | Outfall B | |
|---|---|---|---|
| Sample Date: | 04-12-93 | 04-13-93 | |
| Report Date: | 04-23-93 | 04-23-93 | |
| Sample Number: | 93-8997 | 93-8998 | |
| **RADIOMETRIC pCi/l:** | | | **Det.Limit** |
| Gross Alpha | 58.9 | 16.7 | 1.0 |
| Gross Alpha Prec. +/- | 8.9 | 5.6 | |

**Report Approved By:** R.A. Gearing

kmk s38997.bm

BROHM MINING CORP.

June 22, 1993

Mr. Steve Burkett, Chief
NPDES Branch
Management Division
U.S.E.P.A.
999 18th St., Suite 500
Denver, CO 80202-2466

Mr. Burkett:

Enclosed are the monitoring results from May 1993 requested in the order "Docket No. CWA-V111-93-04-C."

If you have any further questions, please don't hesitate to call.

Sincerely,

BROHM MINING CORP.

Stan Michals
Environmental Tech.

SM:sm

ENV\EPAMARRP.SM

cc: Steve Pirner, SDDENR
Dale Cockrell, Truhe Law Offices
Melanie Pallman, EPA
Kellie Buscher, SDDENR
Rod MacLeod, BMC
Lance Hubbard, BMC
Dale Shay, BMC

South Dakota Office: P.O. Box 485, Deadwood, South Dakota 57732
Telephone: (605) 578-2107 Telecopier: (605) 578-1709
Brohm Mining Corp. is a wholly owned affiliate of Minven Gold Corporation

BROHM MINING CORPORATION
MONITORING RESULTS FROM MAY 1993
DOCKET NO. CWA-VIII-93-04-C

| OUTFALL "A" | FLOW GPD | FIELD pH |
|---|---|---|
| 5-03-93 | 72144 | 7.44 |
| 5-14-93 | 217440 | 4.84 |
| 5-17-93 | 64800 | 6.60 |
| 5-24-93 | 81696 | 7.68 |

| OUTFALL "B" | FLOW GPD | FIELD pH |
|---|---|---|
| 5-03-93 | 295200 | 3.54 |
| 5-07-93 | 1333440 | 3.80 |
| 5-10-93 | 1434240 | 3.58 |
| 5-14-93 | 440640 | 3.30 |
| 5-17-93 | 334080 | 3.55 |
| 5-21-93 | 234720 | 3.41 |
| 5-24-93 | 207360 | 3.30 |
| 5-28-93 | 117420 | 3.33 |
| 5-31-93 | 122400 | 3.13 |

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 05/03/93
SAMPLE TIME: 11:05 AM
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930505103
DATE RECEIVED: 05/05/93
TIME RECEIVED: 07:00 AM
REPORT DATE: 06/16/93

FORM 106-A

GRELIND PRINTING CENTER - RAPID CITY S.D.

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | 2260. |
| Hardness | . |
| PH | 6.99 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 345. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | .031 |
| Cyanide, WAD, mg/l | .013 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .099 |
| Nitrogen, Nitrate, mg/l | 7.32 |
| Nitrogen, Nitrite, mg/l | .120 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 42.3 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .011 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 5.43 |
| Gold | . | . |
| Iron | . | 32.3 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .695 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 7.44 |
| FIELD EC | ... |
| FIELD TEMP | 7.0 C |
| DISCHARGE | 50.1 GPM |

APPROVED BY: [signature]

DATE: 06-16-93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 05/14/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930517202
DATE RECEIVED: 05/17/93
TIME RECEIVED: 06:35 AM
REPORT DATE: 05/18/93

TOTAL RECOVERABLE FLOW = 151. GPM

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 4.89 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 385.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .207 |
| Nitrogen, Nitrate, mg/l | 11.3 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 67.9 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .001 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 21.1 |
| Gold | . | . |
| Iron | . | 30.3 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 3.31 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD TEMP | 7.5 |
| FIELD COND | 2000.++ |
| FIELD pH | 4.84 |
| OIL & GREASE | NONVIS. |

APPROVED BY: Heather Roeber

DATE: 18 May 1993

FORM 106-A
GRELIND PRINTING CENTER - RAPID CITY S.D.

ORATORIES, INC.
XGY OIL ANALYSIS
ENTAL TESTING

a Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 05/17/93
SAMPLE TIME:
SAMPLED BY:

:CHALS
IINING CORP.
)X 485
)D, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930519210
DATE RECEIVED: 05/19/93
TIME RECEIVED: 07:00 AM
REPORT DATE: 05/22/93

)TAL RECOVERABLE

| ERTIES | VALUE |
|---|---|
| , umhos/cm | 3750.0 |
| | 882. |
| | 7.26 |
| solved, mg/l | . |
| pended, mg/l | 55.0 |
| NTU | . |

| NONMETALLIC | VALUE |
|---|---|
| | . |
| | . |
| mg/l | . |
| g/l | . |
| tal, mg/l | <.010 |
| D, mg/l | <.010 |
| ee, mg/l | . |
| g/l | . |
| mmonia, mg/l | .190 |
| itrate, mg/l | 11.5 |
| itrite, mg/l | <.050 |
| /l | 2052. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 32.2 |
| Antimony | . | . |
| Arsenic | . | .023 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .115 |
| Calcium | 332. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 8.01 |
| Gold | . | . |
| Iron | . | 18.6 |
| Lead | . | .001 |
| Lithium | . | . |
| Magnesium | 12.8 | . |
| Manganese | . | 12.8 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.001 |
| Silicon | . | . |
| Silver | . | .004 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 3.04 |

| S | VALUE |
|---|---|
| | 6.6 |
| | 9.7 C |
| | 64800. |
| E | NOT VIS. |

APPROVED BY: [signature]

DATE: 05-22-93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 05/24/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930525104
DATE RECEIVED: 05/25/93
TIME RECEIVED: 07:00 AM
REPORT DATE: 05/26/93

FORM 106-A
GRELIND PRINTING CENTER - RAPID CITY S.D.

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.43 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 20.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .218 |
| Nitrogen, Nitrate, mg/l | 10.5 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .600 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .011 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .481 |
| Gold | . | . |
| Iron | . | <.050 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .090 |

| SPECIAL TESTS | VALUE |
|---|---|
| DISCHARGE | 81696/D. |
| FIELD PH | 7.68 |
| FIELD TEMP | 6.3 C |
| FIELD EC | 2000.+ |

APPROVED BY: [signature]

DATE: 05-26-93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 05/03/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930504109
DATE RECEIVED: 05/04/93
TIME RECEIVED: 06:45 AM
REPORT DATE: 05/05/93

FORM 106-A

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.31 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 42.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .073 |
| Nitrogen, Nitrate, mg/l | 1.43 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 16.2 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .020 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 2.79 |
| Gold | . | . |
| Iron | . | 25.7 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.12 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.54 |
| FIELD EC | 1000. |
| FIELD TEMP | 11.2 C |
| DISCHARGE | 205. GPM |

APPROVED BY: [signature]
DATE: 05-05-93

GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 05/10/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930512124
DATE RECEIVED: 05/12/93
TIME RECEIVED: 06:55 AM
REPORT DATE: 05/13/93

FORM 106 A
GRELIND PRINTING CENTER - RAPID CITY S.D.

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.20 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 32.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .082 |
| Nitrogen, Nitrate, mg/l | 2.21 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 14.4 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .051 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 3.33 |
| Gold | . | . |
| Iron | . | 24.1 |
| Lead | . | .003 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.85 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.58 |
| FIELD EC | 1250. |
| FIELD TEMP | 12.5 |
| DISCHARGE | 1002.GPM |

APPROVED BY: [signature]

DATE: 05-13-93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 05/17/93
SAMPLE TIME: :
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930518204
DATE RECEIVED: 05/18/93
TIME RECEIVED: 06:45 AM
REPORT DATE: 05/19/93

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | 503. |
| PH | 3.21 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 35.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .127 |
| Nitrogen, Nitrate, mg/l | 1.88 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 722. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 20.2 |
| Antimony | . | . |
| Arsenic | . | .068 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .037 |
| Calcium | 135. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 4.04 |
| Gold | . | . |
| Iron | . | 29.8 |
| Lead | . | .001 |
| Lithium | . | . |
| Magnesium | 40.3 | . |
| Manganese | . | 5.65 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | .002 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.41 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.55 |
| FIELD TEMP | 12.8 |
| FIELD EC | 1180. |
| DISCHARGE | 232. GPM |

APPROVED BY: [signature]
DATE: 05-19-93

FORM 10A
GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 05/24/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930525106
DATE RECEIVED: 05/25/93
TIME RECEIVED: 07:00 AM
REPORT DATE: 05/26/93

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.14 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 35.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .223 |
| Nitrogen, Nitrate, mg/l | 1.56 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 22.0 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .033 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 4.71 |
| Gold | . | . |
| Iron | . | 36.5 |
| Lead | . | .001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.50 |

| SPECIAL TESTS | VALUE |
|---|---|
| DISCHARGE | 207360. |
| FIELD PH | 9.20 |
| FIELD TEMP | 9.2 C |
| FIELD EC | 1120. |

APPROVED BY: [signature]

DATE: 05-26-93

FORM 1067
GRELIND PRINTING CENTER - RAPID CITY S.D.

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

**WATER ANALYSIS REPORT - BROHM MINING**

| SAMPLE I.D.: | Outfall A | Outfall B | |
|---|---|---|---|
| Sample Date: | 05-24-93 | 05-24-93 | |
| Report Date: | 06-04-93 | 06-04-93 | |
| Sample Number: | 94-16395 | 93-16396 | |
| **RADIOMETRIC pCi/l:** | | | **Det.Limit** |
| Gross Alpha | 4.5 | 60.0 | 1.0 |
| Gross Alpha Prec. +/- | 0.5 | 2.7 | |

**Report Approved By:** R.A. Searing

kmk s316395.bm

ELI

QUALITY ASSURANCE REPORT - BROHM MINING

Report Date: 06-07-93

ELI #'s: 93-16395/93-16396

| RADIOMETRIC: | METHOD | Dup #1 % | Dup #2 % | Spk #1 % | Spk #2 % | ANALYST | DATE SAMPLE ANALYZED |
|---|---|---|---|---|---|---|---|
| Gross Alpha | EPA-900.0 | --- | --- | --- | --- | DB | 03-Jun-93 |

USEPA-ESML-LV INTERCOMPARISON STUDY RESULTS

| Radiometric | Method | ELI Value | Standard | Difference | Analyst | Date |
|---|---|---|---|---|---|---|
| Uranium | EPA-908.1 | 5.07 | 4.00 | 1.07 | DB | 14-Apr-92 |
| Ra226 | EPA-903.1 | 16.30 | 14.90 | 1.40 | DB | 14-Apr-92 |
| Ra228 | EPA-904.1 | 16.17 | 14.00 | 2.17 | DB | 14-Apr-92 |
| Gross Alpha | EPA-900.0 | 9.33 | 15.00 | -5.67 | DB | 15-May-92 |
| Gross Beta | EPA-900.0 | 35.00 | 44.00 | -9.00 | DB | 15-May-92 |

Report Approved By: R.A. Searling

tld 16395qa.qc

BROHM MINING CORP.

July 23, 1993

Mr. Steve Burkett, Chief
NPDES Branch
Management Division
U.S.E.P.A.
999 18th St., Suite 500
Denver, CO 80202-2466

Mr. Burkett:

Enclosed are the monitoring results from June 1993 requested in the order "Docket No. CWA-V111-93-04-C."

If you have any further questions, please don't hesitate to call.

Sincerely,

BROHM MINING CORP.

Stan Michals
Environmental Technician

SM:sm

cc: Steve Pirner, SDDENR
Dale Cockrell, Truhe Law Offices
Melanie Pallman, EPA
Kellie Buscher, SDDENR
Rod MacLeod, BMC
Lance Hubbard, BMC
Dale Shay, BMC

ENVI\EPA.SM

South Dakota Office: P.O. Box 485, Deadwood, South Dakota 57732
Telephone: (605) 578-2107 Telecopier: (605) 578-1709

Brohm Mining Corp. is a wholly owned affiliate of Minven Gold Corporation

# BROHM MINING CORPORATION

*MONITORING RESULTS FROM JUNE 1993*

*"DOCKET NO. CWA-VIII-93-04-C"*

| OUTFALL "A" | FLOW GPD | FIELD pH |
|---|---|---|
| 06-01-93 | 43,200 | 6.76 |
| 06-07-93 | 204,480 | 7.25 |
| 06-14-93 | 37,440 | 7.46 |
| 06-21-93 | 175,680 | 6.26 |
| 06-29-93 | 48,960 | 6.83 |

| OUTFALL "B" | FLOW GPD | FIELD pH |
|---|---|---|
| 06-01-93 | 122,400 | 3.08 |
| 06-03-93 | 120,960 | 3.12 |
| 06-07-93 | 421,920 | 3.29 |
| 06-10-93 | 1,342,080 | 3.30 |
| 06-14-93 | 426,240 | 3.27 |
| 06-18-93 | 573,120 | 3.10 |
| 06-21-93 | 925,920 | 3.31 |
| 06-24-93 | 493,920 | 3.29 |
| 06-28-93 | 335,520 | 3.09 |

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 06/01/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930603103
DATE RECEIVED: 06/03/93
TIME RECEIVED: 07:00 AM
REPORT DATE: 06/04/93

TOTAL RECOVERABLE METAL,O&G NONE VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.20 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .194 |
| Nitrogen, Nitrate, mg/l | 11.4 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 1.66 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .052 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .442 |
| Gold | . | . |
| Iron | . | .191 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .295 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 6.76 |
| FIELD EC | 2000.+ |
| FIELD TEMP | 12.0 |
| DISCHARGE | 30.0 GPM |

APPROVED BY: Heather A. Roeber
DATE: 4 June 1993

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 06/07/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930608105
DATE RECEIVED: 06/08/93
TIME RECEIVED: 06:30 AM
REPORT DATE: 06/09/93

OIL & GREASE = NONE VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.35 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 20.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .179 |
| Nitrogen, Nitrate, mg/l | 6.36 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 2.78 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .058 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 1.13 |
| Gold | . | . |
| Iron | . | 1.51 |
| Lead | . | .004 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .781 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 7.25 |
| FIELD EC | 1750. |
| FIELD TEMP | 5.5 |
| DISCHARGE | 142. GPM |

APPROVED BY: [signature]

DATE: 06 09 93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 06/14/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930617207
DATE RECEIVED: 06/17/93
TIME RECEIVED: 07:00 AM
REPORT DATE: 06/21/93

FORM 106A
GRELIND PRINTING CENTER - RAPID CITY S.D.

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | 1140. |
| PH | 7.72 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .114 |
| Nitrogen, Nitrate, mg/l | 7.71 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 295. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 1.30 |
| Antimony | . | . |
| Arsenic | . | <.001 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .046 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .454 |
| Gold | . | . |
| Iron | . | .161 |
| Lead | . | .001 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | 6.17 |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | .006 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .797 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 7.46 |
| FIELD EC | 2000.+ |
| FIELD TEMP | 13.4 |
| DISCHARGE | 26.0 GPM |

APPROVED BY: [signature]

DATE: 06-21-93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 06/21/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930622106
DATE RECEIVED: 06/22/93
TIME RECEIVED: 06:55 AM
REPORT DATE: 06/23/93

FORM 106-A

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 5.83 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 495. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .140 |
| Nitrogen, Nitrate, mg/l | 9.29 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 67.6 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .154 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 17.7 |
| Gold | . | . |
| Iron | . | 105. |
| Lead | . | . |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 2.73 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 6.26 |
| FIELD EC | 2000.+ |
| FIELD TEMP | 9.3 C |
| DISCHARGE | 122. GPM |

APPROVED BY: [signature]

DATE: 6-22-93

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HIGH TECHNOLOGY OIL ANALYSIS AND ENVIRONMENTAL TESTING

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SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 06/29/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930630103
DATE RECEIVED: 06/30/93
TIME RECEIVED: 06:50 AM
REPORT DATE: 07/02/93

FORM 106-A

## TOTAL RECOVERABLE METALS,O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | 1392. |
| Hardness | . |
| PH | 7.40 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 17.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .110 |
| Nitrogen, Nitrate, mg/l | 5.23 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .264 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .002 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .047 |
| Gold | . | . |
| Iron | . | <.050 |
| Lead | . | . |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .150 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 6.83 |
| DISCHARGE | 34.0 GPM |
| FIELD TEMP | 12.6 |

APPROVED BY: Sherry Schaefer
DATE: 7/2/93

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(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 06/01/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930603104
DATE RECEIVED: 06/03/93
TIME RECEIVED: 07:00 AM
REPORT DATE: 06/04/93

TOTAL RECOVERABLE METAL,O&G NONE VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.22 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 45.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .323 |
| Nitrogen, Nitrate, mg/l | 1.52 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 26.4 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .054 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 4.84 |
| Gold | . | . |
| Iron | . | 31.5 |
| Lead | . | .010 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.70 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.08 |
| FIELD EC | 2000.+ |
| FIELD TEMP | 16.3 |
| DISCHARGE | 85.0 GPM |

APPROVED BY: Heather A. Rocker
DATE: 4 June 1993

FORM 106-A
GRELIND PRINTING CENTER - RAPID CITY S.D.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

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(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 06/07/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930608106
DATE RECEIVED: 06/08/93
TIME RECEIVED: 06:30 AM
REPORT DATE: 06/09/93

FORM 106-A

GRELIND PRINTING CENTER - RAPID CITY S.D.

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.25 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 75.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .161 |
| Nitrogen, Nitrate, mg/l | .911 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 4.92 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .035 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 1.92 |
| Gold | . | . |
| Iron | . | 21.0 |
| Lead | . | .014 |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.19 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.29 |
| FIELD EC | 820. |
| FIELD TEMP | 10.4 |
| DISCHARGE | 293. GPM |

APPROVED BY: [signature]

DATE: 06-09-93

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SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 06/14/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930617208
DATE RECEIVED: 06/17/93
TIME RECEIVED: 07:00 AM
REPORT DATE: 06/21/93

FORM 106-A

GRELIND PRINTING CENTER · RAPID CITY S.D.

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | 494. |
| PH | 3.20 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 41.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .123 |
| Nitrogen, Nitrate, mg/l | 1.83 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 677. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 15.4 |
| Antimony | . | . |
| Arsenic | . | .168 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .036 |
| Calcium | 128. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 3.80 |
| Gold | . | . |
| Iron | . | 26.2 |
| Lead | . | .003 |
| Lithium | . | . |
| Magnesium | 42.3 | . |
| Manganese | . | 4.76 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | .001 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.77 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.27 |
| FIELD EC | 1170. |
| FIELD TEMP | 14.8 |
| DISCHARGE | 296. GPM |

APPROVED BY: [signature]

DATE: 06-21-93

MID-CONTINENT
TESTING LABORATORIES, INC.
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(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 06/21/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930622107
DATE RECEIVED: 06/22/93
TIME RECEIVED: 06:55 AM
REPORT DATE: 06/23/93

FORM 106-A

## TOTAL RECOVERABLE METALS, O&G NONVISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.19 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 70.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .095 |
| Nitrogen, Nitrate, mg/l | 1.38 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 16.7 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .043 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 4.00 |
| Gold | . | . |
| Iron | . | 25.8 |
| Lead | . | . |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.53 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.31 |
| FIELD EC | 800. |
| FIELD TEMP | 10.0 C |
| DISCHARGE | 643. GPM |

APPROVED BY: [signature]

DATE: 06-21-93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 06/28/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930629103
DATE RECEIVED: 06/29/93
TIME RECEIVED: 06:10 AM
REPORT DATE: 06/30/93

FORM 106-A

TOTAL RECOVERABLE METALS, O&G NOT VISIB

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.16 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 260. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .260 |
| Nitrogen, Nitrate, mg/l | 1.35 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 25.0 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .037 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 4.80 |
| Gold | . | . |
| Iron | . | 54.9 |
| Lead | . | . |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.93 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD pH | 3.09 |
| FIELD EC | 1080. |
| FIELD TEMP | 22.2 |
| FLOW (GPM) | 233. |

APPROVED BY: [signature]

DATE: 6-30-93

## TEST CONDITIONS: *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 48 hours

Sample Collection procedure: grab

Sample collection date: 14 June 1993

Dilution water: BB Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <24h old

Feeding: none

End Point: mortality

Start date: 15 June 1993

End date: 17 June 1993

Type of exposure chamber: 50ml disposable plastic cups

Volume of exposure chamber: 25 ml

Number of Animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

## SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: Outfall A

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB, MS

Start: 15 June 1993 at 1500
End: 17 June 1993 at 1500
Test substance: Outfall A
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 6.25% Outfall A | 12.5% Outfall A | 25% Outfall A | 50% Outfall A | 100% Outfall A |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 14/20 | 0/20 | 0/20 | 0/20 | 0/20 |
| % Survival | 100 | 100 | 70 | 0 | 0 | 0 | 0 |
| Diss. $O_2$ max. / min. | 7.1 / 6.9 | 7.3 / 7.2 | 7.3 / 7.2 | 7.3 | 7.4 | 7.3 | 7.2 |
| pH begin[x] / after 24h | 8.41 / 8.54 | 7.92 / 8.08 | 8.20 | 8.31 | 8.45 | 8.59 | 7.98 / 8.65 |
| Conduct µmho max./min. | 749 / 706 | 173 / 171 | | | | | 3230 |
| Temp. °C max. / min. | 20.8 / 20.5 | 20.8 / 20.5 | 20.8 / 20.5 | 20.5 | 20.5 | 20.5 | 20.5 |

Statistical Analysis: response levels recorded as % Outfall A

- 48h LC50 (trimmed Spearman Karber) = 7.62% (95% CI could not be calculated)
- NOEC (Steel's Many One Rank test) = 6.25%

[x] pH measurements of the middle ranges of the dilutions are given from after the first 24h. Initial pH's were recorded for the controls and the 100% only.

**SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: Untreated Outfall B**

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB, MS

Start: 15 June 1993 at 1530
End: 17 June 1993 at 1515
Test substance: Untreated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 6.25% Outfall B | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 0/20 | 0/20 | 0/20 | 0/20 | 0/20 |
| % Survival | 100 | 100 | 0 | 0 | 0 | 0 | 0 |
| Diss.$O_2$ max. min. | 7.1 / 6.9 | 7.3 / 7.0 | 7.0 | 7.1 | 7.2 | 7.3 | 7.3 |
| pH begin[x] after 24h | 8.41 / 8.54 | 7.92 / 8.06 | 7.97 | 7.76 | 5.92 | 4.21 | 3.43 / 3.34 |
| Conduct µmho max./min. | 749 / 706 | 164 / 153 | | | | | 1451 |
| Temp. °C max. min. | 20.8 / 20.5 | 20.8 / 20.5 | 20.5 | 20.5 | 20.5 | 20.5 | 20.5 |

Statistical Analysis: recorded as % untreated Outfall B

- 48h LC50 (graphical method) = 2.75% (95% CI could not be calculated)
- NOEC (Dunnett's Method) = <6.25%

[x] pH measurements of the middle ranges of the dilutions are given from after the first 24h. Initial pH's were recorded for the controls and the 100% only.

**SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: pH treated Outfall B**

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB, MS

Start: 15 June 1993 at 1515
End: 17 June 1993 at 1515
Test substance: pH treated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 6.25% treated Outfall B | 12.5% treated Outfall B | 25% treated Outfall B | 50% treated Outfall B | 100% treated Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 1/20 | 0/20 | 0/20 | 0/20 | 0/20 |
| % Survival | 100 | 100 | 5 | 0 | 0 | 0 | 0 |
| Diss.$O_2$ max. min. | 7.1 6.9 | 7.1 7.1 | 7.2 7.0 | 7.2 | 7.2 | 7.2 | 7.2 |
| pH begin[x] end | 8.41 8.54 | 7.92 7.84 | 8.05 | 8.00 | 7.90 | 7.71 | 7.20 7.52 |
| Conduct µmho max./min. | 749 706 | 189 181 | | | | | 2060 2300 |
| Temp. °C max. min. | 20.8 20.5 | 20.8 20.5 | 20.8 20.5 | 20.5 | 20.5 | 20.5 | 20.5 |

Statistical Analysis: recorded as % pH treated Outfall B

- 48h LC50 (graphical method) = 2.80% (95% CI could not be calculated)
- NOEC (Dunnett's Method) = <6.25%

[x] pH measurements of the middle ranges of the dilutions are given from after the first 24h. Initial pH's were recorded for the controls and the 100% only.

## TEST CONDITIONS: *PIMEPHALES PROMELAS* ACUTE TOXICITY TESTS

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 96 hours

Sample Collection procedure: grab

Sample collection date: 14 June 1993

Dilution water: BB Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <7 days old

Feeding: 0.1 mL *Artemia* nauplii prior to test initiation and prior to the 48h renewal

End Point(s): mortality

Start date and time: 15 June 1993

End date and time: 19 June 1993

Type of exposure chamber: 400 ml glass beakers

Volume of exposure solution: 300 ml

Number of Animals exposed/chamber: 10

Number of replicates/treatment: 3

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

Aeration: none

## SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TOXICITY TEST: Outfall A

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, MS

Start: 15 June 1993 at 1500
End: 19 June 1993 at 1510
Test substance: Outfall A
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 6.25% Outfall A | 12.5% Outfall A | 25% Outfall A | 50% Outfall A | 100% Outfall A |
|---|---|---|---|---|---|---|---|
| alive/exposed | 39/40 | 37/40 | 40/40 | 36/40 | 39/40 | 38/40 | 28/40 |
| % Survival | 98 | 93 | 100 | 90 | 98 | 95 | 70 |
| Diss.$O_2$ max. / min. | 6.6 / 5.9 | 7.0 / 6.0 | 6.9 / 6.3 | 6.9 / 6.4 | 6.8 / 6.4 | 6.8 / 6.6 | 6.9 / 6.6 |
| pH begin[x] / after 24h | 8.41 / 8.21 | 7.92 / 8.08 | 7.83 | 7.88 | 8.03 | 8.15 | 7.98 / 8.24 |
| Conduct. µmho max./min. | 825 / 725 | 175 / 167 | | | | | 3200 / 3080 |
| Temp.(°C) max. / min. | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 20.0 / 20.5 |

Statistical Analysis: response levels recorded as % Outfall A

- 96h LC50 (Probit Analysis) = >100%
- NOEC (Dunnett's Method) = 50%

[x] pH measurements of the middle ranges of the dilutions are given from after the first 24h. Initial pH's were recorded for the controls and the 100% only.

## SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TEST: Untreated Outfall B

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, MS

Start: 15 June 1993 at 1530
End: 19 June 1993 at 1545
Test substance: untreated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 6.25% Outfall B | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 39/40 | 39/40 | 25/40 | 0/40 | 0/40 | 0/40 | 0/40 |
| % Survival | 98 | 98 | 63 | 0 | 0 | 0 | 0 |
| Diss.$O_2$ max.<br>min. | 6.6<br>5.9 | 6.7<br>5.4 | 6.5<br>6.3 | 6.8<br>6.6 | 7.0 | 7.1 | 7.1 |
| pH begin[x]<br>after 24h | 8.41<br>8.21 | 7.92<br>7.56 | 7.56 | 7.35 | 5.98 | 4.09 | 3.43<br>3.21 |
| Conduct. µmho<br>max./min. | 825<br>725 | 200<br>152 | | | | | 1394 |
| Temp.(°C) max.<br>min. | 21.0<br>20.5 | 21.0<br>20.5 | 21.0<br>20.5 | 20.8<br>20.5 | 20.5 | 20.5 | 20.5 |

Statistical Analysis: recorded as % untreated Outfall B

- 96h LC50 (trimmed Spearman Karber) = 7.18%
- NOEC (Dunnett's Method) = <6.25%

x pH measurements of the middle ranges of the dilutions are given from after the first 24h. Initial pH's were recorded for the controls and the 100% only.

**SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TEST: pH treated Outfall B**

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, MS

Start: 15 June 1993 at 1515
End: 19 June 1993 at 1530
Test substance: pH treated Outfall B
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 6.25% treated Outfall B | 12.5% treated Outfall B | 25% treated Outfall B | 50% treated Outfall B | 100% treated Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 39/40 | 40/40 | 39/40 | 39/40 | 37/40 | 33/40 | 22/40 |
| % Survival | 98 | 100 | 98 | 98 | 93 | 83 | 55 |
| Diss.$O_2$ max. / min. | 6.6 / 5.9 | 6.7 / 5.9 | 6.8 / 6.4 | 6.9 / 6.5 | 6.8 / 6.5 | 6.9 / 6.4 | 7.1 / 6.4 |
| pH begin[x] / after 24h | 8.41 / 8.21 | 7.92 / 7.53 | 7.67 | 7.69 | 7.59 | 7.39 | 7.20 / 6.88 |
| Conduct. µmho max./min. | 825 / 725 | 231 / 194 | | | | | 1535 / 1421 |
| Temp.(°C) max. / min. | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 | 21.0 / 20.5 |

Statistical Analysis: response levels recorded as % pH treated Outfall B

- 96h LC50 (Probit Analysis) = >100%
- NOEC (Dunnett's Method) = 25%

[x] The pH measurements of the middle ranges of the Outfall dilutions are given as a range. Initial pH's were recorded for the controls and the 100% only.

## WET CHEMISTRY RESULTS ON SAMPLES RECEIVED 15 JUNE 1993

Samples were taken on 14 June 1993:

| Measurement | Recon. $H_2O$ | BB Creek Rcv. $H_2O$ | Outfall A | Untreated Outfall B | pH treated Outfall B′ |
|---|---|---|---|---|---|
| Analysis Temperature (°C) | 21.0 | 19.0 | 19.0 | 19.0 | 19.0 |
| Total Hardness ($mgCaCO_3/L$) | 202 | 62 | 1200 | 980 | 980 |
| pH | 8.41 | 7.92 | 7.98 | 3.43 | 7.20 |
| Alkalinity ($mgCaCO_3/L$) | 144 | 46 | 372 | ND° | 46 |
| Conductivity (μmho) | 683 | 175 | 3010 | 1382 | 2010 |
| Dissolved Oxygen ($mgO_2/L$) | 6.8 | 8.9 | 7.8 | 8.7 | 7.5 |
| Ammonia (mg $NH_3$-N/L | ND | ND | ND | ND | ND |
| Unionized Ammonia (mg $NH_3^+$) | 0 | 0 | 0 | 0 | 0 |
| Total Residual Chlorine (mg/L) | 0 | 0 | 0 | 0 | 0 |

° Alkalinity for the untreated Outfall B could not be determined because the methodology requires that the pH be > 4.5.

′ The pH was artificially raised with 1N NaOH to achieve a pH of 7 to 8 for use as pH treated Outfall B.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON *CERIODAPHNIA DUBIA*

Test date: 8 to 10 June 1993

| g NaCl/L | control | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 20/20 | 20/20 | 18/20 | 16/20 | 16/20 | 9/20 |
| % survival | 100 | 100 | 90 | 80 | 80 | 45 |

LC50 (Probit Analysis) = 3.10g NaCl/L (95% CI, 2.63 to 4.70)

Note: This is within our accepted performance range (2.6 to 3.2) determined by 12 previous reference tests performed.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON FATHEAD MINNOW LARVAE

Test date: 16 to 20 June 1993

| g NaCl/L | control | 6.0 | 7.0 | 7.5 | 8.0 | 9.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 20/20 | 20/20 | 19/20 | 18/20 | 12/20 | 2/20 |
| % survival | 100 | 100 | 95 | 90 | 60 | 10 |

96h LC50 (Probit Analysis) = 8.17g NaCl/L (95% CI, 7.94 to 8.46)

Note: This is within our accepted performance range (7.2 to 8.8) determined by 12 previous reference tests performed.

**LITERATURE CITED:**

USEPA Region VIII. 1992. NPDES whole effluent toxics control program March, 1992. Denver, Colorado.

Weber, C.I. ed. 1991. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms.* 4th Edition. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. EPA/600/4-90/027.

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

**WATER ANALYSIS REPORT - BROHM MINING**

| SAMPLE I.D.: | Outfall A | Outfall B | |
|---|---|---|---|
| Sample Date: | 06-14-93 | 06-14-93 | |
| Report Date: | 06-22-93 | 06-22-93 | |
| Sample Number: | 93-22978 | 93-22979 | |
| **RADIOMETRIC pCi/l:** | | | **Det.Limit** |
| Gross Alpha | 11.9 | 35.8 | 1.0 |
| Gross Alpha Prec. +/- | 1.0 | 2.7 | |

**Report Approved By:**

kmk s322978.bm

ELI

QUALITY ASSURANCE REPORT - BROHM MINING

Report Date: 06-23-93

ELI #'s: 93-22978/93-22979

| RADIOMETRIC: | METHOD | Dup #1 % | Dup #2 % | Spk #1 % | Spk #2 % | ANALYST | DATE SAMPLE ANALYZED |
|---|---|---|---|---|---|---|---|
| Gross Alpha | EPA-900.0 | 116 | --- | --- | --- | DB | 21-Jun-93 |

USEPA-ESML-LV INTERCOMPARISON STUDY RESULTS

| Radiometric | Method | ELI Value | Standard | Difference | Analyst | Date |
|---|---|---|---|---|---|---|
| Uranium | EPA-908.1 | 5.07 | 4.00 | 1.07 | DB | 14-Apr-92 |
| Ra226 | EPA-903.1 | 16.30 | 14.90 | 1.40 | DB | 14-Apr-92 |
| Ra228 | EPA-904.1 | 16.17 | 14.00 | 2.17 | DB | 14-Apr-92 |
| Gross Alpha | EPA-900.0 | 9.33 | 15.00 | -5.67 | DB | 15-May-92 |
| Gross Beta | EPA-900.0 | 35.00 | 44.00 | -9.00 | DB | 15-May-92 |

Report Approved By: R.A. Marling

tld 22978qa.qc

BROHM MINING CORP.

August 19, 1993

Mr. Steve Burkett, Chief
NPDES Branch
Management Division
U.S.E.P.A.
999 18th St., Suite 500
Denver, CO 80202-2466

Mr. Burkett:

Enclosed are the monitoring results from July 1993 requested in the order "Docket No. CWA-V111-93-04-C."

If you have any further questions, please don't hesitate to call.

Sincerely,

BROHM MINING CORP.

Stan Michals
Environmental Technician

SM:sm

ENVI\EPAMST.SM

cc: Steve Pirner, SDDENR
Dale Cockrell, Truhe Law Offices
Melanie Pallman, EPA
Kellie Buscher, SDDENR
Rod MacLeod, BMC
Lance Hubbard, BMC
Dale Shay, BMC

South Dakota Office: P.O. Box 485, Deadwood, South Dakota 57732
Telephone: (605) 578-2107 Telecopier: (605) 578-1709

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# BROHM MINING CORPORATION

MONITORING RESULTS FROM JULY 1993

"DOCKET NO. CWA-VIII-93-04-C"

| OUTFALL "A" | FLOW GPD | FIELD pH |
|---|---|---|
| 7-06-93 | 8,640 | 6.69 |
| 7-12-93 | 18,720 | 6.70 |
| 7-19-93 | 11,520 | 7.06 |
| 7-26-93 | 12,960 | 6.81 |

| OUTFALL "B" | FLOW GPD | FIELD pH |
|---|---|---|
| 7-01-93 | 216,000 | 2.30 |
| 7-06-93 | 148,320 | 3.27 |
| 7-09-93 | 145,440 | 3.30 |
| 7-12-93 | 105,120 | 3.16 |
| 7-16-93 | 90,720 | 2.92 |
| 7-19-93 | 73,440 | 3.01 |
| 7-22-93 | 122,400 | 3.00 |
| 7-26-93 | 93,600 | 3.22 |
| 7-30-93 | 80,640 | 2.94 |

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2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 07/06/93
SAMPLE TIME: 11:40 AM
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930707102
DATE RECEIVED: 07/07/93
TIME RECEIVED: 06:45 AM
REPORT DATE: 07/08/93

FORM 106-A

O & G NOT VISIB. TOTAL RECOVERABLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | 356. |
| PH | 7.38 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 2.04 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 494. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .439 |
| Antimony | . | . |
| Arsenic | . | .001 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | <.001 |
| Calcium | 102. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .043 |
| Gold | . | . |
| Iron | . | .149 |
| Lead | . | <.001 |
| Lithium | . | . |
| Magnesium | 24.6 | . |
| Manganese | . | <.050 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | .003 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | <.050 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD pH | 6.69 |
| FIELD EC | 1370. |
| FIELD TEMP | 13.7 |
| FLOW | 8640. |

APPROVED BY: Janette S Wright
DATE: 7-8-93

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(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 07/12/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930713101
DATE RECEIVED: 07/12/93
TIME RECEIVED: 03:00 PM
REPORT DATE: 07/20/93

FORM 106-A

OIL AND GREASE NON VISIBLE.

FIELD FLOW = 18720./DAY TOTAL RECOV.

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.41 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 1.78 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .124 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .002 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .027 |
| Gold | . | . |
| Iron | . | <.050 |
| Lead | . | . |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .092 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD TEMP | 14.7 |
| FIELD EC | 1090. |
| FIELD pH | 6.7 |
| OIL & GREASE | <10. PPM |

APPROVED BY: [signature]

DATE: 07-26-93

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(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 07/19/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930720105
DATE RECEIVED: 07/20/93
TIME RECEIVED: 07:15 AM
REPORT DATE: 07/21/93

FORM 106-A

## TOTAL RECOVERABLE METALS,O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.38 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 1.38 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .158 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | <.001 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .017 |
| Gold | . | . |
| Iron | . | .073 |
| Lead | . | . |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .074 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 7.06 |
| FIELD EC | 880. |
| FIELD TEMP | 15.5 |
| DISCHARGE | 8.0 GPM |

APPROVED BY: Gary M. Sayre

DATE: 07-21-93

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(605) 348-0111

SAMPLE NAME: OUTFALL A
DESCRITPION: RUBY DAM
SAMPLE DATE: 07/26/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930727101
DATE RECEIVED: 07/26/93
TIME RECEIVED: 03:30 PM
REPORT DATE: 07/28/93

FORM 106-A

## TOTAL RECOVERABLE METALS,O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 7.05 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | <.050 |
| Nitrogen, Nitrate, mg/l | 3.95 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | .150 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .004 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | .047 |
| Gold | . | . |
| Iron | . | .069 |
| Lead | . | . |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | .069 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 6.81 |
| FIELD EC | 940. |
| FIELD TEMP | 17.1 |
| DISCHARGE | 15.6 GPM |

APPROVED BY: S. Schaefer

DATE: 7/28/93

GRELIND PRINTING CENTER - RAPID CITY S.D.

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2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 07/06/93
SAMPLE TIME: 04:30 PM
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930707103
DATE RECEIVED: 07/07/93
TIME RECEIVED: 06:45 AM
REPORT DATE: 07/08/93

FORM 106-A

O & G NOT VISIB. TOTAL RECOVERABLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | 512. |
| PH | 3.16 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 171. |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | <.010 |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .275 |
| Nitrogen, Nitrate, mg/l | 1.21 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | 818. |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 30.9 |
| Antimony | . | . |
| Arsenic | . | .162 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .040 |
| Calcium | 136. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 4.44 |
| Gold | . | . |
| Iron | . | 39.3 |
| Lead | . | .018 |
| Lithium | . | . |
| Magnesium | 41.9 | . |
| Manganese | . | 11.4 |
| Mercury | . | <.0002 |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | <.005 |
| Silicon | . | . |
| Silver | . | .009 |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.94 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD pH | 3.27 |
| FIELD EC | 1340. |
| FIELD TEMP | 19.6 |
| FLOW | 103.GPM |

APPROVED BY: Janette S. Wright
DATE: 7-8-93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 07/12/93
SAMPLE TIME: 03:00 PM
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930714102
DATE RECEIVED: 07/14/93
TIME RECEIVED: 07:20 AM
REPORT DATE: 07/15/93

FORM 106-A

TOTAL RECOVERABLE METALS,FLOW = 73.4 GPM

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.20 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .253 |
| Nitrogen, Nitrate, mg/l | 1.33 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 27.1 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .023 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 4.60 |
| Gold | . | . |
| Iron | . | 27.7 |
| Lead | . | . |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.60 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.16 |
| FIELD EC | 1320. |
| FIELD TEMP | 21.9 |
| OIL & GREASE | <10.0 |

APPROVED BY: [signature]

DATE: 07-15-93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 07/19/93
SAMPLE TIME: 02:55 PM
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930720106
DATE RECEIVED: 07/20/93
TIME RECEIVED: 07:15 AM
REPORT DATE: 07/21/93

FORM 106-A

## TOTAL RECOVERABLE METALS

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.20 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .213 |
| Nitrogen, Nitrate, mg/l | 1.24 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 24.8 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .025 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 4.86 |
| Gold | . | . |
| Iron | . | 36.5 |
| Lead | . | . |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.92 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.01 |
| FIELD EC | 1380. |
| FIELD TEMP | 18.8 |

APPROVED BY: [signature]

DATE: 07-21-93

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: OUTFALL B
DESCRITPION: OUTFALL BY SW-2
SAMPLE DATE: 07/26/93
SAMPLE TIME:
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19930727102
DATE RECEIVED: 07/26/93
TIME RECEIVED: 03:30 PM
REPORT DATE: 07/28/93

FORM 106-A

GRELIND PRINTING CENTER - RAPID CITY S.D.

## TOTAL RECOVERABLE METALS,O&G NOT VISIBLE

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | . |
| Hardness | . |
| PH | 3.16 |
| Solids, Dissolved, mg/l | . |
| Solids, Suspended, mg/l | 36.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | . |
| Bicarbonate | . |
| Carbonate, mg/l | . |
| Chloride, mg/l | . |
| Cyanide, Total, mg/l | . |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | .212 |
| Nitrogen, Nitrate, mg/l | 1.23 |
| Nitrogen, Nitrite, mg/l | <.050 |
| Sulfate, mg/l | . |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | . | 29.8 |
| Antimony | . | . |
| Arsenic | . | . |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | . | .025 |
| Calcium | . | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | . | 4.85 |
| Gold | . | . |
| Iron | . | 30.0 |
| Lead | . | . |
| Lithium | . | . |
| Magnesium | . | . |
| Manganese | . | . |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | . | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | . | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | . | 1.59 |

| SPECIAL TESTS | VALUE |
|---|---|
| FIELD PH | 3.22 |
| FIELD EC | 1270. |
| FIELD TEMP | 19.9 |
| DISCHARGE | 64.6 GPM |

APPROVED BY: Sherry Schaefer
DATE: 7/28/93

## TEST CONDITIONS: *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 48 hours

Sample Collection procedure: grab

Sample collection dates: 7/29/93 for Compliance Points 002 and OF-C; 7/30/93 for Bear Butte Crk.

Dilution water: Bear Butte Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <24h old

Feeding: none

End Point: mortality

Start date: 31 July 1993

End date: 2 August 1993

Type of exposure chamber: 50ml disposable plastic cups

Volume of exposure chamber: 25 ml

Number of Animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

## SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: COMPLIANCE POINT 002

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB, MS

Start: 31 July 1993 at 1115
End: 2 Aug. 1993 at 1145
Test substance: 002
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 6.25% Outfall 002 | 12.5% Outfall 002 | 25% Outfall 002 | 50% Outfall 002 | 100% Outfall 002 |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 20/20 | 20/20 | 19/20 | 20/20 | 18/20 |
| % Survival | 100 | 100 | 100 | 100 | 95 | 100 | 90 |
| Diss.$O_2$ max. / min. | 7.2 / 6.7 | 7.5 / 7.0 | 7.5 / 7.0 | 7.4 / 7.1 | 7.1 / 7.1 | 7.2 / 7.1 | 7.2 / 7.2 |
| pH initial / final | 8.45 / 8.37 | 7.97 / 8.14 | | | | | 7.86 / 8.43 |
| Conduct µS max./min. | 712 / 629 | 244 / 239 | | | | | 1301 / 1224 |
| Temp. °C max. / min. | 21.0 / 20.6 | 21.0 / 20.6 | 21.0 / 20.6 | 21.0 / 20.6 | 21.0 / 20.6 | 21.0 / 20.6 | 21.0 / 20.6 |

Statistical Analysis: response levels recorded as % 002

- 48h LC50 = cannot be calculated without <50% survival in any of the exposures
- NOEC (Dunnett's Procedure) = 100%

## SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: COMPLIANCE POINT OF-C (UNTREATED)

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB, MS

Start: 31 July 1993 at 1130
End: 2 Aug. 1993 at 1150
Test substance: Untreated OF-C
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 6.25% Outfall OF-C | 12.5% Outfall OF-C | 25% Outfall OF-C | 50% Outfall OF-C | 100% Outfall OF-C |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 5/20 | 0/20 | 0/20 | 0/20 | 0/20 |
| % Survival | 100 | 100 | 25 | 0 | 0 | 0 | 0 |
| Diss. $O_2$ max. min. | 7.2 / 6.7 | 7.2 / 7.0 | 7.2 / 7.0 | 7.3 | 7.3 | 7.3 | 7.3 |
| pH begin after 24h | 8.45 / 8.77 | 7.97 / 8.21 | | | | | 5.96 / NA |
| Conduct µmho max./min. | 712 / 629 | 261 / 228 | | | | | 531 |
| Temp. °C max. min. | 21.0 / 20.6 | 21.0 / 20.6 | 21.0 / 20.6 | 21.0 | 21.0 | 21.0 | 21.0 |

Statistical Analysis: recorded as % untreated OF-C

- 48h LC50 (graphical method) = 8.1% (95% CI could not be calculated)
- NOEC (Dunnett's Method) = <6.25%

## SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: COMPLIANCE POINT OF-C (pH TREATED)

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB, MS

Start: 31 July 1993 at 1245
End: 2 Aug. 1993 at 1220
Test substance: pH treated OF-C
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 6.25% treated Outfall OF-C | 12.5% treated Outfall OF-C | 25% treated Outfall OF-C | 50% treated Outfall OF-C | 100% treated Outfall OF-C |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 10/20 | 2/20 | 0/20 | 0/20 | 0/20 |
| % Survival | 100 | 100 | 50 | 10 | 0 | 0 | 0 |
| Diss. $O_2$ max. / min. | 7.2 / 6.7 | 7.0 / 7.0 | 7.1 / 7.0 | 7.0 / 7.0 | 7.0 | 7.0 | 7.0 |
| pH begin / end | 8.45 / 8.37 | 7.97 / 8.23 | | | | | 7.65 / 7.77 |
| Conduct µmho max./min. | 712 / 629 | 333 / 244 | | | | | 740 |
| Temp. °C max. / min. | 21.0 / 20.6 | 21.0 / 20.6 | 21.0 / 20.6 | 21.0 / 20.6 | 21.0 | 21.0 | 21.0 |

Statistical Analysis: recorded as % pH treated OF-C

- 48h LC50 (Probit Analysis) = 6.31% (95% CI, 3.92 to 7.90)
- NOEC (Dunnett's Method) = <6.25%

## TEST CONDITIONS: *PIMEPHALES PROMELAS* ACUTE TOXICITY TESTS

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 96 hours

Sample Collection procedure: grab

Sample collection dates: 7/29/93 for Compliance Points 002 and OF-C; 7/30/93 for Bear Butte Crk.

Dilution water: BB Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <7 days old

Feeding: 0.1 mL *Artemia* nauplii prior to test initiation and prior to the 48h renewal

End Point(s): mortality

Start date and time: 31 July 1993

End date and time: 4 August 1993

Type of exposure chamber: 400 ml glass beakers

Volume of exposure solution: 300 ml

Number of Animals exposed/chamber: 10

Number of replicates/treatment: 4

Test temperature: 20°C ± 1

Standard toxicant used: NaCl

Aeration: none

**SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TOXICITY TEST: COMPLIANCE POINT 002**

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, MS

Start: 31 July 1993 at 1215
End: 4 Aug. 1993 at 1130
Test substance: 002
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 6.25% Outfall 002 | 12.5% Outfall 002 | 25% Outfall 002 | 50% Outfall 002 | 100% Outfall 002 |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 40/40 | 40/40 | 40/40 | 39/40 | 40/40 | 40/40 |
| % Survival | 100 | 100 | 100 | 100 | 98 | 100 | 100 |
| Diss.$O_2$ max. / min. | 6.6 / 6.8 | 6.8 / 6.5 | 7.1 / 6.7 | 7.1 / 6.6 | 7.0 / 6.6 | 6.9 / 6.5 | 6.8 / 6.7 |
| pH begin / after 24h | 8.45 / 8.21 | 7.97 / 7.95 | | | | | 7.86 / 8.18 |
| Conduct. µmho max./min. | 741 / 710 | 305 / 195 | | | | | 1564 / 1461 |
| Temp.(°C) max. / min. | 20.2 / 19.5 | 20.2 / 19.5 | 20.2 / 19.5 | 20.2 / 19.5 | 20.2 / 19.5 | 20.2 / 19.5 | 20.2 / 19.5 |

Statistical Analysis: response levels recorded as % 002

- 96h LC50 = ND; cannot be calculated without <50% survival in any of the exposures
- NOEC (Dunnett's Method) = >100%

**SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TEST: COMPLIANCE POINT OF-C (UNTREATED)**

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, MS

Start: 31 July 1993 at 1235
End: 4 Aug. 1993 at 1140
Test substance: untreated OF-C
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 6.25% Outfall OF-C | 12.5% Outfall OF-C | 25% Outfall OF-C | 50% Outfall OF-C | 100% Outfall OF-C |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 39/40 | 38/40 | 37/40 | 32/40 | 6/40 | 0/40 |
| % Survival | 100 | 98 | 95 | 93 | 80 | 15 | 0 |
| Diss.$O_2$ max.<br>min. | 6.6<br>5.9 | 6.9<br>6.4 | 6.9<br>6.4 | 6.9<br>6.4 | 6.9<br>6.4 | 6.9<br>6.4 | 6.2 |
| pH begin<br>after 24h | 8.45<br>8.21 | 7.97<br>7.98 | | | | | 5.96<br>6.01 |
| Conduct. µmho<br>max./min. | 741<br>710 | 290<br>257 | | | | | 490 |
| Temp.(°C) max.<br>min. | 20.2<br>19.5 | 20.2<br>19.5 | 20.2<br>19.5 | 20.2<br>19.5 | 20.2<br>19.5 | 20.2<br>19.5 | 19.5 |

Statistical Analysis: recorded as % untreated OF-C

- 96h LC50 (Probit analysis) = 35.3% (95% CI, 30.5 to 40.0)
- NOEC (Wilcoxin Rank-Sum Test) = 25%

**SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TEST: COMPLIANCE POINT OF-C (pH TREATED)**

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, MS

Start: 31 July 1993 at 1300
End: 4 Aug. 1993 at 1210
Test substance: pH treated OF-C
Client/Project: Brohm Mining

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 6.25% treated Outfall OF-C | 12.5% treated Outfall OF-C | 25% treated Outfall OF-C | 50% treated Outfall OF-C | 100% treated Outfall OF-C |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 39/40 | 30/30¤ | 39/40 | 38/40 | 38/40 | 36/40 |
| % Survival | 100 | 98 | 100 | 98 | 95 | 95 | 90 |
| Diss.$O_2$ max. / min. | 6.6 / 6.8 | 6.7 / 5.9 | 6.8 / 6.4 | 6.9 / 6.5 | 6.8 / 6.5 | 6.9 / 6.4 | 7.1 / 6.4 |
| pH begin / after 24h | 8.45 / 8.21 | 7.97 / 8.02 | | | | | 7.65 / 7.79 |
| Conduct. µmho max./min. | 741 / 710 | 268 / 232 | | | | | 674 / 577 |
| Temp.(°C) max. / min. | 20.2 / 19.5 | 20.2 / 19.5 | 20.2 / 19.5 | 20.2 / 19.5 | 20.2 / 19.5 | 20.2 / 19.5 | 20.2 / 19.5 |

Statistical Analysis: response levels recorded as % pH treated OF-C

- 96h LC50 (Probit Analysis) = >100%
- NOEC (Dunnett's Method) = 100%

¤ An accidental spill occurred resulting in the loss of one of the four replicates.

## WET CHEMISTRY RESULTS ON SAMPLES RECEIVED 31 JULY 1993

Outfall samples were taken on 7/29 and receiving water samples were taken on 7/30:

| Measurement | Recon. $H_2O$ | BB Creek Rcv. $H_2O$ | 002 | Untreated OF-C | pH treated OF-C# |
|---|---|---|---|---|---|
| Analysis Temperature (°C) | 21 | 15 | 16 | 14 | 18 |
| Total Hardness ($mgCaCO_3/L$) | 204 | 98 | 1200 | 300 | ND¤ |
| pH | 8.45 | 7.97 | 7.86 | 5.96 | 7.65 |
| Alkalinity ($mgCaCO_3/L$) | 133 | 88 | 184 | 18 | 49 |
| Conductivity ($\mu$mho) | 534 | 207 | 1209 | 494 | 502 |
| Dissolved Oxygen ($mgO_2/L$) | 6.9 | 8.3 | 9.3 | 9.1 | 7.8 |
| Ammonia (mg $NH_3$-N/L | ND | 0.4 | 1.3 | 0.7 | 0.8 |
| Unionized Ammonia (mg $NH_3^+$) | 0 | 0 | 0 | 0 | 0 |
| Total Residual Chlorine (mg/L) | ND | ND | ND | 0.03 | ND |

# The pH was artificially raised with 1N NaOH to achieve a pH of 7 to 8 for use as pH treated OF-C.

¤ The ability to measure the total hardness was impaired by an unknown interference that did not allow the endpoint of the titration method to become clear.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON *CERIODAPHNIA DUBIA*

Test date: 29 June to 1 July, 1993

| g NaCl/L | control | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 20/20 | 20/20 | 17/20 | 7/20 | 0/20 | 0/20 |
| % survival | 100 | 100 | 85 | 35 | 0 | 0 |

LC50 (Probit Analysis) = 2.61g NaCl/L (95% CI, 2.34 to 2.87)

Note: This is within our accepted performance range (2.5 to 3.2) determined by 12 previous reference tests performed.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON FATHEAD MINNOW LARVAE

Test date: 1 to 5 August 1993

| g NaCl/L | control | 6.0 | 7.0 | 7.5 | 8.0 | 9.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 20/20 | 20/20 | 15/20 | 11/20 | 6/20 | 0/20 |
| % survival | 100 | 100 | 75 | 55 | 30 | 0 |

96h LC50 (Probit Analysis) = 7.54g NaCl/L (95% CI, 7.31 to 7.77)

Note: This is within our accepted performance range (7.2 to 8.7) determined by 12 previous reference tests performed.

**LITERATURE CITED:**

USEPA Region VIII. 1992. NPDES whole effluent toxics control program March, 1992. Denver, Colorado.

Weber, C.I. ed. 1991. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. 4th Edition. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. EPA/600/4-90/027.

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

**WATER ANALYSIS REPORT - BROHM MINING**

| SAMPLE I.D.: | Outfall A | Outfall B | |
|---|---|---|---|
| Sample Date: | 07-25-93 | 07-25-93 | |
| Report Date: | 08-06-93 | 08-06-93 | |
| Sample Number: | 93-29337 | 93-29338 | |
| **RADIOMETRIC pCi/l:** | | | **Det.Limit** |
| Gross Alpha | 4.9 | 70.8 | 1.0 |
| Gross Alpha Prec. +/- | 1.7 | 6.9 | |

**Report Approved By:** R.A. Leahy

kmk s329337.bm

BROHM MINING CORP.

September 17, 1993

Mr. Steve Burkett, Chief
NPDES Branch
Management Division
U.S.E.P.A.
999 18th St., Suite 500
Denver, CO 80202-2466

Mr. Burkett:

Enclosed are the monitoring results from August 1993 requested in the order "Docket No. CWA-V111-93-04-C."

If you have any further questions, please don't hesitate to call.

Sincerely,

BROHM MINING CORP.

Stan Michals
Environmental Technician

SM:sm

cc: Steve Pirner, SDDENR
Dale Cockrell, Truhe Law Offices
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Brohm Mining Corp. is a wholly owned affiliate of Minven Gold Corporation

BROHM MINING CORPORATION
MONITORING RESULTS FROM AUGUST 1993
DOCKET NO. CWA-VIII-93-04-C

| OUTFALL "A" | FLOW GPD | FIELD pH | OIL/ GREASE |
|---|---|---|---|
| 8-02-93 | 14400 | 6.69 | NON-VISIBLE |
| 8-09-93 | 10080 | 6.74 | NON-VISIBLE |
| 8-16-93 | 8640 | 7.00 | NON-VISIBLE |
| 8-23-93 | 11520 | 6.88 | NON-VISIBLE |
| 8-30-93 | 7200 | 6.78 | NON-VISIBLE |
| OUTFALL "B" | | | |
| 8-02-93 | 74880 | 3.07 | NON-VISIBLE |
| 8-06-93 | 59040 | 2.78 | NON-VISIBLE |
| 8-09-93 | 53280 | 3.00 | NON-VISIBLE |
| 8-13-93 | 43200 | 2.73 | NON-VISIBLE |
| 8-16-93 | 40320 | 3.13 | NON-VISIBLE |
| 8-20-93 | 47520 | 2.86 | NON-VISIBLE |
| 8-23-93 | 38880 | 3.03 | NON-VISIBLE |
| 8-27-93 | 36000 | 2.72 | NON-VISIBLE |
| 8-30-93 | 31680 | 3.19 | NON-VISIBLE |

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

**WATER ANALYSIS REPORT - BROHM MINING**

| SAMPLE I.D.: | Outfall A | Outfall B | |
|---|---|---|---|
| Sample Date: | 08-02-93 | 08-02-93 | |
| Report Date: | 08-16-93 | 08-16-93 | |
| Sample Number: | 93-29811 | 93-29812 | |
| **RADIOMETRIC pCi/l:** | | | **Det.Limit** |
| Gross Alpha | <1.0 | <1.0 | 1.0 |
| Gross Alpha Prec. +/- | | | |

Report Approved By: KB Rea

sv s329811.bm

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QUALITY ASSURANCE REPORT – Brohm Mining Corporation
Report Date: 17–Aug–93
ELI #(s): 93:29811–12

| RADIOMETRIC pCi/gm: | METHOD | Dup #1 % | Dup #2 % | Spk #1 % | Spk #2 % | ANALYST | DATE SAMPLE ANALYZED |
|---|---|---|---|---|---|---|---|
| Gross Alpha | EPA–900.0 | 100 | --- | --- | --- | DB | 8–12–93 |

USEPA–ESML–LV INTERCOMPARISON STUDY RESULTS

| Radiometric | Method | ELI Value | Standard | Difference | Analyst | Date |
|---|---|---|---|---|---|---|
| Uranium | EPA–908.1 | 5.07 | 4.00 | 1.07 | DB | 13–Apr–92 |
| Ra226 | EPA–903.1 | 16.30 | 14.90 | 1.40 | DB | 13–Apr–92 |
| Ra228 | EPA–904.1 | 16.17 | 14.00 | 2.17 | DB | 13–Apr–92 |
| Gross Alpha | EPA–900.0 | 9.33 | 15.00 | –5.67 | DB | 14–May–92 |
| Gross Beta | EPA–900.0 | 35.00 | 44.00 | –9.00 | DB | 14–May–92 |

Report Approved By: DB Rea

dmc 93:29811–12

## TEST CONDITIONS: *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 48 hours

Sample Collection procedure: grab

Sample collection dates: 11 August 1993

Dilution water: Bear Butte Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <24h old

Feeding: none

End Point: mortality

Start date: 13 August 1993

End date: 15 August 1993

Type of exposure chamber: 50ml disposable plastic cups

Volume of exposure chamber: 25 ml

Number of Animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature: 20°C ± 2

Standard toxicant used: NaCl

## SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: Outfall A

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB

Start: 13 Aug. 1993 at 1115
End: 15 Aug. 1993 at 1100
Test substance: Outfall A
Client/Project: Brohm Mining Corporation

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 6.25% Outfall A | 12.5% Outfall A | 25% Outfall A | 50% Outfall A | 100% Outfall A |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 |
| % Survival | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Diss.$O_2$ max. / min. | 6.7 / 6.4 | 6.7 / 6.4 | 6.7 / 6.5 | 6.7 / 6.5 | 6.7 / 6.4 | 6.7 / 6.4 | 6.7 / 6.5 |
| pH initial / after 24h | 8.02 / 8.65 | 8.16 / 8.47 | | | | | 8.02 / 8.63 |
| Conduct µS max./min. | 679 / 662 | 281 / 276 | | | | | 1172 / 1152 |
| Temp. °C max. / min. | 21.6 / 21.0 | 21.6 / 21.0 | 21.6 / 21.0 | 21.6 / 21.0 | 21.6 / 21.0 | 21.6 / 21.0 | 21.6 / 21.0 |

Statistical Analysis: response levels recorded as % Outfall B

- 48h LC50 = ND; cannot be calculated without <50% survival in any of the exposures
- NOEC (Dunnett's Procedure) = 100%

**SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: Untreated Outfall B**

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB

Start: 13 Aug. 1993 at 1130
End: 15 Aug. 1993 at 1115
Test substance: Untreated Outfall B
Client/Project: Brohm Mining Corporation

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 6.25% Outfall B | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 0/20 | 0/20 | 0/20 | 0/20 | 0/20 |
| % Survival | 100 | 100 | 0 | 0 | 0 | 0 | 0 |
| Diss. $O_2$ max. min. | 6.7 / 6.4 | 6.7 / 6.3 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 |
| pH begin after 24h | 8.02 / 8.65 | 8.16 / 8.47 | | | | | 3.23 / 3.28 |
| Conduct µmho max./min. | 679 / 662 | 261 / 228 | | | | | 1675 |
| Temp. °C max. min. | 21.6 / 21.0 | 21.0 / 21.6 | 21.0 / 21.6 | 21.0 | 21.0 | 21.0 | 21.0 |

Statistical Analysis: recorded as % untreated Outfall B

- 48h LC50 (graphical method) = 2.8% (95% CI could not be calculated)
- NOEC (Dunnett's Method) = <6.25%

**SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: pH treated Outfall B**

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB, MS

Start: 13 Aug. 1993 at 1145
End: 15 Aug. 1993 at 1125
Test substance: pH treated Outfall B
Client/Project: Brohm Mining Corporation

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 6.25% treated Outfall B | 12.5% treated Outfall B | 25% treated Outfall B | 50% treated Outfall B | 100% treated Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 19/19° | 15/20 | 14/20 | 10/20 | 9/20 | 1/20 |
| % Survival | 100 | 100 | 75 | 70 | 50 | 45 | 5 |
| Diss. $O_2$ max. / min. | 6.7 / 6.4 | 6.4 / 6.3 | 6.4 / 6.3 | 6.4 / 6.3 | 6.4 / 6.3 | 6.4 / 6.4 | 6.4 / 6.4 |
| pH begin / after 24h | 8.02 / 8.65 | 8.16 / 8.34 | | | | | 7.68 / 7.62 |
| Conduct µmho max./min. | 679 / 662 | 293 / 273 | | | | | 1709 / 1731 |
| Temp. °C max. / min. | 21.6 / 21.0 | 21.6 / 21.0 | 21.6 / 21.0 | 21.6 / 21.0 | 21.6 / 21.0 | 21.6 / 21.0 | 21.6 / 21.0 |

Statistical Analysis: recorded as % pH treated OF-C

- 48h LC50 (Probit Analysis) = 23.5% (95% CI, 15.1 to 36.0)
- NOEC (Steel's Many One Rank test) = <6.25%

° One of the original 20 *Ceriodaphnia* neonates could not be used in the data analysis since it was found stuck to the side of the exposure vessel.

## TEST CONDITIONS: *PIMEPHALES PROMELAS* ACUTE TOXICITY TESTS

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 96 hours

Sample Collection procedure: grab

Sample collection dates: 11 August 1993

Dilution water: Bear Butte Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <7 days old

Feeding: 0.1 mL *Artemia* nauplii prior to test initiation and prior to the 48h renewal

End Point(s): mortality

Start date and time: 12 August 1993

End date and time: 16 August 1993

Type of exposure chamber: 400 ml glass beakers

Volume of exposure solution: 300 ml

Number of Animals exposed/chamber: 10

Number of replicates/treatment: 4

Test temperature: 20°C ± 2

Standard toxicant used: NaCl

Aeration: none

## SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TOXICITY TEST: Outfall A

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, MS

Start: 12 Aug. 1993 at 1200
End: 16 Aug. 1993 at 1200
Test substance: Outfall A
Client/Project: Brohm Mining Corporation

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 6.25% Outfall A | 12.5% Outfall A | 25% Outfall A | 50% Outfall A | 100% Outfall A |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 39/39 | 40/40 | 40/40 | 40/40 | 40/40 | 40/40 |
| % Survival | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Diss.$O_2$ max. / min. | 6.5 / 6.0 | 6.4 / 6.0 | 6.4 / 6.0 | 6.4 / 6.0 | 6.4 / 6.1 | 6.4 / 6.0 | 6.4 / 6.1 |
| pH begin / after 24h | 8.02 / 8.05 | 8.16 / 8.10 | | | | | 8.02 / 8.19 |
| Conduct. µmho max./min. | 727 / 668 | 261 / 251 | | | | | 1211 / 1168 |
| Temp.(°C) max. / min. | 21.6 / 20.8 | 21.6 / 20.8 | 21.6 / 20.8 | 21.6 / 20.8 | 21.6 / 20.8 | 21.6 / 20.8 | 21.6 / 20.8 |

Statistical Analysis: response levels recorded as % Outfall A

- 96h LC50 = ND; cannot be calculated without <50% survival in any of the exposures
- NOEC (Dunnett's Method) = >100%

**SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TEST: Untreated Outfall B**

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, MS

Start: 12 August 1993 at 1030
End: 16 Aug. 1993 at 1105
Test substance: Untreated Outfall B
Client/Project: Brohm Mining Corporation

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 6.25% Outfall B | 12.5% Outfall B | 25% Outfall B | 50% Outfall B | 100% Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 40/40 | 28/40 | 0/40 | 0/40 | 0/40 | 0/40 |
| % Survival | 100 | 100 | 70 | 0 | 0 | 0 | 0 |
| Diss.$O_2$ max. / min. | 6.4 / 6.0 | 6.9 / 6.0 | 6.9 / 6.2 | 6.3 | 6.5 | 6.6 | 6.6 |
| pH begin / after 24h | 8.02 / 8.05 | 7.97 / 7.98 | | | | | 5.96 / 6.01 |
| Conduct. µmho max./min. | 727 / 668 | 279 / 246 | | | | | 1550 |
| Temp.(°C) max. / min. | 21.6 / 20.8 | 21.6 / 20.8 | 21.6 / 20.8 | 21.0 | 21.0 | 21.0 | 21.0 |

Statistical Analysis: recorded as % untreated Outfall B

- 96h LC50 (Spearman-Karber method) = 7.62% (95% CI, NA)
- NOEC (Dunnett's procedure) = <6.25%

**SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TEST: pH treated Outfall B**

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB, MS

Start: 12 Aug. 1993 at 1245
End: 16 Aug. 1993 at 1300
Test substance: pH treated Outfall B
Client/Project: Brohm Mining Corporation

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 6.25% treated Outfall B | 12.5% treated Outfall B | 25% treated Outfall B | 50% treated Outfall B | 100% treated Outfall B |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 40/40 | 39/40 | 40/40 | 40/40 | 40/40 | 40/40 |
| % Survival | 100 | 100 | 98 | 100 | 100 | 100 | 100 |
| Diss.$O_2$ max. / min. | 6.5 / 6.0 | 6.7 / 5.9 | 6.8 / 6.4 | 6.9 / 6.5 | 6.8 / 6.5 | 6.9 / 6.4 | 7.1 / 6.4 |
| pH begin / after 24h | 8.02 / 8.05 | 8.16 / 7.71 | | | | | 7.68 / 7.53 |
| Conduct. µmho max./min. | 727 / 668 | 270 / 248 | | | | | 1800 / 1733 |
| Temp.(°C) max. / min. | 21.6 / 20.8 | 21.6 / 20.8 | 21.6 / 20.8 | 21.6 / 20.8 | 21.6 / 20.8 | 21.6 / 20.8 | 21.6 / 20.8 |

Statistical Analysis: response levels recorded as % pH treated Outfall B

- 96h LC50 = ND; cannot be calculated without <50% survival in any of the exposures
- NOEC (Dunnett's Method) = 100%

## WET CHEMISTRY RESULTS ON SAMPLES RECEIVED 12 AUGUST 1993

Samples were taken on 11 August 1993:

| Measurement | Recon. $H_2O$ | BB Creek Rcv. $H_2O$ | Outfall A | Untreated Outfall B | pH treated Outfall B# |
|---|---|---|---|---|---|
| Analysis Temperature (°C) | 24 | 16.0 | 18.0 | 16.0 | 18 |
| Total Hardness ($mgCaCO_3/L$) | 202 | 110 | 362 | 4100 | ND¤ |
| pH | 8.02 | 8.16 | 8.02 | 3.23 | 7.65 |
| Alkalinity ($mgCaCO_3/L$) | 132 | 112 | 218 | NA° | 74 |
| Conductivity ($\mu$mho) | 707 | 215 | 1136 | 1501 | 1635 |
| Dissolved Oxygen ($mgO_2/L$) | 6.5 | 8.8 | 4.5 | 8.1 | 7.5 |
| Ammonia (mg $NH_3$-N/L | ND | 0.06 | 0.03 | 0.16 | 0.18 |
| Unionized Ammonia (mg $NH_3^+$) | 0 | 0 | 0 | 0.02 | 0.02 |
| Total Residual Chlorine (mg/L) | ND | 0.04 | ND | ND | ND |

# The pH was artificially raised with 1N NaOH to achieve a pH of 7 to 8 for use as pH treated Outfall B.

¤ This is only an estimation since, as before, the ability to measure hardness was impaired by an unknown interference that did not allow the endpoint of the titration method to become clear.

° To determine alkalinity, the pH of the sample must be >4.5.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON *CERIODAPHNIA DUBIA*

Test date: 14 to 16 August 1993

| g NaCl/L | control | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 20/20 | 20/20 | 17/20 | 16/20 | 12/20 | 1/20 |
| % survival | 100 | 100 | 85 | 80 | 60 | 5 |

LC50 (Probit Analysis) = 2.35g NaCl/L (95% CI, 2.15 to 2.58)

Note: This is within our accepted performance range (1.6 to 3.2) determined by 12 previous reference tests performed.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON FATHEAD MINNOW LARVAE

Test date: 12 to 16 August 1993

| g NaCl/L | control | 6.0 | 7.0 | 7.5 | 8.0 | 9.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 20/20 | 20/20 | 18/20 | 15/20 | 11/20 | 0/20 |
| % survival | 100 | 100 | 90 | 75 | 55 | 0 |

96h LC50 (Probit Analysis) = 7.90g NaCl/L (95% CI, 7.69 to 8.15)

Note: This is within our accepted performance range (7.2 to 8.6) determined by 12 previous reference tests performed.

**LITERATURE CITED:**

USEPA Region VIII. 1992. NPDES whole effluent toxics control program March, 1992. Denver, Colorado.

Weber, C.I. ed. 1991. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. 4th Edition. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. EPA/600/4-90/027.

BROHM MINING CORPORATION
GILT EDGE MINE

| LOCATION | DATE | TIME | CONDUCT-IVITY | HARDNESS | PH | SOLIDS DISSOLVE | SOLIDS SUSPEND | TURBIDITY | ALKALINITY BICARBONATE | CARBONATE | CHLORIDE | CYANIDE TOTAL | CYANIDE WAD | CYANIDE FREE | FLUORIDE | NITROGEN AMMONIA | NITROGEN NITRATE | NITROGEN NITRITE | SULFATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OUTFALL A | 08/02/93 | 10:55 AM | | 426 | 7.25 | | <10.0 | | | | | <.010 | <.010 | | | <.050 | 1.96 | <.050 | 553 |
| OUTFALL A | 08/09/93 | 10:40 AM | | | 7.31 | | <10.0 | | | | | <.010 | <.010 | | | <.050 | 1.65 | <.050 | |
| OUTFALL A | 08/16/93 | 10:55 AM | | | 7.26 | | <10.0 | | | | | <.010 | <.010 | | | <.050 | 1.27 | <.050 | |
| OUTFALL A | 08/23/93 | 01:50 PM | | | 7.18 | | <10.0 | | | | | <.010 | <.010 | | | <.050 | 2.42 | <.050 | |
| OUTFALL A | 08/30/93 | | | | 7.24 | | <10.0 | | | | | <.010 | <.010 | | | <.050 | 1.61 | <.050 | |
| OUTFALL B | 08/02/93 | 02:25 PM | | 539 | 3.21 | | <10.0 | | | | | <.010 | <.010 | | | 0.181 | 1.23 | <.050 | 803 |
| OUTFALL B | 08/09/93 | 11:35 AM | | | 3.16 | | <10.0 | | | | | | | | | 0.206 | 1.25 | <.050 | |
| OUTFALL B | 08/16/93 | 11:40 AM | | | 3.16 | | | 10 | | | | | | | | 0.224 | 1.14 | <.050 | |
| OUTFALL B | 08/23/93 | 11:35 AM | | | 3.05 | | <10.0 | | | | | | | | | 0.238 | 1.17 | <.050 | |
| OUTFALL B | 08/30/93 | | | | 3.21 | | <10.0 | | | | | | | | | 0.285 | 1.08 | <.050 | |

BROHM MINING CORPO
GILT EDGE MINE

| LOCATION | DATE | TIME | ALUMINUM DISS. | ALUMINUM TOTAL | ANTIMONY DISS. | ANTIMONY TOTAL | ARSENIC DISS. | ARSENIC TOTAL | BARIUM DISS. | BARIUM TOTAL | BERYLLIUM DISS. | BERYLLIUM TOTAL | BORON DISS. | BORON TOTAL | CADMIUM DISS. | CADMIUM TOTAL | CALCIUM DISS. | CALCIUM TOTAL | CHROMIUM DISS. | CHROMIUM TOTAL | COBALT DISS. | COBALT TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OUTFALL A | 08/02/93 | 10:55 AM | | 0.546 | | | | 0.036 | | | | | | | | 0.002 | | 129 | | | | |
| OUTFALL A | 08/09/93 | 10:40 AM | | 0.288 | | | | | | | | | | | | 0.002 | | | | | | |
| OUTFALL A | 08/16/93 | 10:55 AM | | 0.087 | | | | | | | | | | | | 0.003 | | | | | | |
| OUTFALL A | 08/23/93 | 01:50 PM | | <.050 | | | | | | | | | | | | 0.003 | | | | | | |
| OUTFALL A | 08/30/93 | | | 0.055 | | | | | | | | | | | | 0.001 | | | | | | |
| OUTFALL B | 08/02/93 | 02:25 PM | | 31.3 | | | | 0.152 | | | | | | | | 0.037 | | 140 | | | | |
| OUTFALL B | 08/09/93 | 11:35 AM | | 29.3 | | | | | | | | | | | | 0.03 | | | | | | |
| OUTFALL B | 08/16/93 | 11:40 AM | | 32 | | | | | | | | | | | | 0.031 | | | | | | |
| OUTFALL B | 08/23/93 | 11:35 AM | | 33.8 | | | | | | | | | | | | 0.028 | | | | | | |
| OUTFALL B | 08/30/93 | | | 27.4 | | | | | | | | | | | | 0.029 | | | | | | |

BROHM MINING CORPO
GILT EDGE MINE

| LOCATION | DATE | TIME | COPPER DISS. | COPPER TOTAL | GOLD DISS. | GOLD TOTAL | IRON DISS. | IRON TOTAL | LEAD DISS. | LEAD TOTAL | LITHIUM DISS. | LITHIUM TOTAL | MAGNESIUM DISS. | MAGNESIUM TOTAL | MANGANESE DISS. | MANGANESE TOTAL | MERCURY DISS. | MERCURY TOTAL | MOLYBDENUM DISS. | MOLYBDENUM TOTAL | NICKEL DISS. | NICKEL TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OUTFALL A | 08/02/93 | 10:55 AM | | 0.026 | | | | <.050 | | <.001 | | | | 25.2 | | <.050 | | <.0002 | | | | |
| OUTFALL A | 08/09/93 | 10:40 AM | | 0.02 | | | | 0.087 | | | | | | | | | | | | | | |
| OUTFALL A | 08/16/93 | 10:55 AM | | 0.022 | | | | <.050 | | | | | | | | | | | | | | |
| OUTFALL A | 08/23/93 | 01:50 PM | | 0.023 | | | | <.050 | | | | | | | | | | | | | | |
| OUTFALL A | 08/30/93 | | | 0.024 | | | | <.050 | | | | | | | | | | | | | | |
| OUTFALL B | 08/02/93 | 02:25 PM | | 5.15 | | | | 32.3 | | 0.001 | | | | 46 | | 8.77 | | <.0002 | | | | |
| OUTFALL B | 08/09/93 | 11:35 AM | | 4.43 | | | | 32.6 | | | | | | | | | | | | | | |
| OUTFALL B | 08/16/93 | 11:40 AM | | 4.32 | | | | 25.9 | | | | | | | | | | | | | | |
| OUTFALL B | 08/23/93 | 11:35 AM | | 4.04 | | | | 21.9 | | | | | | | | | | | | | | |
| OUTFALL B | 08/30/93 | | | 2.96 | | | | 21.9 | | | | | | | | | | | | | | |

BROHM MINING CORPO
GILT EDGE MINE

| LOCATION | DATE | TIME | POTASSIUM DISS. | POTASSIUM TOTAL | SELENIUM DISS. | SELENIUM TOTAL | SILICON DISS. | SILICON TOTAL | SILVER DISS. | SILVER TOTAL | SODIUM DISS. | SODIUM TOTAL | STRONTIUM DISS. | STRONTIUM TOTAL | VANADIUM DISS. | VANADIUM TOTAL | ZINC DISS. | ZINC TOTAL | ANION | CATION | %BALANCE | LAB NUMBER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OUTFALL A | 08/02/93 | 10:55 AM | | | | <.005 | | | | 0.005 | | | | | | | | <.050 | | | | 19930804102 |
| OUTFALL A | 08/09/93 | 10:40 AM | | | | | | | | | | | | | | | | 0.296 | | | | 19930810102 |
| OUTFALL A | 08/16/93 | 10:55 AM | | | | | | | | | | | | | | | | <.050 | | | | 19930817111 |
| OUTFALL A | 08/23/93 | 01:50 PM | | | | | | | | | | | | | | | | <.050 | | | | 19930825109 |
| OUTFALL A | 08/30/93 | | | | | | | | | | | | | | | | | <.050 | | | | 19930831106 |
| OUTFALL B | 08/02/93 | 02:25 PM | | | | <.005 | | | | 0.002 | | | | | | | | 0.855 | | | | 19930804103 |
| OUTFALL B | 08/09/93 | 11:35 AM | | | | | | | | | | | | | | | | 1.81 | | | | 19930810103 |
| OUTFALL B | 08/16/93 | 11:40 AM | | | | | | | | | | | | | | | | 1.16 | | | | 19930817112 |
| OUTFALL B | 08/23/93 | 11:35 AM | | | | | | | | | | | | | | | | 1.67 | | | | 19930825110 |
| OUTFALL B | 08/30/93 | | | | | | | | | | | | | | | | | 1.56 | | | | 19930831107 |

BROHM MINING CORP.

October 19, 1993

Melanie Pallman
NPDES Branch
Management Division
U.S.E.P.A.
999 18th St., Suite 500
Denver, CO 80202-2466

Dear Melanie:

Enclosed are the monitoring results from September 1993 requested in the order "Docket No. CWA-V111-93-04-C."

If you have any further questions, please don't hesitate to call.

Sincerely,

BROHM MINING CORP.

Stan Michals
Environmental Technician

SM:sm

cc: Tim Tollefsrud, SD DENR
Dale Cockrell, Truhe Law Offices
Rod MacLeod, BMC
Lance Hubbard, BMC
Dale Shay, BMC
Samuel H. Sage, Atlantic States Legal Foundation
Deb Rogers Miller, TIP

envi\epa9.sm

South Dakota Office: P.O. Box 485, Deadwood, South Dakota 57732
Telephone: (605) 578-2107 Telecopier: (605) 578-1709

Brohm Mining Corp. is a wholly owned affiliate of Minven Gold Corporation

BROHM MINING CORPORATION
MONITORING RESULTS FROM SEPTEMBER 1993
DOCKET NO. CWA-VIII-93-04-C"

| OUTFALL "A" | FLOW GPD | FIELD pH | OIL/ GREASE |
|---|---|---|---|
| 9-07-93 | 7776 | 7.23 | NON-VISIBLE |
| 9-13-93 | 6048 | 7.14 | NON-VISIBLE |
| 9-20-93 | 11520 | 7 | NON-VISIBLE |
| 9-27-93 | 8640 | 6.97 | NON-VISIBLE |
| OUTFALL "B" | | | |
| 9-03-93 | 23040 | 3.2 | NON-VISIBLE |
| 9-07-93 | 21024 | 3.18 | NON-VISIBLE |
| 9-10-93 | 21600 | 2.93 | NON-VISIBLE |
| 9-13-93 | 18720 | 3.11 | NON-VISIBLE |
| 9-17-93 | 21600 | 2.92 | NON-VISIBLE |
| 9-20-93 | 14400 | 3.05 | NON-VISIBLE |
| 9-24-93 | 17280 | 2.96 | NON-VISIBLE |
| 9-27-93 | 14400 | 3.12 | NON-VISIBLE |
| 9-30-93 | 10080 | 2.35 | NON-VISIBLE |

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

**WATER ANALYSIS REPORT - BROHM MINING**

| **SAMPLE I.D.:** | **Outfall A** | **Outfall B** | |
|---|---|---|---|
| Sample Date: | 09-07-93 | 09-07-93 | |
| Report Date: | 09-22-93 | 09-22-93 | |
| Sample Number: | 93-40781 | 93-40782 | |
| **RADIOMETRIC pCi/l:** | | | **Det.Limit** |
| Gross Alpha | <1.0 | 23.4 | 1.0 |
| Gross Alpha Prec. +/- | | 2.1 | |

**Report Approved By:** R.A. Sanding

sv s340781.bm

BROHM MINING CORPORATION
MONITORING RESULTS FROM SEPTEMBER 1993
DOCKET NO. CWA-VIII-93-04-C*

| LOCATION | DATE | TIME | CONDUCTIVITY | HARDNESS | PH | SOLIDS DISSOLVE | SOLIDS SUSPEND | TURBIDITY | ALKALINITY BICARBONATE | CARBONATE | CHLORIDE | CYANIDE TOTAL | CYANIDE WAD | CYANIDE FREE | FLUORIDE | NITROGEN AMMONIA | NITROGEN NITRATE | NITROGEN NITRITE | SULFATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OUTFALL A | 09/07/93 | 10:55 AM | | 348 | 7.3 | | <10.0 | | | | | <.010 | <.010 | | | <.050 | 1.39 | <.050 | 337 |
| OUTFALL A | 09/13/93 | 10:15 AM | | | 7.22 | | <10.0 | | | | | <.010 | <.010 | | | <.050 | 1.26 | <.050 | |
| OUTFALL A | 09/20/93 | 10:45 AM | | | 7.17 | | <10.0 | | | | | <.010 | <.010 | | | <.050 | 4.82 | <.050 | |
| OUTFALL A | 09/27/93 | 10:40 AM | | | 7.25 | | <10.0 | | | | | <.010 | <.010 | | | <.050 | 5.8 | <.050 | |
| OUTFALL B | 09/07/93 | 12:05 PM | | 555 | 3.12 | | <10.0 | | | | | <.010 | <.010 | | | 0.377 | 1 | <.050 | 908 |
| OUTFALL B | 09/13/93 | 11:55 AM | | | 3.21 | | <10.0 | | | | | | | | | 0.36 | 1 | <.050 | |
| OUTFALL B | 09/20/93 | 02:10 PM | | | 3.06 | | 15 | | | | | | | | | 0.39 | 0.953 | <.050 | |
| OUTFALL B | 09/27/93 | 11:50 AM | | | 3.14 | | <10.0 | | | | | | | | | 0.425 | 1.04 | <.050 | |

BROHM MINING CORPORATION
MONITORING RESULTS FROM SEPTEMBER
DOCKET NO. CWA-VIII-93-04-C*

| LOCATION | DATE | TIME | ALUMINUM DISS. | ALUMINUM TOTAL | ANTIMONY DISS. | ANTIMONY TOTAL | ARSENIC DISS. | ARSENIC TOTAL | BARIUM DISS. | BARIUM TOTAL | BERYLLIUM DISS. | BERYLLIUM TOTAL | BORON DISS. | BORON TOTAL | CADMIUM DISS. | CADMIUM TOTAL | CALCIUM DISS. | CALCIUM TOTAL | CHROMIUM DISS. | CHROMIUM TOTAL | COBALT DISS. | COBALT TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OUTFALL A | 09/07/93 | 10:55 AM | | 0.106 | | | | 0.001 | | | | | | | | 0.002 | | | | | | |
| OUTFALL A | 09/13/93 | 10:15 AM | | 0.052 | | | | | | | | | | | | 0.002 | | | | | | |
| OUTFALL A | 09/20/93 | 10:45 AM | | 0.086 | | | | | | | | | | | | 0.002 | | | | | | |
| OUTFALL A | 09/27/93 | 10:40 AM | | <.050 | | | | | | | | | | | | 0.002 | | | | | | |
| OUTFALL B | 09/07/93 | 12:05 PM | | 33.5 | | | | 0.048 | | | | | | | | 0.018 | | | | | | |
| OUTFALL B | 09/13/93 | 11:55 AM | | 40.3 | | | | | | | | | | | | 0.025 | | | | | | |
| OUTFALL B | 09/20/93 02:10 PM | | | 39.1 | | | | | | | | | | | | 0.033 | | | | | | |
| OUTFALL B | 09/27/93 | 11:50 AM | | 38.9 | | | | | | | | | | | | 0.027 | | | | | | |

BROHM MINING CORPORATION
MONITORING RESULTS FROM SEPTEMBER
DOCKET NO. CWA-VIII-93-04-C*

| LOCATION | DATE | TIME | COPPER DISS. | COPPER TOTAL | GOLD DISS. | GOLD TOTAL | IRON DISS. | IRON TOTAL | LEAD DISS. | LEAD TOTAL | LITHIUM DISS. | LITHIUM TOTAL | MAGNESIUM DISS. | MAGNESIUM TOTAL | MANGANESE DISS. | MANGANESE TOTAL | MERCURY DISS. | MERCURY TOTAL | MOLYBDENUM DISS. | MOLYBDENUM TOTAL | NICKEL DISS. | NICKEL TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OUTFALL A | 09/07/93 | 10:55 AM | | 0.011 | | | | 0.054 | | <.001 | | | | | | <.050 | | <.0002 | | | | |
| OUTFALL A | 09/13/93 | 10:15 AM | | 0.058 | | | | 0.193 | | | | | | | | | | | | | | |
| OUTFALL A | 09/20/93 | 10:45 AM | | 0.026 | | | | 0.063 | | | | | | | | | | | | | | |
| OUTFALL A | 09/27/93 | 10:40 AM | | 0.023 | | | | <.050 | | | | | | | | | | | | | | |
| OUTFALL B | 09/07/93 | 12:05 PM | | 3.2 | | | | 26.4 | | <.001 | | | | | | 9.36 | | <.0002 | | | | |
| OUTFALL B | 09/13/93 | 11:55 AM | | 2.92 | | | | 17.9 | | | | | | | | | | | | | | |
| OUTFALL B | 09/20/93 | 02:10 PM | | 3.07 | | | | 19.5 | | | | | | | | | | | | | | |
| OUTFALL B | 09/27/93 | 11:50 AM | | 3.46 | | | | 26.1 | | | | | | | | | | | | | | |

BROHM MINING CORPORATION
MONITORING RESULTS FROM SEPTEMBER
DOCKET NO. CWA-VIII-93-04-C*

| LOCATION | DATE | TIME | POTASSIUM DISS. | POTASSIUM TOTAL | SELENIUM DISS. | SELENIUM TOTAL | SILICON DISS. | SILICON TOTAL | SILVER DISS. | SILVER TOTAL | SODIUM DISS. | SODIUM TOTAL | STRONTIUM DISS. | STRONTIUM TOTAL | VANADIUM DISS. | VANADIUM TOTAL | ZINC DISS. | ZINC TOTAL | ANION | CATION | %BALANCE | LAB NUMBER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OUTFALL A | 09/07/93 | 10:55 AM | | | | <.005 | | | | 0.002 | | | | | | | | 0.105 | | | | 19930908104 |
| OUTFALL A | 09/13/93 | 10:15 AM | | | | | | | | | | | | | | | | 0.1 | | | | 19930914104 |
| OUTFALL A | 09/20/93 | 10:45 AM | | | | | | | | | | | | | | | | 0.064 | | | | 19930921104 |
| OUTFALL A | 09/27/93 | 10:40 AM | | | | | | | | | | | | | | | | 0.064 | | | | 19930929101 |
| OUTFALL B | 09/07/93 | 12:05 PM | | | | <.005 | | | | <.001 | | | | | | | | 2.17 | | | | 19930908105 |
| OUTFALL B | 09/13/93 | 11:55 AM | | | | | | | | | | | | | | | | 2.07 | | | | 19930914105 |
| OUTFALL B | 09/20/93 | 02:10 PM | | | | | | | | | | | | | | | | 2.35 | | | | 19930921105 |
| OUTFALL B | 09/27/93 | 11:50 AM | | | | | | | | | | | | | | | | 2.26 | | | | 19930929102 |

BROHM MINING CORP.

November 17, 1993

Melanie Pallman
NPDES Branch
Management Division
U.S.E.P.A.
999 18th St., Suite 500
Denver, CO 80202-2466

Dear Melanie:

Enclosed are the monitoring results from October 1993 requested in the order "Docket No. CWA-V111-93-36-C."

If you have any further questions, please don't hesitate to call.

Sincerely,

BROHM MINING CORP.

Stan Michals
Environmental Technician

SM:sm

cc: Tim Tollefsrud SDDENR
Dale Cockrell, Truhe Law Offices
Rod MacLeod, BMC
Lance Hubbard, BMC
Dale Shay, BMC
Samuel H. Sage, Atlantic States Legal Foundation
Deb Rogers Miller, TIP

ENVI\EPA10.SM

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Brohm Mining Corp. is a wholly owned affiliate of Minven Gold Corporation

BROHM MINING CORPORATION
MONITORING RESULTS FROM OCTOBER 1993
DOCKET NO. CWA-VIII-93-36-C

| 001 | | | | | 002 | | | | | STRAWBERRY CREEK SEEP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | FLOW GPD | FIELD pH | FIELD Temp. C | OIL/ GREASE | DATE | FLOW GPD | FIELD pH | FIELD Temp. C | OIL/ GREASE | FLOW GPD | FIELD pH | FIELD Temp. C | OIL/ GREASE |
| 1 | 252000 | 7.12 | 6.5 | NON-VISIBLE | 1 | 7200 | 7.7 | 8.6 | NON-VISIBLE | NO DISCHARGE | | | |
| 2 | 264960 | | | | 2 | | | | | | | | |
| 3 | 247680 | | | | 3 | | | | | | | | |
| 4 | 228960 | 7.24 | | NON-VISIBLE | 4 | 5904 | 7.78 | | NON-VISIBLE | | | | |
| 5 | 207360 | | | | 5 | | | | | | | | |
| 6 | 208800 | | | | 6 | | | | | | | | |
| 7 | 243360 | | | | 7 | | | | | | | | |
| 8 | 286560 | | | | 8 | | | | | | | | |
| 9 | 275040 | | | | 9 | | | | | | | | |
| 10 | 246240 | | | | 10 | | | | | | | | |
| 11 | 277920 | 6.26 | 2.9 | NON-VISIBLE | 11 | 7056 | 7.8 | 6.7 | NON-VISIBLE | | | | |
| 12 | 253440 | | | | 12 | | | | | | | | |
| 13 | 252000 | | | | 13 | | | | | | | | |
| 14 | 236160 | | | | 14 | | | | | | | | |
| 15 | 468000 | | | | 15 | | | | | | | | |
| 16 | 622080 | | | | 16 | | | | | | | | |
| 17 | 375840 | | | | 17 | | | | | | | | |
| 18 | 329760 | 6.32 | | NON-VISIBLE | 18 | 23040 | 7.74 | | NON-VISIBLE | | | | |
| 19 | 390240 | | | | 19 | | | | | | | | |
| 20 | 328320 | | | | 20 | | | | | | | | |
| 21 | 351360 | | | | 21 | | | | | | | | |
| 22 | 336960 | | | | 22 | | | | | | | | |
| 23 | 298080 | | | | 23 | | | | | | | | |
| 24 | 303840 | | | | 24 | | | | | | | | |
| 25 | 302400 | 6.24 | 3.3 | NON-VISIBLE | 25 | 11520 | 7.55 | 5.1 | NON-VISIBLE | | | | |
| 26 | 319680 | | | | 26 | | | | | | | | |
| 27 | 322560 | | | | 27 | | | | | | | | |
| 28 | 358560 | | | | 28 | | | | | | | | |
| 29 | 303840 | | | | 29 | | | | | | | | |
| 30 | 316800 | | | | 30 | | | | | | | | |
| 31 | 308160 | | | | 31 | | | | | | | | |

## TEST CONDITIONS: *CERIODAPHNIA DUBIA* ACUTE TOXICITY TEST

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 48 hours

Sample Collection procedure: grab

Sample collection dates: 25 October 1993

Dilution water: Bear Butte Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <24h old

Feeding: none

End Point: mortality

Start date: 26 October 1993

End date: 28 October 1993

Type of exposure chamber: 50ml disposable plastic cups

Volume of exposure chamber: 25 ml

Number of Animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature: 20°C ± 2

Standard toxicant used: NaCl

## SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: 001

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB

Start: 26 Oct. 1993 at 1245
End: 28 Oct. 1993 at 1315
Test substance: Compliance point 001
Client/Project: Brohm Mining Corporation

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 6.25% 001 | 12.5% 001 | 25% 001 | 50% 001 | 100% 001 |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 1/20 | 0/20 | 0/20 | 0/20 | 0/20 |
| % Survival | 100 | 100 | 5 | 0 | 0 | 0 | 0 |
| Diss. $O_2$ max. / min. | 7.0 / 6.6 | 7.5 / 6.9 | 7.5 / 7.1 | 7.5 | 7.3 | 7.2 | 7.3 |
| pH initial / after 24h | 8.17 / 8.42 | 7.88 / 8.25 | | | | | 6.13 / 7.60 |
| Conduct µS max./min. | 769 / 746 | 318 / 315 | | | | | 596 |
| Temp. °C max. / min. | 20.5 / 20.3 | 20.5 / 20.3 | 20.5 / 20.3 | 20.5 / 20.3 | 20.5 / 20.3 | 20.5 / 20.3 | 20.5 / 20.3 |

Statistical Analysis: response levels recorded as compliance point 001

- 48h LC50 (graphical method) = 2.85% (95% CI, NA with graphical method)
- NOEC (Dunnett's Procedure) = <6.25%

## SUMMARY RESULTS OF *CERIODAPHNIA* ACUTE TOXICITY TEST: 002

TEST: Acute 48h with *Ceriodaphnia dubia* OPERATORS: DD, CB

Start: 26 Oct. 1993 at 1230
End: 28 Oct. 1993 at 1300
Test substance: Compliance point 002
Client/Project: Brohm Mining Corporation

Test results:

| Treatment | Recon. $H_2O$ Control | Receive. $H_2O$ Control | 6.25% 002 | 12.5% 002 | 25% 002 | 50% 002 | 100% 002 |
|---|---|---|---|---|---|---|---|
| alive/exposed | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 | 20/20 |
| % Survival | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Diss. $O_2$ max. / min. | 7.0 / 6.6 | 7.5 / 6.8 | 7.4 / 6.8 | 7.4 / 6.9 | 7.5 / 6.9 | 7.5 / 6.7 | 7.6 / 6.9 |
| pH initial / after 24h | 8.17 / 8.42 | 7.88 / 8.28 | | | | | 7.74 / 8.38 |
| Conduct µS max./min. | 769 / 746 | 292 / 285 | | | | | 1727 / 1689 |
| Temp. °C max. / min. | 20.5 / 20.3 | 20.5 / 20.3 | 20.5 / 20.3 | 20.5 / 20.3 | 20.5 / 20.3 | 20.5 / 20.3 | 20.5 / 20.3 |

Statistical Analysis: response levels recorded as compliance point 002

- 48h LC50 = ND; cannot be calculated without <50% survival in any of the exposures
- NOEC (Dunnett's Procedure) = 100%

## TEST CONDITIONS: *PIMEPHALES PROMELAS* ACUTE TOXICITY TESTS

Method: EPA Region VIII 1992 NPDES WET Control Program

Test Duration: 96 hours

Sample Collection procedure: grab

Sample collection dates: 25 October 1993

Dilution water: Bear Butte Creek receiving water; a separate reconstituted water control was also run

Age of organisms at start: <7 days old

Feeding: 0.1 mL *Artemia* nauplii prior to test initiation and prior to the 48h renewal

End Point(s): mortality

Start date and time: 26 October 1993

End date and time: 30 October 1993

Type of exposure chamber: 400 ml glass beakers

Volume of exposure solution: 300 ml

Number of Animals exposed/chamber: 10

Number of replicates/treatment: 4

Test temperature: 20°C ± 2

Standard toxicant used: NaCl

Aeration: none

## SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TOXICITY TEST: 001

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB

Start: 26 Oct. 1993 at 1130
End: 30 Oct. 1993 at 1045
Test substance: Compliance point 001
Client/Project: Brohm Mining Corporation

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 6.25% 001 | 12.5% 001 | 25% 001 | 50% 001 | 100% 001 |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 39/40 | 37/40 | 36/40 | 26/40 | 10/40 | 0/40 |
| % Survival | 100 | 98 | 93 | 90 | 65 | 25 | 0 |
| Diss. $O_2$ max. / min. | 6.7 / 6.5 | 6.9 / 6.1 | 7.0 / 5.7 | 7.0 / 5.6 | 7.1 / 5.9 | 7.2 / 6.9 | 7.4 |
| pH begin / after 24h | 8.17 / 8.15 | 7.88 / 7.93 | | | | | 6.13 / 7.21 |
| Conduct. µmho max./min. | 764 / 712 | 319 / 278 | | | | | 595 |
| Temp.(°C) max. / min. | 20.5 / 20.1 | 20.5 / 20.1 | 20.5 / 20.1 | 20.5 / 20.1 | 20.5 / 20.1 | 20.5 / 20.1 | 20.5 / 20.1 |

Statistical Analysis: response levels recorded as % compliance point 001

- 96h LC50 = 32.99% (95% CI, 27.03 - 38.83)
- NOEC (Dunnett's Method) = 12.5%

## SUMMARY RESULTS OF *PIMEPHALES PROMELAS* 96h ACUTE TOXICITY TEST: 002

TEST: Acute 96h with fathead minnow larvae

OPERATORS: DD, CB

Start: 26 Oct. 1993 at 1100
End: 30 Oct. 1993 at 1010
Test substance: Compliance point 002
Client/Project: Brohm Mining Corporation

Test results:

| Treatment | Recon. $H_2O$ Control | Receive $H_2O$ Control | 6.25% 002 | 12.5% 002 | 25% 002 | 50% 002 | 100% 002 |
|---|---|---|---|---|---|---|---|
| alive/exposed | 40/40 | 40/40 | 40/40 | 40/40 | 39/40 | 40/40 | 40/40 |
| % Survival | 100 | 100 | 100 | 100 | 98 | 100 | 100 |
| Diss.$O_2$ max.<br>min. | 6.7<br>6.5 | 6.9<br>6.1 | 7.0<br>5.7 | 7.0<br>5.6 | 7.1<br>5.9 | 7.2<br>6.9 | 7.4 |
| pH begin<br>after 24h | 8.17<br>8.15 | 7.88<br>7.92 | | | | | 7.74<br>8.04 |
| Conduct. µmho<br>max./min. | 764<br>712 | 296<br>268 | | | | | 1785<br>1709 |
| Temp.(°C) max.<br>min. | 20.5<br>20.1 | 20.5<br>20.1 | 20.5<br>20.1 | 20.5<br>20.1 | 20.5<br>20.1 | 20.5<br>20.1 | 20.5<br>20.1 |

Statistical Analysis: response levels recorded as % compliance point 002

- 96h LC50 = ND; cannot be calculated without <50% survival in any of the exposures
- NOEC (Dunnett's Method) = 100%

## WET CHEMISTRY RESULTS ON SAMPLES RECEIVED 31 JULY 1993

Samples were taken on 25 October 1993:

| Measurement | Recon. $H_2O$ | BB Creek Rcv. $H_2O$ | Comp. point 001 | Comp. point 002 |
|---|---|---|---|---|
| Analysis Temperature (°C) | 23.0 | 17.5 | 16.0 | 15.0 |
| Total Hardness ($mgCaCO_3/L$) | 204 | 120 | 260 | 572 |
| pH | 8.17 | 7.88 | 6.13 | 7.74 |
| Alkalinity ($mgCaCO_3/L$) | 132 | 84 | 493 | 156 |
| Conductivity ($\mu$mho) | 649 | 301 | 493 | 1506 |
| Dissolved Oxygen ($mgO_2/L$) | 6.5 | 8.6 | 8.8 | 8.7 |
| Ammonia (mg $NH_3$-N/L | ND | ND | ND | ND |
| Unionized Ammonia (mg $NH_3^+$) | 0 | 0 | 0 | 0 |
| Total Residual Chlorine (mg/L) | ND | ND | 0.02 | ND |

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON *CERIODAPHNIA DUBIA*

Test date: 19 to 21 October 1993

| g NaCl/L | control | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 19/20 | 20/20 | 20/20 | 13/20 | 3/20 | 0/20 |
| % survival | 95 | 100 | 100 | 65 | 15 | 0 |

LC50 (Probit Analysis) = 2.14g NaCl/L (95% CI, 1.97 to 2.27)

Note: This is within our accepted performance range (1.8 to 3.1) determined by 12 previous reference tests performed.

## SUMMARY RESULTS OF NaCl REFERENCE TEST ON FATHEAD MINNOW LARVAE

Test date: 26 to 30 October 1993

| g NaCl/L | control | 6.0 | 7.0 | 7.5 | 8.0 | 9.0 |
|---|---|---|---|---|---|---|
| # alive/# exp. | 20/20 | 20/20 | 17/20 | 13/20 | 6/20 | 1/20 |
| % survival | 100 | 100 | 85 | 65 | 30 | 5 |

96h LC50 (Probit Analysis) = 7.71g NaCl/L (95% CI, 7.48 to 7.95)

Note: This is within our accepted performance range (7.6 to 8.4) determined by 12 previous reference tests performed.

MID-CONTINENT
TESTING LABORATORIES, INC.
HIGH TECHNOLOGY OIL ANALYSIS
AND ENVIRONMENTAL TESTING

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111

SAMPLE NAME: SW-35
DESCRITPION:
SAMPLE DATE: 10/27/93
SAMPLE TIME: 03:00 PM
SAMPLED BY:

STAN MICHALS
BROHM MINING CORP.
P.O. BOX 485
DEADWOOD, SD 57732

ACCOUNT NUMBER: W1000
LAB NUMBER: 19931028201
DATE RECEIVED: 10/28/93
TIME RECEIVED: 07:25 AM
REPORT DATE: 10/29/93

| PHYSICAL PROPERTIES | VALUE |
|---|---|
| Conductivity, umhos/cm | 1780. |
| Hardness | 628. |
| PH | 7.75 |
| Solids, Dissolved, mg/l | 923. |
| Solids, Suspended, mg/l | <10.0 |
| Turbidity, NTU | . |

| INORGANIC & NONMETALLIC | VALUE |
|---|---|
| Alkalinity | 168. |
| Bicarbonate | 205. |
| Carbonate, mg/l | 0.00 |
| Chloride, mg/l | 19.5 |
| Cyanide, Total, mg/l | <.010 |
| Cyanide, WAD, mg/l | . |
| Cyanide, Free, mg/l | . |
| Fluoride, mg/l | . |
| Nitrogen, Ammonia, mg/l | . |
| Nitrogen, Nitrate, mg/l | .933 |
| Nitrogen, Nitrite, mg/l | . |
| Sulfate, mg/l | 741. |

| QUALITY CONTROL | VALUE |
|---|---|
| Major Anion Sum, meq/L | 19.39 |
| Major Cation Sum, meq/L | 20.05 |
| Anion-Cation Balance, % | 1.68 |

| SPECIAL TESTS | VALUE |
|---|---|
| ACIDITY | <10.0 |

| METALS mg/l | DISSOLVED | TOTAL |
|---|---|---|
| Aluminum | .124 | .193 |
| Antimony | . | . |
| Arsenic | <.001 | <.001 |
| Barium | . | . |
| Beryllium | . | . |
| Boron | . | . |
| Cadmium | .002 | .003 |
| Calcium | 198. | . |
| Chromium | . | . |
| Cobalt | . | . |
| Copper | .013 | .016 |
| Gold | . | . |
| Iron | <.050 | <.050 |
| Lead | . | . |
| Lithium | . | . |
| Magnesium | 32.5 | . |
| Manganese | <.050 | <.050 |
| Mercury | . | . |
| Molybdenum | . | . |
| Nickel | . | . |
| Potassium | 4.15 | . |
| Selenium | . | . |
| Silicon | . | . |
| Silver | . | . |
| Sodium | 170. | . |
| Strontium | . | . |
| Vanadium | . | . |
| Zinc | .079 | .080 |

APPROVED BY: [signature]

DATE: 10-29-93

BROHM MINING CORPORATION
MONITORING RESULTS FROM OCTOBER 1993
DOCKET NO. CWA-VIII-93-36-C*

| LOCATION | DATE | TIME | CONDUCTIVITY | HARDNESS | PH | SOLIDS SETTABLE | SOLIDS SUSPEND | TURBIDITY | ALKALINITY BICARBONATE | CARBONATE CHLORIDE | CYANIDE TOTAL | CYANIDE WAD | CYANIDE FREE | FLUORIDE | NITROGEN AMMONIA | NITROGEN NITRATE | NITROGEN NITRITE | SULFATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | 10/01/93 | | 201 | | 7.13 | | 19 | | | | <.010 | <.010 | | | <.050 | 0.08 | <.050 | |
| 001 | 10/04/93 | | 201 | | 7.27 | | 11 | | | | | | | | | | | |
| 001 | 10/11/93 | 11:00 AM | 196 | | 7.21 | | 20 | | | | <.010 | <.010 | | | <.050 | 0.1 | <.050 | |
| 001 | 10/18/93 | 11:40 AM | 245 | | 6.3 | | 45 | | | | | | | | | | | |
| 001 | 10/25/93 | 11:15 AM | 252 | | 6.04 | | 40 | | | | <.010 | <.010 | | | <.050 | 0.265 | <.050 | |
| 002 | 10/01/93 | | 539 | | 7.9 | | <10.0 | | | | <.010 | <.010 | | | <.050 | 4.29 | <.050 | |
| 002 | 10/04/93 | | 505 | | 7.88 | | <10.0 | | | | | | | | | | | |
| 002 | 10/11/93 | 09:55 AM | 452 | | 7.86 | <.500 | | | | | <.010 | <.010 | | | <.050 | 2.69 | <.050 | |
| 002 | 10/18/93 | 10:25 AM | 723 | | 7.65 | <.500 | | | | | | | | | | | | |
| 002 | 10/25/93 | 09:50 AM | 601 | | 7.75 | | <10.0 | | | | <.010 | <.010 | | | <.050 | 6.31 | <.050 | |

BROHM MINING CORPORATION
MONITORING RESULTS FROM OCTOBER 19
DOCKET NO. CWA-VIII-93-36-C*

| LOCATION | DATE | TIME | ALUMINUM DISS. | ALUMINUM TOTAL | ANTIMONY DISS. | ANTIMONY TOTAL | ARSENIC DISS. | ARSENIC TOTAL | BARIUM DISS. | BARIUM TOTAL | BERYLLIUM DISS. | BERYLLIUM TOTAL | BORON DISS. | BORON TOTAL | CADMIUM DISS. | CADMIUM TOTAL | CALCIUM DISS. | CALCIUM TOTAL | CHROMIUM DISS. | CHROMIUM TOTAL | COBALT DISS. | COBALT TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | 10/01/93 | | | 3.3 | | | | 0.002 | | | | 0.002 | | | | 0.006 | 57.3 | | | 0.001 | | |
| 001 | 10/04/93 | | | 2.43 | | | | | | | | | | | | 0.007 | 58 | | | | | |
| 001 | 10/11/93 | 11:00 AM | | 1.92 | | | | | | | | | | | | 0.007 | 56.4 | | | | | |
| 001 | 10/18/93 | 11:40 AM | | 7.32 | | | | | | | | | | | | 0.009 | 71.8 | | | | | |
| 001 | 10/25/93 | 11:15 AM | | 7.73 | | | | | | | | | | | | 0.011 | 72.3 | | | | | |
| 002 | 10/01/93 | | | <.050 | | | | 0.002 | | | | <.001 | | | | 0.002 | 169 | | | 0.002 | | |
| 002 | 10/04/93 | | | 0.079 | | | | | | | | | | | | 0.002 | 158 | | | | | |
| 002 | 10/11/93 | 09:55 AM | | <.050 | | | | | | | | | | | | 0.002 | 143 | | | | | |
| 002 | 10/18/93 | 10:25 AM | | <.050 | | | | | | | | | | | | 0.002 | 227 | | | | | |
| 002 | 10/25/93 | 09:50 AM | | <.050 | | | | | | | | | | | | 0.002 | 191 | | | | | |

BROHM MINING CORPORATION
MONITORING RESULTS FROM OCTOBER 19
DOCKET NO. CWA-VIII-93-36-C*

| LOCATION | DATE | TIME | COPPER DISS. | COPPER TOTAL | GOLD DISS. | GOLD TOTAL | IRON DISS. | IRON TOTAL | LEAD DISS. | LEAD TOTAL | LITHIUM DISS. | LITHIUM TOTAL | MAGNESIUM DISS. | MAGNESIUM TOTAL | MANGANESE DISS. | MANGANESE TOTAL | MERCURY DISS. | MERCURY TOTAL | MOLYBDENUM DISS. | MOLYBDENUM TOTAL | NICKEL DISS. | NICKEL TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | 10/01/93 | | | 0.776 | | | | 1.04 | | <.001 | | | | 14 | | 0.863 | | <.0002 | | | | 0.019 |
| 001 | 10/04/93 | | | 0.714 | | | | | | <.001 | | | | 13.7 | | | | | | | | |
| 001 | 10/11/93 | 11:00 AM | | 0.665 | | | | | | <.001 | | | | 13.4 | | | | | | | | |
| 001 | 10/18/93 | 11:40 AM | | 1.26 | | | | | | 0.001 | | | | 15.9 | | | | | | | | |
| 001 | 10/25/93 | 11:15 AM | | 1.53 | | | | | | <.001 | | | | 17.4 | | | | | | | | |
| 002 | 10/01/93 | | | 0.028 | | | | <.050 | | <.001 | | | | 28.3 | | <.050 | | <.0002 | | | | 0.002 |
| 002 | 10/04/93 | | | 0.044 | | | | | | <.001 | | | | 26.8 | | | | | | | | |
| 002 | 10/11/93 | 09:55 AM | | 0.022 | | | | | | <.001 | | | | 23.1 | | | | | | | | |
| 002 | 10/18/93 | 10:25 AM | | 0.05 | | | | | | 0.001 | | | | 37.9 | | | | | | | | |
| 002 | 10/25/93 | 09:50 AM | | 0.025 | | | | | | <.001 | | | | 30.2 | | | | | | | | |

BROHM MINING CORPORATION
MONITORING RESULTS FROM OCTOBER 19
DOCKET NO. CWA-VIII-93-36-C*

| LOCATION | DATE | TIME | POTASSIUM DISS. | POTASSIUM TOTAL | SELENIUM DISS. | SELENIUM TOTAL | SILICON DISS. | SILICON TOTAL | SILVER DISS. | SILVER TOTAL | SODIUM DISS. | SODIUM TOTAL | STRONTIUM DISS. | STRONTIUM TOTAL | VANADIUM DISS. | VANADIUM TOTAL | ZINC DISS. | ZINC TOTAL | ANION | CATION | %BALANCE | LAB NUMBER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | 10/01/93 | | | | | <.005 | | | | <.001 | | | | | | | | 0.354 | | | | 19931005102 |
| 001 | 10/04/93 | | | | | | | | | | | | | | | | | 0.318 | | | | 19931005103 |
| 001 | 10/11/93 | 11:00 AM | | | | | | | | | | | | | | | | 0.406 | | | | 19931013202 |
| 001 | 10/18/93 | 11:40 AM | | | | | | | | | | | | | | | | 0.587 | | | | 19931020108 |
| 001 | 10/25/93 | 11:15 AM | | | | | | | | | | | | | | | | 0.533 | | | | 19931102101 |
| 002 | 10/01/93 | | | | | <.005 | | | | 0.001 | | | | | | | | 0.103 | | | | 19931005104 |
| 002 | 10/04/93 | | | | | | | | | | | | | | | | | 0.076 | | | | 19931005105 |
| 002 | 10/11/93 | 09:55 AM | | | | | | | | | | | | | | | | 0.078 | | | | 19931013203 |
| 002 | 10/18/93 | 10:25 AM | | | | | | | | | | | | | | | | 0.091 | | | | 19931020109 |
| 002 | 10/25/93 | 09:50 AM | | | | | | | | | | | | | | | | 0.089 | | | | 19931102103 |

BROHM MINING CORP.

December 22, 1993

Melanie Pallman
NPDES Branch
Management Division
U.S.E.P.A.
999 18th St., Suite 500
Denver, CO 80202-2466

Dear Melanie:

Enclosed are the monitoring results from November 1993 required in the EPA Administrative Order on Consent Docket No. CWA-V111-93-36-C. Also, pursuant to paragraph #21 of the above referenced order, monitoring data from 001 and 002 will be submitted on the Discharge Monitoring Report NPDES Permit No. SD0026891.

If you have any further questions, please don't hesitate to call.

Sincerely,

BROHM MINING CORP.

Stan Michals
Environmental Technician

SM:sm

cc: Tim Tollefsrud SDDENR
Dale Cockrell, Truhe Law Offices
Rod MacLeod, BMC
Lance Hubbard, BMC
Dale Shay, BMC
Samuel H. Sage, Atlantic States Legal Foundation
Deb Rogers Miller, TIP

EPA11.SM

South Dakota Office: P.O. Box 485, Deadwood, South Dakota 57732
Telephone: (605) 578-2107 Telecopier: (605) 578-1709

Brohm Mining Corp. is a wholly owned affiliate of Minven Gold Corporation

BROHM MINING CORPORATION
MONITORING RESULTS FROM SEPTEMBER 1993
DOCKET NO. CWA-VIII-93-36-C*

| SITE --> | SEEP | | |
|---|---|---|---|
| | pH | Fld. Temp | GPM |
| NOV 1 | NO DISCHARGE | -- | -- |
| 2 | NO DISCHARGE | -- | -- |
| 3 | NO DISCHARGE | -- | -- |
| 4 | NO DISCHARGE | -- | -- |
| 5 | NO DISCHARGE | -- | -- |
| 6 | NO DISCHARGE | -- | -- |
| 7 | NO DISCHARGE | -- | -- |
| 8 | NO DISCHARGE | -- | -- |
| 9 | NO DISCHARGE | -- | -- |
| 10 | NO DISCHARGE | -- | -- |
| 11 | NO DISCHARGE | -- | -- |
| 12 | NO DISCHARGE | -- | -- |
| 13 | NO DISCHARGE | -- | -- |
| 14 | NO DISCHARGE | -- | -- |
| 15 | NO DISCHARGE | -- | -- |
| 16 | NO DISCHARGE | -- | -- |
| 17 | NO DISCHARGE | -- | -- |
| 18 | 2.71 | | NO READING |
| 19 | NO READING | | NO READING |
| 20 | 2.70 | .2 | 260 |
| 21 | 2.74 | | 190 |
| 22 | 2.70 | 2.4 | 95 |
| 23 | 2.72 | | 83 |
| 24 | 2.70 | | FROZEN |
| 25 | 2.80 | | FROZEN |
| 26 | 2.60 | | FROZEN |
| 27 | 2.60 | | FROZEN |
| 28 | 2.80 | | FROZEN |
| 29 | 2.80 | | EST. 7 |
| 30 | 2.80 | | EST. 7 |

BROHM MINING CORPORATION
MONITORING RESULTS FROM SEPTEMBER 1993
DOCKET NO. CWA-VIII-93-36-C"

| LOCATION | DATE | TIME | CONDUCT-IVITY | HARDNESS | PH | SOLIDS SETTABLE | SOLIDS SUSPEND | TURBIDITY | ALKALINITY BICARBONATE | CARBONATE | CHLORIDE | CYANIDE TOTAL | CYANIDE WAD | CYANIDE FREE | FLUORIDE | NITROGEN AMMONIA | NITROGEN NITRATE | NITROGEN NITRITE | SULFATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEEP | 11/20/93 | 04:15 PM | | 982 | 2.89 | | 10 | | | | | | <.010 | | | 0.857 | 3.41 | 0.013 | |
| SEEP | 11/22/93 | 12:05 PM | | 1003 | 2.86 | | 90 | | | | | | | | | 0.869 | 3.78 | 0.013 | |

BROHM MINING CORPORATION
MONITORING RESULTS FROM SEPTEMBER
DOCKET NO. CWA-VIII-93-36-C"

| LOCATION | DATE | TIME | ALUMINUM DISS. | ALUMINUM TOTAL | ANTIMONY DISS. | ANTIMONY TOTAL | ARSENIC DISS. | ARSENIC TOTAL | BARIUM DISS. | BARIUM TOTAL | BERYLLIUM DISS. | BERYLLIUM TOTAL | BORON DISS. | BORON TOTAL | CADMIUM DISS. | CADMIUM TOTAL | CALCIUM DISS. | CALCIUM TOTAL | CHROMIUM DISS. | CHROMIUM TOTAL | COBALT DISS. | COBALT TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEEP | 11/20/93 | 04:15 PM | | 121 | | | | 0.46 | | | | | | | | 0.383 | 277 | | | | | |
| SEEP | 11/22/93 | 12:05 PM | | 129 | | | | | | | | | | | | 0.371 | 283 | | | | | |

BROHM MINING CORPORATION
MONITORING RESULTS FROM SEPTEMBER
DOCKET NO. CWA-VIII-93-36-C"

| LOCATION | DATE | TIME | COPPER DISS. | COPPER TOTAL | GOLD DISS. | GOLD TOTAL | IRON DISS. | IRON TOTAL | LEAD DISS. | LEAD TOTAL | LITHIUM DISS. | LITHIUM TOTAL | MAGNESIUM DISS. | MAGNESIUM TOTAL | MANGANESE DISS. | MANGANESE TOTAL | MERCURY DISS. | MERCURY TOTAL | MOLYBDENUM DISS. | MOLYBDENUM TOTAL | NICKEL DISS. | NICKEL TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEEP | 11/20/93 | 04:15 PM | | 93.6 | | | | 192 | | 0.006 | | | | 70.6 | | 6.62 | | <.0002 | | | | 0.368 |
| SEEP | 11/22/93 | 12:05 PM | | 95.5 | | | | | | 0.006 | | | | 72 | | | | | | | | |

BROHM MINING CORPORATION
MONITORING RESULTS FROM SEPTEMBER
DOCKET NO. CWA-VIII-93-36-C"

| LOCATION | DATE | TIME | POTASSIUM DISS. | POTASSIUM TOTAL | SELENIUM DISS. | SELENIUM TOTAL | SILICON DISS. | SILICON TOTAL | SILVER DISS. | SILVER TOTAL | SODIUM DISS. | SODIUM TOTAL | STRONTIUM DISS. | STRONTIUM TOTAL | VANADIUM DISS. | VANADIUM TOTAL | ZINC DISS. | ZINC TOTAL | ANION | CATION | %BALANCE | LAB NUMBER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEEP | 11/20/93 | 04:15 PM | | | | <.005 | | | | 0.001 | | | | | | | | 2.84 | | | | 19931123103 |
| SEEP | 11/22/93 | 12:05 PM | | | | | | | | | | | | | | | | 2.98 | | | | 19931123104 |