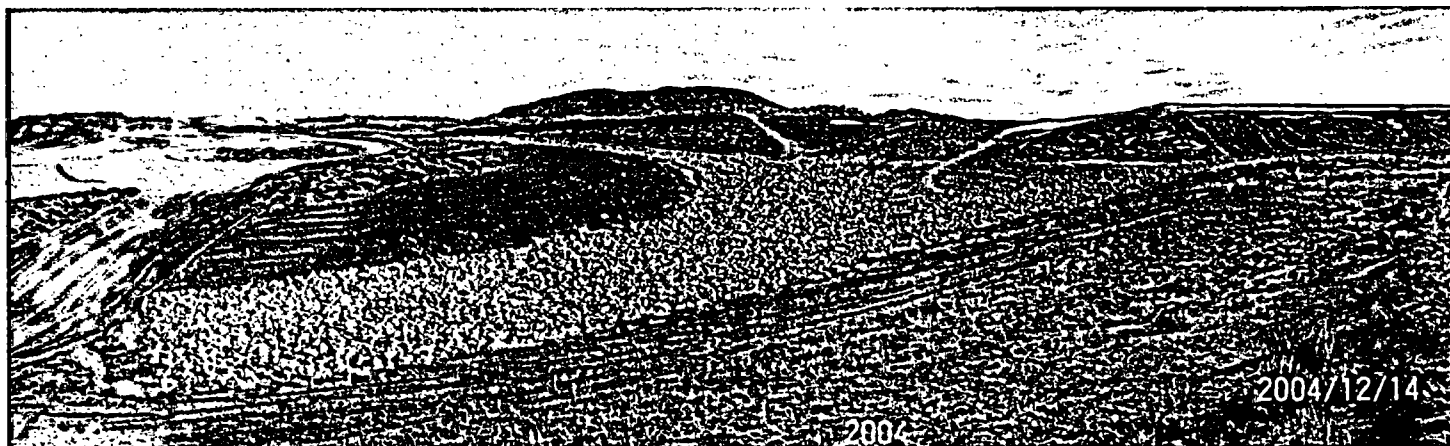




**PATHFINDER**

**Lucky Mc Mine  
Tailings Reclamation Project  
Completion Report  
Source Material License SUA-672  
April, 2005**



**PATHFINDER Mines Corporation  
Mills, Wyoming**

**Volume 2**

**APPENDIX**

**E**

TABLE D-1. - Lucky Mc Radon Flux Test Results and Gamma Readings on Completed Radon Barrier

4/12/05

| Site # | RnFlux<br>(pCi/m2-sec) | Gamma<br>uR/hr. | Site # | RnFlux<br>(pCi/m2-sec) | Gamma<br>uR/hr. | Site # | RnFlux<br>(pCi/m2-sec) | Gamma<br>uR/hr. | Site # | RnFlux<br>(pCi/m2-sec) | Gamma<br>uR/hr. |
|--------|------------------------|-----------------|--------|------------------------|-----------------|--------|------------------------|-----------------|--------|------------------------|-----------------|
| 1      | < 0.5                  | 6               | 61     | off barrier            | —               | 121    | < 0.5                  | 9.5             | 181    | not sampled            | —               |
| 2      | < 0.5                  | 5               | 62     | 1                      | 15.5            | 122    | 0.9                    | 10              | 182    | not sampled            | —               |
| 3      | < 0.5                  | 7               | 63     | not sampled            | 8               | 123    | 1                      | 9.5             | 183    | not sampled            | —               |
| 4      | < 0.5                  | 10              | 64     | < 0.5                  | 10              | 124    | < 0.5                  | 9.5             | 184    | < 0.5                  | 9               |
| 5      | < 0.5                  | 11              | 65     | 0.6                    | 5.5             | 125    | 0.9                    | 9               | 185    | not sampled            | —               |
| 6      | < 0.5                  | 5.5             | 66     | 0.7                    | 9.5             | 126    | < 0.5                  | 12              | 186    | 0.9                    | 8               |
| 7      | < 0.5                  | 7               | 67     | < 0.5                  | 8               | 127    | < 0.5                  | 9               | 187    | not sampled            | —               |
| 8      | < 0.5                  | 6               | 68     | < 0.5                  | 8               | 128    | < 0.5                  | 9               | 188    | < 0.5                  | 7               |
| 9      | < 0.5                  | 11              | 69     | < 0.5                  | 8.5             | 129    | 0.5                    | 9               | 189    | not sampled            | —               |
| 10     | < 0.5                  | 9.5             | 70     | < 0.5                  | 9               | 130    | < 0.5                  | 11              | 190    | not sampled            | —               |
| 11     | 1.3                    | 6               | 71     | < 0.5                  | 10.5            | 131    | < 0.5                  | 12              | 191    | < 0.5                  | 6               |
| 12     | < 0.5                  | 6.5             | 72     | < 0.5                  | 10              | 132    | < 0.5                  | 14              | 192    | not sampled            | —               |
| 13     | < 0.5                  | 11.5            | 73     | < 0.5                  | 9.5             | 133    | 1.1                    | 29              | 193    | < 0.5                  | 10              |
| 14     | 0.9                    | 6               | 74     | < 0.5                  | 7               | 134    | < 0.5                  | 17              | 194    | off barrier            | —               |
| 15     | < 0.5                  | 5               | 75     | < 0.5                  | 8               | 135    | < 0.5                  | 18              | 195    | 0.6                    | 9               |
| 16     | < 0.5                  | 5.5             | 76     | 0.7                    | 25              | 136    | 10.8                   | 11              | 196    | off barrier            | —               |
| 17     | < 0.5                  | 10              | 77     | < 0.5                  | 8               | 137    | < 0.5                  | 13              | 197    | not sampled            | —               |
| 18     | < 0.5                  | 9.5             | 78     | 2.7                    | 10              | 138    | 8.6                    | 33              | 198    | not sampled            | —               |
| 19     | < 0.5                  | 10              | 79     | not sampled            | 6               | 139    | < 0.5                  | 13              | 199    | off barrier            | —               |
| 20     | < 0.5                  | 9.5             | 80     | < 0.5                  | 9               | 140    | < 0.5                  | 10              | 200    | not sampled            | —               |
| 21     | < 0.5                  | 11.5            | 81     | < 0.5                  | 10.5            | 141    | 1.7                    | 11              | 201    | < 0.5                  | 7               |
| 22     | < 0.5                  | 6               | 82     | < 0.5                  | 11.5            | 142    | 6.6                    | 12              | 202    | not sampled            | —               |
| 23     | < 0.5                  | 9               | 83     | < 0.5                  | 9               | 143    | 0.9                    | 11              | 203    | < 0.5                  | 7               |
| 24     | < 0.5                  | 12              | 84     | < 0.5                  | 10              | 144    | < 0.5                  | 9               | 204    | evap. pond             | —               |
| 25     | < 0.5                  | 5.5             | 85     | 0.8                    | 11.5            | 145    | 0.8                    | 21              | 205    | evap. pond             | —               |
| 26     | < 0.5                  | 9.5             | 86     | 4.4                    | 20              | 146    | < 0.5                  | 12              | 206    | evap. pond             | —               |
| 27     | < 0.5                  | 10.5            | 87     | < 0.5                  | 10              | 147    | < 0.5                  | 13              | 207    | not sampled            | —               |
| 28     | < 0.5                  | 9               | 88     | < 0.5                  | 8.5             | 148    | 5.4                    | 14              | 208    | < 0.5                  | 7               |
| 29     | 0.7                    | 10              | 89     | < 0.5                  | 14              | 149    | < 0.5                  | 9.5             | 209    | < 0.5                  | 7               |
| 30     | < 0.5                  | 10              | 90     | < 0.5                  | 10.5            | 150    | < 0.5                  | 13              | 210    | not sampled            | —               |
| 31     | < 0.5                  | 10.5            | 91     | < 0.5                  | 10              | 151    | < 0.5                  | 9.5             | 211    | < 0.5                  | 8               |
| 32     | 1.4                    | 13              | 92     | < 0.5                  | 9.5             | 152    | < 0.5                  | 11              | 212    | evap. pond             | —               |
| 33     | < 0.5                  | 7               | 93     | < 0.5                  | 10              | 153    | < 0.5                  | 11.5            | 213    | evap. pond             | —               |
| 34     | < 0.5                  | 5.5             | 94     | 0.9                    | 11              | 154    | < 0.5                  | 21              | 214    | evap. pond             | —               |
| 35     | < 0.5                  | 6.5             | 95     | 1.3                    | 13              | 155    | < 0.5                  | 8               | 215    | evap. pond             | —               |
| 36     | < 0.5                  | 9               | 96     | 1.1                    | 14              | 156    | 0.8                    | 12              | 216    | evap. pond             | —               |
| 37     | < 0.5                  | 10.5            | 97     | 1.5                    | 11              | 157    | < 0.5                  | 11              | 217    | not sampled            | —               |
| 38     | off barrier            | —               | 98     | < 0.5                  | 9               | 158    | 1.2                    | 12              | 218    | < 0.5                  | 9               |
| 39     | off barrier            | —               | 99     | 1.7                    | 15              | 159    | 3.8                    | 13              | 219    | not sampled            | —               |
| 40     | 0.7                    | 11              | 100    | < 0.5                  | 11              | 160    | < 0.5                  | 8               | 220    | < 0.5                  | 8               |
| 41     | 0.6                    | 12              | 101    | < 0.5                  | 9               | 161    | < 0.5                  | 8               | 221    | not sampled            | —               |
| 42     | < 0.5                  | 11              | 102    | < 0.5                  | 15              | 162    | < 0.5                  | 8               | 222    | < 0.5                  | 7               |
| 43     | < 0.5                  | 9.5             | 103    | < 0.5                  | 10              | 163    | 1.3                    | 12              | 223    | not sampled            | —               |
| 44     | < 0.5                  | 6.5             | 104    | < 0.5                  | 10              | 164    | 1.5                    | 11              | 224    | < 0.5                  | 7               |
| 45     | < 0.5                  | 6               | 105    | < 0.5                  | 10.5            | 165    | < 0.5                  | 10              | 225    | evap. pond             | —               |
| 46     | < 0.5                  | 5               | 106    | < 0.5                  | 11              | 166    | < 0.5                  | 9               | 226    | evap. pond             | —               |
| 47     | < 0.5                  | 7               | 107    | < 0.5                  | 10              | 167    | < 0.5                  | 8               | 227    | not sampled            | —               |
| 48     | < 0.5                  | 10              | 108    | < 0.5                  | 10              | 168    | < 0.5                  | 10              | 228    | not sampled            | —               |
| 49     | < 0.5                  | 10.5            | 109    | < 0.5                  | 14              | 169    | < 0.5                  | 8               | 229    | < 0.5                  | 8               |
| 50     | < 0.5                  | 11              | 110    | 5                      | 25              | 170    | < 0.5                  | 8               | 230    | not sampled            | —               |
| 51     | < 0.5                  | 9               | 111    | 0.6                    | 7.5             | 171    | < 0.5                  | 10              | 231    | not sampled            | —               |
| 52     | < 0.5                  | 10.5            | 112    | < 0.5                  | 22              | 172    | dam outslope           | —               | 232    | not sampled            | —               |
| 53     | < 0.5                  | 6.5             | 113    | 0.9                    | 9.5             | 173    | dam outslope           | —               | 233    | < 0.5                  | 9               |
| 54     | < 0.5                  | 5.5             | 114    | < 0.5                  | 10.5            | 174    | dam outslope           | —               | 234    | not sampled            | —               |
| 55     | < 0.5                  | 5               | 115    | 1.5                    | 18.5            | 175    | dam outslope           | —               | 235    | < 0.5                  | 6               |
| 56     | 0.6                    | 11              | 116    | 0.8                    | 18              | 176    | dam outslope           | —               | 236    | < 0.5                  | 8               |
| 57     | 0.8                    | 5.5             | 117    | < 0.5                  | 13              | 177    | dam outslope           | —               | 237    | not sampled            | —               |
| 58     | < 0.5                  | 13.5            | 118    | < 0.5                  | 11              | 178    | < 0.5                  | 9               | 238    | not sampled            | —               |
| 59     | 1.2                    | 9.5             | 119    | 1.1                    | 12              | 179    | not sampled            | —               | 239    | < 0.5                  | 8               |
| 60     | 0.7                    | 12              | 120    | 3.2                    | 9               | 180    | < 0.5                  | 8               |        |                        |                 |

AVG. Rn FLUX = 0.8 pCi/m2-sec.  
AVG. GAMMA = 10 uR/hr.

**THIS PAGE IS AN  
OVERSIZED DRAWING  
OR FIGURE,  
THAT CAN BE VIEWED  
AT THE RECORD TITLED:**

**“Exhibit E-1 Radon Flux  
Test Program”**

**WITHIN THIS PACKAGE  
OR BY SEARCHING USING**

**D-01**



**RADON FLUX ON COMPLETED  
RADON BARRIER  
LABORATORY REPORTS**

2.182



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November 13, 1998

Mr. Tom Hardgrove  
Pathfinder Mines - Lucky McMine  
PO Box 730  
Mills, WY 82644

**Subject:        *Large Area Activated Charcoal Canister (LAACC) Report***

Dear Tom:

Enclosed you will find 1998 LAACC information that should be acceptable by U.S. Nuclear Regulatory Commission's (USNRC) technical personnel. Energy Laboratories, Inc.-Casper (ELI) is directly certified by the U.S. Environmental Protection Agency (EPA) Region VIII under the Safe Drinking Water Act. Certification includes regulated bacteriological, inorganic, volatile organic, synthetic organic, and radiochemical parameters. A rigorous Quality Assurance/Quality Control program is maintained which meets or exceeds the requirements of the EPA and the USNRC. In addition, ELI is a listed laboratory under the Radon Proficiency Program (RMP).

Our LAACC data has been accepted by Milt Lammering of the Denver EPA office, USNRC, and the States of Utah and Texas.

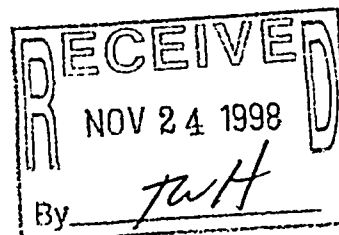
If additional information is required by you or other agencies please advise.

Sincerely,

Sheryl Garling  
Radiation Safety Officer and Project Manager

SAG:sag

Enclosures





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### SAMPLE NARRATIVE

---

**Date:** November 13, 1998  
**Client:** Pathfinder Mines Corporation  
**Location:** Lucky McMine  
**Laboratory Method:** EPA Method 115  
**Method Name:** Large Area Activated Charcoal Canister (LAACC) Radon Flux Measurement  
**Sample Numbers:** 98-59770 through 98-59791  
**Prepared By:** Sheryl A. Garling

On September 24, 1998, Pathfinder Mines Corporation's employees placed 17-LAACC units at their Lucky McMine site. No field duplicates or area background units were deployed. Pathfinder established the survey grid with all points identified in the field.. The units were removed September 25, 1998, after 24 hours of exposure.

The following field conditions were reported:

- There was no precipitation within the previous 24 hours prior to September 24, 1998,
- Clear and breezy weather conditions were observed on Thursday, September 24 1998,
- Minimum temperature observed was 49°F,
- There was no precipitation during the measurement period.

PMC employees transported the radon flux charcoal canisters back to the laboratory.

ELI has performed several charcoal can leak test analyses and charcoal loss on the charcoal cans. This data concludes the laboratory procedure that ELI follows for Method 115 provides the desired analytical results without compromising the data, i.e. through radon loss through the cans or seal, excessive charcoal loss during transfer, and gamma counting procedures.

The following is the procedure performed by ELI for the LAACC measurement following Method 115.

Each can was sealed with a minimum of two wraps of elastic electrical tape. ELI has previously performed leak tests on this system and the charcoal measurement was not compromised using this method of sealing.

The radon flux charcoal transfer/counting canisters were transported back to the laboratory for counting.

The LAACCs are constructed to the specifications as identified in document EPA 520/5-85-029, *Radon Flux Measurements On Gardiner And Royster Phosphogypsum Piles Near Tampa and Mulberry, Florida*. The collector gap between charcoal and surface of tailings is between ¼" to ½".



Pathfinder Mines Corporation  
November 13, 1998  
Page 2 of 3

Standard laboratory practices were followed when counting the charcoal canisters:

- Counting efficiencies are recorded for the various standards, laboratory blanks, and equipment operation,
- Section 4.0 E of Method 115 states that the precision, accuracy, and completeness shall be within 10%,  $\pm 10\%$ , and 85%, respectively, for samples measuring greater than 1.0 pCi/m<sup>2</sup> sec.
- Calculations for precision and accuracy follow, with actual calculations included on page 3.

**Calculation 1**

Accuracy Calculation for Standards as identified by the USNRC:

$$\frac{\text{Measured} - \text{Actual}}{\text{Actual}}$$

**Calculation 2**

Precision Calculation as identified by the USNRC:  
Known as Percent difference:

$$\frac{\text{Duplicate Count \#1} - \text{Duplicate Count \#2}}{\text{Average (Duplicate \#1, Duplicate \#2)}}$$

**Calculation 3**

Data Counting error 2-sigma as defined by USEPA Standard Operating Procedure for Radon-222 Measurement Using Charcoal Canisters EPA 520/5-87-005 is calculated as follows:

@ 95% confidence,  
Expressed in decimal percent, or multiply by 100 for %

$$2 \times \frac{\text{square root (Gross Counts + Background Counts)}}{\text{Gross Counts} - \text{Background Counts}}$$

Prepared By: Sheryl Stirling

Date: 11-13-98



Pathfinder Mines Corporation - Gas Hills Lucky McMine

November 13, 1998

Page 3 of 3

**Supplement to Large Area Activated Charcoal Canisters 1998 Report  
Quality Assurance Calculations**

| <b>Calculation 1 - Standard Accuracy</b>    |         |
|---|---------|
| Description                                 | Data    |
| Equipment Efficiency - cpm/dpm              | 0.00668 |
| dpm/pCi                                     | 2.22    |
| Count Time - minutes                        | 5       |
| Background - gross counts                   | 102     |
| Background - cpm                            | 20.4    |
| Standard 1 - pCi/can, actual                | 18210   |
| Standard 2 - pCi/can, actual                | 36420   |
| Standard 1 - average gross counts, measured | 1404    |
| Standard 2 - average gross counts, measured | 2714    |
| Standard 1 - average gross cpm, measured    | 280.8   |
| Standard 2 - average gross cpm, measured    | 542.8   |
| Standard 1 - average net cpm, measured      | 260.4   |
| Standard 2 - average net cpm, measured      | 522.4   |
| Standard 1 - average pCi/can, measured      | 17559   |
| Standard 2 - average pCi/can, measured      | 35227   |
| Standard 1 - (Measure-Actual)/Actual, %     | -3.57   |
| Standard 2 - (Measured-Actual)/Actual, %    | -3.28   |

| <b>Calculation 2 - Precision</b>        |                       |                           |                                |
|---|-----------------------|---------------------------|--------------------------------|
| Description                             | Count<br>Gross Counts | Duplicate<br>Gross Counts | (Dup1-Dup2)/<br>Avg(Dup1&Dup2) |
| Duplicate 1 - 59778 - <0.5/<0.5 pCi/m2s | 170                   | 162                       | 4.82                           |
| Duplicate 2 - 59780 - 0.87/0.87 pCi/m2s | 303                   | 299                       | 1.33                           |
| Average - % Difference                  |                       |                           | 3.07                           |

| <b>Calculation 3 - Data Counting Error</b> |      |              |
|--|------|--------------|
| Data Precision                             | Data | Precision, % |
| Background gross counts                    | 121  | 6.27         |
| Count Time - minute                        | 5    |              |
| 64520 Data 4.66 pCi/m2sec, gross counts    | 1339 |              |
| gross counts + background                  | 1460 |              |
| gross counts - background                  | 1218 |              |



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## Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Page 1 of 1

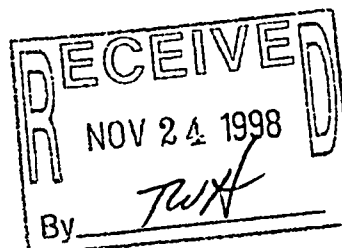
Project: Pathfinder Mines Corp.  
Location: Gas Hills/Lucky Mc.  
Report Date: September 28, 1998  
Weather: Clear, breezy 49 degrees

Date Set: 09-24-98  
Date Remove: 09-25-98  
Date Counted: 09-26-98

Method: Pathfinder's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID    | LAACC # | Cannister # | Location         | 09-24-98<br>Time Set | 09-25-98<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> |
|-----------|---------|-------------|------------------|----------------------|-------------------------|----------------------------------|
| 98- 59770 | 25      | 25          | LMRF-1           | 8:39                 | 8:44                    | <0.5                             |
| 98- 59771 | 16      | 10          | LMRF-2           | 8:41                 | 8:46                    | <0.5                             |
| 98- 59772 | 2       | 2           | LMRF-3           | 8:44                 | 8:47                    | <0.5                             |
| 98- 59773 | 24      | 26          | LMRF-5           | 8:46                 | 8:48                    | <0.5                             |
| 98- 59774 | 7       | 7           | LMRF-6           | 8:48                 | 8:50                    | <0.5                             |
| 98- 59775 | 23      | 23          | LMRF-7           | 8:50                 | 8:51                    | <0.5                             |
| 98- 59776 | 1       | 1           | LMRF-8           | 8:52                 | 8:53                    | <0.5                             |
| 98- 59777 | 18      | 18          | LMRF-11          | 8:54                 | 8:55                    | 1.3                              |
| 98- 59778 | 20      | 20          | LMRF-12          | 8:57                 | 8:58                    | <0.5                             |
| 98- 59778 | 20      | 20          | LMRF-12          | 8:57                 | 8:58                    | <0.5                             |
| 98- 59779 | 4       | 11          | LMRF-13          | 9:04                 | 9:05                    | <0.5                             |
| 98- 59780 | 19      | 19          | LMRF-14          | 9:07                 | 9:09                    | 0.9                              |
| 98- 59780 | 19      | 19          | LMRF-14          | 9:07                 | 9:09                    | 0.9                              |
| 98- 59781 | 6       | 13          | LMRF-15          | 9:09                 | 9:11                    | <0.5                             |
| 98- 59782 | 21      | 30          | LMRF-22          | 9:12                 | 9:14                    | <0.5                             |
| 98- 59783 | 3       | 14          | LMRF-23          | 9:15                 | 9:16                    | <0.5                             |
| 98- 59784 | 5       | 8           | LMRF-24          | 9:17                 | 9:18                    | <0.5                             |
| 98- 59785 | 22      | 22          | #1Tails test pad | 9:21                 | 9:22                    | <0.5                             |
| 98- 59786 | 17      | 17          | #2Tails test pad | 9:28                 | 9:29                    | <0.5                             |
| 98- 59787 | TB1     | TB1         | TB1              | 9:00                 | 9:00                    | <0.5                             |
| 98- 59788 | TB2     | TB2         | TB2              | 9:00                 | 9:00                    | <0.5                             |
| 98- 59789 | TB3     | TB3         | TB3              | 9:00                 | 9:00                    | <0.5                             |
| 98- 59790 | TB4     | TB4         | TB4              | 9:00                 | 9:00                    | <0.5                             |
| 98- 59791 | TB5     | TB5         | TB5              | 9:00                 | 9:00                    | <0.5                             |

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COMPLETE ANALYTICAL SERVICES

**Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report**

Page 1 of 1

Project: Pathfinder Mines Corp.  
Location: Gas Hills/Lucky Mc.  
Report Date: September 28, 1998  
Weather: Clear, breezy 49 degrees

Date Set: 09-24-98  
Date Remove: 09-25-98  
Date Counted: 09-26-98

| Trip Blank - Lab ID | Cannister # | Radon Flux - pCi/m <sup>2</sup> s* |
|---------------------|-------------|------------------------------------|
| 98- 59787           | TB1         | <0.5                               |
| 98- 59788           | TB2         | <0.5                               |
| 98- 59789           | TB3         | <0.5                               |
| 98- 59790           | TB4         | <0.5                               |
| 98- 59791           | TB5         | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 93                 | 1429                  | 2814                  |

| Replicate<br>Lab ID | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------------------|--------------|-------------------------------------|---------------------|
| 98- 59778           | 09-27-98     | <0.5                                | 1.000               |
| 98- 59780           | 09-26-98     | 0.9                                 | 1.001               |

Average of recoveries:

1.000

Minimum Radon Flux for Gas Hills/Lucky Mac: <0.5 pCi/m<sup>2</sup>s  
Maximum Radon Flux for Gas Hills/Lucky Mac: 1.27 pCi/m<sup>2</sup>s  
Average Radon Flux for #25-17: 0.57 pCi/m<sup>2</sup>s

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.

Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By: *D. Blunda*  
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Reviewed By: *R. V.*

Starting ID 59770  
 Starting LAACC 25  
 Project: Pathfinder Mines Corp  
 Location: Gas Hills/Lucky Mc.  
 Report date: September 28, 1998  
 Weather: clear, breezy 49 degrees

Data 1  
 Date Set 9/24/98  
 Date Removed 9/25/98  
 Date Counted 9/26/98  
 Area K Eff. 0.00068  
 Average  
 Std1 1404  
 Std2 2714  
 Bkg 102  
 Instrbkg 117  
 Average  
 Std Counts 1443  
 Bkg Counts 93  
 DPM, pCi 18210  
 Count Time, min 5

Data 2  
 Date Set 9/24/98  
 Date Removed 9/25/98  
 Date Counted 9/26/98  
 Area K Eff. 0.00068  
 Average  
 Std Counts 1443  
 Bkg Counts 93  
 DPM, pCi 18210  
 Count Time, min 5



| Lab ID | QA | LAACC # | Can ID | Field ID         | Gross Counts | Net Counts | Net CP | Time Set | Time Removed | t1, sec | Time Count Start | t2, sec | t3, sec | pCi 222Rn m-2 s-1 | Run # | Count Date | Int 1 | Int 2 | Int 3 | Int 4 |
|--------|----|---------|--------|------------------|--------------|------------|--------|----------|--------------|---------|------------------|---------|---------|-------------------|-------|------------|-------|-------|-------|-------|
| 59770  |    | 25      | 25     | LMRF-1           | 128          | 35         | 7      | 8:39     | 8:44         | 85700   | 10:35            | 179750  | 180060  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.82  | 0.82  |
| 59771  |    | 18      | 10     | LMRF-2           | 153          | 60         | 12     | 8:41     | 8:46         | 85700   | 10:40            | 179940  | 180240  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.82  | 0.82  |
| 59772  |    | 2       | 2      | LMRF-3           | 133          | 40         | 8      | 8:44     | 8:47         | 85460   | 10:51            | 180300  | 180600  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.82  | 0.82  |
| 59773  |    | 24      | 26     | LMRF-5           | 136          | 43         | 9      | 8:46     | 8:47         | 86340   | 10:57            | 180540  | 180840  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.82  | 0.82  |
| 59774  |    | 7       | 7      | LMRF-6           | 127          | 34         | 7      | 8:48     | 8:50         | 86400   | 12:20            | 185400  | 185700  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.81  | 0.81  |
| 59775  |    | 23      | 23     | LMRF-7           | 155          | 62         | 12     | 8:50     | 8:51         | 86340   | 12:25            | 185580  | 185880  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.81  | 0.81  |
| 59776  |    | 1       | 1      | LMRF-8           | 123          | 30         | 6      | 8:52     | 8:53         | 86340   | 12:34            | 186000  | 186300  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.81  | 0.81  |
| 59777  |    | 18      | 18     | LMRF-11          | 401          | 308        | 62     | 8:54     | 8:55         | 86280   | 12:45            | 186480  | 186780  | 1.27              | 1     | 09-26-98   | 0.000 | 0.17  | 0.81  | 0.81  |
| 59778  | D1 | 20      | 20     | LMRF-12          | 170          | 77         | 15     | 8:57     | 8:58         | 86460   | 12:52            | 186900  | 187200  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.81  | 0.81  |
| 59778  |    | 20      | 20     | LMRF-12          | 162          | 69         | 14     | 8:57     | 8:58         | 86040   | 11:15            | 267060  | 267360  | <0.5              | 1     | 09-27-98   | 0.000 | 0.17  | 0.68  | 0.68  |
| 59779  |    | 4       | 11     | LMRF-13          | 131          | 38         | 8      | 9:04     | 9:05         | 86280   | 13:56            | 190140  | 190440  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.80  | 0.80  |
| 59780  | D2 | 19      | 19     | LMRF-14          | 303          | 210        | 42     | 9:07     | 9:09         | 86520   | 14:01            | 190440  | 190740  | 0.87              | 1     | 09-26-98   | 0.000 | 0.17  | 0.80  | 0.80  |
| 59780  |    | 19      | 19     | LMRF-14          | 299          | 206        | 41     | 9:07     | 9:09         | 86400   | 16:35            | 199560  | 199860  | 0.87              | 1     | 09-26-98   | 0.000 | 0.17  | 0.79  | 0.79  |
| 59781  |    | 6       | 13     | LMRF-15          | 131          | 38         | 8      | 9:09     | 9:11         | 86340   | 14:19            | 191220  | 191520  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.80  | 0.80  |
| 59782  |    | 21      | 30     | LMRF-22          | 137          | 44         | 9      | 9:12     | 9:14         | 86340   | 14:38            | 192180  | 192480  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.80  | 0.80  |
| 59783  |    | 3       | 14     | LMRF-23          | 187          | 94         | 19     | 9:15     | 9:16         | 86340   | 14:43            | 192360  | 192660  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.80  | 0.80  |
| 59784  |    | 5       | 8      | LMRF-24          | 132          | 39         | 8      | 9:17     | 9:18         | 86220   | 14:48            | 192420  | 192720  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.80  | 0.80  |
| 59785  |    | 22      | 22     | #1Tails test pad | 119          | 26         | 5      | 9:21     | 9:22         | 86040   | 15:30            | 194520  | 194820  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.80  | 0.80  |
| 59786  |    | 17      | 17     | #2Tails test pad | 160          | 67         | 13     | 9:28     | 9:29         | 88140   | 15:35            | 196500  | 196800  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.80  | 0.80  |
| 59787  | T1 | TB1     | TB1    | TB1              | 109          | 16         | 3      | 9:00     | 9:00         | 86400   | 16:00            | 198000  | 198300  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.79  | 0.79  |
| 59788  | T2 | TB2     | TB2    | TB2              | 94           | 1          | 0      | 9:00     | 9:00         | 86400   | 16:05            | 198300  | 198600  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.79  | 0.79  |
| 59789  | T3 | TB3     | TB3    | TB3              | 95           | 2          | 0      | 9:00     | 9:00         | 86400   | 16:10            | 198600  | 198900  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.79  | 0.79  |
| 59790  | T4 | TB4     | TB4    | TB4              | 95           | 2          | 0      | 9:00     | 9:00         | 86400   | 16:15            | 198900  | 199200  | <0.5              | 1     | 09-26-98   | 0.000 | 0.17  | 0.79  | 0.79  |
| 59791  | T5 | TB5     | TB5    | TB5              | 96           | 3          | 1      | 9:00     | 9:00         | 118900  | 16:20            | 231600  | 231900  | <0.5              | 1     | 09-26-98   | 0.000 | 0.22  | 0.79  | 0.79  |



FI ACQUIRE

CDL F2 FLARE PREVIOUS SPECTRUM

# LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page \_\_\_\_ Of \_\_\_\_

Client: Pathfinder Mines Corp.

Location: Gas Hills - Lucky Me

Inst.: \_\_\_\_ Eff: \_\_\_\_ Tech: \_\_\_\_

Weather Condition: clear, breezy Precip: none

Min Temp: 49°F

Inst. Back: ~~102~~ ~~104~~

Charcoal Back: 10284 Lot: \_\_\_\_

Standard: 1404/1613 Count: 2714, 2914  
11459

| LAACC Unit # | Charcoal Can # | Location I.D. / Station | 9-24-98 Mo/Day/Yr 24 hr time set | 9-25-98 Mo/Day/Yr 24 hr time removed | Site Personnel Initials | Lab Sample Number | Date/Time (Start)       | Count Min | Gross Counts          | Comments                        |
|--------------|----------------|-------------------------|----------------------------------|--------------------------------------|-------------------------|-------------------|-------------------------|-----------|-----------------------|---------------------------------|
| 25           | 25             | LMRF-1                  | 0839                             | 0844                                 | TWH                     | 98-59770          | 1033<br><del>1035</del> | 5         | 128<br><del>102</del> |                                 |
| 16           | 10             | LMRF-2                  | 0841                             | 0846                                 | TWH                     | 59771             | 1035<br><del>1043</del> | ↓         | 153                   |                                 |
| 2            | 2              | LMRF-3                  | 0844                             | 0847                                 | TWH                     | 59772             | 1046                    | all       | 133                   |                                 |
| 24           | 26             | LMRF-5                  | 0846                             | 0848                                 | TWH                     | 59773             | 1052                    |           | 136                   |                                 |
| 7            | 7              | LMRF-6                  | 0848                             | 0850                                 | TWH                     | 59774             | 1215<br><del>1209</del> |           | 127                   |                                 |
| 23           | 23             | LMRF-7                  | 0850                             | 0851                                 | TWH                     | 59775             | 1220                    |           | 155                   |                                 |
| 1            | 1              | LMRF-8                  | 0852                             | 0853                                 | TWH                     | 59776             | 1229                    |           | 123                   |                                 |
| 18           | 18             | LMRF-11                 | 0854                             | 0855                                 | TWH                     | 59777             | 1240<br><del>1235</del> |           | 401                   |                                 |
| 20           | 20             | LMRF-12                 | 0857                             | 0858                                 | TWH                     | 59778             | 1247                    |           | 170                   |                                 |
| 4            | 11             | LMRF-13                 | 0904                             | 0905                                 | TWH                     | 59779             | 1351                    |           | 131                   |                                 |
| 19           | 19             | LMRF-14                 | 0907                             | 0909                                 | TWH                     | 59780             | 1356                    |           | 303                   |                                 |
| 6            | 13             | LMRF-15                 | 0909                             | 0911                                 | TWH                     | 59781             | 1416                    |           | 131                   | SITE NOT TO FINAL LIFT-1' COVER |
| 21           | 30             | LMRF-22                 | 0912                             | 0914                                 | TWH                     | 59782             | 1433                    |           | 137                   |                                 |
| 3            | 14             | LMRF-23                 | 0915                             | 0916                                 | TWH                     | 59783             | 1438                    |           | 187                   |                                 |
| 5            | 8              | LMRF-24                 | 0917                             | 0918                                 | TWH                     | 59784             | 1443                    |           | 132                   |                                 |
| 22           | 22             | No. 1 Tails test pad    | 0921                             | 0922                                 | TWH                     | 59785             | 1525                    |           | 119                   |                                 |
| 17           | 17             | No. 2 Tails Test pad    | 0928                             | 0929                                 | TWH                     | 59786             | 1530                    |           | 160                   |                                 |

# LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page \_\_\_\_ Of \_\_\_\_

Client: Pathfinder Mines Corp

Location: Gas Hills - Lucky Me

Inst.: \_\_\_\_\_ Eff: \_\_\_\_\_ Tech: \_\_\_\_\_

Weather Condition: Clear, breezy Precip: none

Min Temp: 49°F

Inst. Back: \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

Standard: \_\_\_\_\_ Count: \_\_\_\_\_

| LAACC Unit # | Charcoal Can # | Location I.D. / Station | Mo/Day/Yr 24 hr time set | Mo/Day/Yr 24 hr time removed | Site Personnel Initials        | Lab Sample Number | Date/Time Start | Count Min | Gross Counts | Comments |
|--------------|----------------|-------------------------|--------------------------|------------------------------|--------------------------------|-------------------|-----------------|-----------|--------------|----------|
|              |                | Trip Blank #1           |                          |                              |                                | 59787             | 1536            | 5 min     | 109          |          |
|              |                | #2                      |                          |                              |                                | 59788             | 1552            |           | 094          |          |
|              |                | #3                      |                          |                              |                                | 59789             | 1558            |           | 095          |          |
|              |                | #4                      |                          |                              |                                | 59790             | 1603            |           | 095          |          |
|              |                | #5                      |                          |                              |                                | 59791             | 1608            |           | 096          |          |
|              |                |                         |                          |                              | 2ND                            | BLANK             | 1613            |           | 084          |          |
|              |                |                         |                          |                              | 2ND                            | STD #1            | 1619            |           | 1454         |          |
|              |                |                         |                          |                              | 2ND                            | STD #2            | 1624            |           | 2914         |          |
|              |                |                         |                          |                              | 1st                            | BLANK             | 1005            |           | 102          |          |
|              |                |                         |                          |                              | 1st                            | STD #1            | 1810 1013       |           | 1404         |          |
|              |                |                         |                          |                              | 1st                            | SM 36472          | 1014            |           | 2714         |          |
|              |                |                         |                          |                              | DUPLICATES need to be analyzed |                   |                 |           |              |          |
|              |                |                         |                          |                              | 9-26                           | #19 DUP           | 1630            |           | 299          |          |
|              |                |                         | 9-27-98                  |                              | 9-27                           | 2nd DUP           | 1110            |           | 162          |          |
|              |                |                         |                          |                              | 9-27                           | 23rd DUP          | 1128            |           | 138          |          |
|              |                |                         |                          |                              | 9-27                           | BLANK             | 1008            |           | 100          |          |
|              |                |                         |                          |                              | 9-27                           | STD #1            | 0944            |           | 1386         |          |

9-27

STD #2

1141

2680

ENERGY LABORATORIES, INC. - CASPER, WYOMING

STANDARD OPERATING PROCEDURES

RADON FLUX MEASUREMENT

EPA METHOD 115

LARGE AREA ACTIVATED CHARCOAL COLLECTORS (LAACC)

Approved By:

Originator Sheryl Merling 4-6-98 Date

Technical Reviewer (if applicable) David Blaida 4-6-98 Date

ELI Quality Assurance Director Ken W. G. 4-6-98 Date

ELI Laboratory Manager S.A. Harding 4-6-98 Date

Distribution of Official Copies:

ELI Laboratory Manager  
ELI Quality Assurance Director  
All ELI Staff

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to provide a general description of the placement, handling, subsequent analytical measurement, and calculation of radon flux measured from Large Area Activated Charcoal Canister (LAACC), also known as EPA Method 115, per 40 Code of Federal Regulations (CFR), Part 61, Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants; Radionuclides; Final Rule and Notice of Reconsideration, December 15, 1989. In addition to the published EPA Method 115, technical information was also taken from EPA's publication 520/5-85-029, Radon Flux Measurements on Gardiner and Royster Phosphogypsum Piles Near Tampa and Mulberry, Florida.

Radon flux measurements are performed on uranium mill tailings, phosphogypsum stacks, or on any solids (soil, waste, etc.) in which radon flux measurements are required. The majority of radon flux measurements have been for conventional uranium milling operations.

## 2.0 SUMMARY

The method used to measure radon flux involves adsorption of radon on activated charcoal in a large area collector (LAACC); diagram located in Section 7.0 Attachments. The collector is placed onto the surface of the material to be measured and is allowed to collect radon for a period of 24 hours. The charcoal is transferred into steel pre-numbered cans then transported to the laboratory for analysis and calculation of radon flux. The radon collected on the charcoal is measured by gamma spectroscopy or equivalent equipment (multi or single channel analyzers). In addition to EPA's Method 115 document, publication EPA 520/5-85-029, *Radon Flux Measurements on Gardiner and Royster Phosphogypsum Piles Near Tampa and Mulberry, Florida, January 1986*, and EPA 520/1-89-009, *Indoor Radon and Radon Decay Product Measurement Protocols*, provides the basic information on design, measurement, and theory related to radon flux measurement and analysis. Partial copies of the publications have been attached in Section 6.0 References.

## 3.0 NOTES AND PRECAUTIONS

The following areas should be addressed before sampling:

- < timing of collection (24 hours sampling or quarterly annual collection),
- < regions within the tailings impoundment (quantity and area),
- < personnel responsible for placement of collectors,
- < EPA notification of intent to proceed with collection,
- < current topographical map of tailings impoundments to be sampled,
- < sample point locations to be marked in the field prior to collector placement, and
- < location of any background samples such as up wind of the impoundment (undisturbed areas) as a point of comparison or field duplicate samples.

Safety precautions that should be observed while performing radon flux measurement in the field and analysis in the laboratory are as follows:

### *In the field*

- < Observe all site specific hazard conditions,
- < Make sure all paperwork is secured from environmental conditions, and
- < Do not open or compromise trip blank charcoal canisters.

*In the laboratory*

- < Observe all laboratory safety procedures as specified in the Chemical Hygiene Plan and/or by the Standard Operating Procedure for the equipment or method.

**4.0 DEFINITIONS**

None.

**5.0 MATERIALS AND PROCEDURES**

**5.1 Materials**

The collector consists of a PVC end cap with handle, screened spacer pads, charcoal distribution grid, screened retainer pad, and a steel-retaining rod. Approximately 180 grams of activated charcoal is spread in the distribution grid. The retainer pad is placed over the charcoal and held in place by the retaining rod. Refer to the diagram of construction located in Section 6.0 References.

**5.2 Procedure for Measurement and Calculation of Radon Flux from Uranium Mill Tailings Piles**

The following describes the monitoring methods which must be used in determining the <sup>222</sup>Rn emissions from underground uranium mines, uranium mill tailings piles, phosphogypsum stacks, and other piles of waste material emitting radon.

The loading process should be done in an enclosed area so adverse wind conditions do not disturb the charcoal (blow it away). To allow for a quick transfer of charcoal into the collectors prior to deployment, LAACC units should be loaded by two or more people. The collectors are loaded with the charcoal by removing the retaining rod and pad, placing the pre-weighed (pre-measured) charcoal into the charcoal support grid, and replacing the pad and rod. The collectors are transported to the field by vehicle and deployed. The LAACC unit, charcoal canister, and tailings grid location should be recorded. Teams of two or more people should begin deployment immediately upon the charcoal transfer. Minimize the time a loaded collector is allowed to sit in ambient atmosphere. Care must be taken to minimize confusion and order of LAACC units and charcoal cans. An organized method of transfer and a large working area assist in minimizing any errors in LAACC/canister mismatching.

The pre-numbered collectors are deployed by carefully positioning the end cap on a flat surface of the material to be measured with soils or tailings used to seal the edge, at the predetermined location. It is imperative that a complete seal is obtained between the collector and the material to be measured. A shovel or a hand trowel may be used to

scoop the material around the edge of the collector, being careful not to scoop material into the vent hole. The location identification, LAACC number, and the set time should be recorded.

After approximately 24 hours (minor time overruns are acceptable) of exposure, the collectors are picked up and the time retrieved is recorded. If any other conditions are observed (such as a broken seal, wind blown conditions, etc.), they should also be recorded. The transfer of the charcoal should begin immediately upon retrieval. The LAACCs are transported to the enclosed work area where a team of two or more personnel are responsible for transferring the charcoal carefully back into the appropriate pre-numbered cans. The time between retrieval and transferring the exposed charcoal should be held to a minimum, however, site and field conditions contribute to the timeliness of the transfer.

The activated charcoal is removed from the collector by removing the retaining rod and pad from the collector and dumping the charcoal into a large funnel which empties into the pre-numbered steel alloy can. The can's lid is placed and a wrap of electrical tape is applied to the can seam to eliminate any charcoal loss due to lid removal or introduction of air and/or radon into the can. The tape also assists in creating a closed system to allow for the radon collected to equilibrate for four (4) hours before counting to allow the ingrowth of the radon daughters.

The cans are transported to the laboratory where they are counted and recorded. The following information pertains to the calculation that will be made to ascertain the radon flux for each specific LAACC location. Due to the near 100% efficiency of the activated charcoal to adsorb and retain radon and its associated particulate daughters from the atmosphere in the LAACC units, no can sealing or seal testing is required. This method of collection and transportation is endorsed by EPA via EPA 402-R-92-004, EPA 402-R-92-004, *Indoor Radon and Radon Decay Products Measurement Device Protocols*, July 1992, and EPA 520/5-87-005, *EERF Standard Operating Procedure for Rn-222 Measurement Using Charcoal Canisters*, June 1987.

### **5.2.1 Frequency of Flux Measurement**

A single set of radon flux measurements may be made, or if the owner or operator chooses, measurements that are more frequent may be made over a one-year period. These measurements may involve quarterly, monthly, or weekly intervals. All radon measurements shall be made as described in paragraphs 5.2.2 through 5.2.6 except that for measurements made over a one-year period, the requirement of paragraph 5.2.4(c) shall not apply. The mean radon flux from the pile shall be the arithmetic mean of the mean radon flux for each measurement period. The weather conditions, moisture content of the tailings and area of the pile covered by water existing at the time of the measurement shall be chosen so as to provide measurements representative of the long term radon flux from the pile and shall be subject to EPA review and approval.

### 5.2.2 *Distribution of Flux Measurements*

The distribution and number of radon flux measurements required on a pile will depend on the clearly defined areas of the pile (called regions) that can have significantly different radon fluxes due to surface conditions. The mean radon flux shall be determined for each individual region of the pile. Regions that shall be considered for operating mill-tailing piles are:

- < water covered areas;
- < water saturated areas (beaches);
- < dry top surface areas; and
- < sides, except where earthen material is used in dam construction.

For mill tailings after closure the pile shall be considered to consist of only one region.

### 5.2.3 *Number of Radon Flux Measurements*

Radon flux measurements shall be made within each region of the pile, except for those areas covered with water. Measurements shall be made at regularly spaced locations across the surface of the region, realizing that surface roughness will prohibit measurements in some areas of a region. The minimum number of flux measurements considered necessary to determine a representative mean radon flux value for each type of region on an operating pile is:

- < water saturated area - no measurements required as radon flux is assumed to be zero;
- < water saturated beaches - 100 radon flux measurements;
- < loose and dry top surface - 100 radon flux measurements; and
- < sides - 100 radon flux measurements, except where earthen materials are used in dam construction.

For mill tailings pile after closure which consists of only one region, minimum of 100 measurements are required.

#### 5.2.3.1 *Trip and field blanks*

ELI prepares a minimum of 10% trip blanks to be sent to the field with the LAACC testing equipment and measurement charcoal containers. The trip blanks travel with the charcoal cans that will be used in the LAACC devices. The trip blanks stay with the unopened charcoal cans

while in storage prior to transfer and deployment. The trip blanks stay in the work area upon deployment of the devices to the field for actual measurement. They are intended to provide information regarding the integrity of the shipping and handling of the measuring equipment to and from the field from the laboratory.

#### **5.2.3.2 Background and field duplicate measurements**

Due to the non-homogeneous nature of tailings piles, it is recommended that some duplicate measurements be made in the field. Set two LAACC devices in the field adjacent to each other. In addition to field duplicates, it is recommended that some LAACC devices are deployed in areas of known background conditions (undisturbed field conditions). This data will complement the radon flux measurements as determined on the tailings pile.

#### **5.2.4 Restrictions to Radon Flux Measurements**

The following restrictions are placed on making radon flux measurements:

- a. measurements shall not be initiated within 24 hours of a rainfall;
- b. if a rainfall occurs during the 24 hour measurements period, the measurement is invalid if the seal around the lip of the collector is surrounded by water; and
- c. measurements shall not be performed if the ambient temperature is below 35°F or if the ground is frozen. A min/max thermometer may be used if no meteorological data is available.

#### **5.2.5 Areas of Pile Regions**

The approximate area of each region of the pile shall be determined in units of square meters.

#### **5.2.6 Radon Flux Measurements**

Measuring radon flux involves the adsorption of radon on activated charcoal in a large-area collector. The radon collector is placed on the surface of the pile area to be measured and allowed to collect for a period of 24 hours. The radon collected on the charcoal is measured by gamma-ray spectroscopy. The detailed measurement procedure provided in Appendix A of EPA 520/5-85-0029(1) shall be used to measure the radon flux on uranium mill tailings, *except the surface of the tailings shall not be penetrated by the lip of the*



*radon collector as directed in the procedure, rather the collector shall be carefully positioned on a flat surface with soil or tailings used to seal the edge.*

### 5.2.7 Calculations

The mean radon flux for reach region on the pile and for the total pile shall be calculated and reported as follows:

- a. The individual radon flux calculations shall be made as provided in Appendix A EPA 86 (1). The mean radon flux for each region of the pile shall be calculated by summing all individual flux measurements for the region and dividing by the total number of flux measurements for the region.
- b. The mean radon flux for the total uranium mill tailings pile shall be calculated as follows:

$$J_s = \frac{J_1 A_1 + \dots J_2 A_2 \dots J_i A_i}{A_t}$$

where:

|       |   |   |
|-------|---|---|
| $J_s$ | = | mean flux for the total pile (pCi/m <sup>2</sup> -s),   |
| $J_i$ | = | mean flux measured in region i (pCi/m <sup>2</sup> -s), |
| $A_i$ | = | area of region i (m <sup>2</sup> ), and                 |
| $A_t$ | = | total area of pile (m <sup>2</sup> ).                   |

### 5.3 Quality Assurance

ELI is an EPA certified and listed laboratory through the Radon Measurement Proficiency (RMP) Program. Laboratory certification has been maintained in the areas for determination of radiochemical, inorganics, organics, and bacteriological constituents in drinking waters. ELI has been actively participating in EPA's Radon Proficiency Program since its inception for determination of radon concentrations in homes and structures. ELI has two staff members presently accepted by the U. S. Nuclear Regulatory Commission (NRC) as Radiation Safety Officers and have performed radiation surveys for uranium operations since 1980. These surveys include alpha, beta, and gamma emitting radionuclides in air, soil/surface, and water for determination of employee occupational exposure awhile working at mine sites.

### **5.3.1 Sampling Procedures**

Records of field activities and laboratory measurements shall be maintained. The following information shall be recorded for each charcoal canister measurement:

- < site,
- < name of pile,
- < sample location,
- < sample ID number,
- < date and time on,
- < date and time off, and
- < observations of meteorological conditions and comments.

Records shall include all applicable information associated with determining the sample measurement, calculations, observations, and comments.

### **5.3.2 Sample Custody**

Custodial control of all charcoal samples exposed in the field shall be maintained in accordance with EPA chain of custody field procedures. A control record shall document all custody changes that occur between the field and laboratory personnel.

### **5.3.3 Calibration Procedures and Frequency**

ELI has two multi-channel gamma spectrometers available at its Casper facility. The radioactivity of two standard charcoal sources, each containing a carefully determined quantity of Radium-226 ( $^{226}\text{Ra}$ ) uniformly distributed through ~180 grams of activated charcoal shall be measured. An efficiency factor is computed by dividing the average measured radioactivity of the two standard charcoal sources, minus the background, in cpm by the known radioactivity of the sources in dpm. The same two standard charcoal sources shall be made, at a minimum, at the beginning and at the end of each day's counting as a check of the radioactivity counting equipment. A background count using unexposed charcoal should be made, at a minimum, at the beginning and at the end of each counting day to check for inadvertent contamination of the detector or other changes affecting the background. The unexposed charcoal comprising the blank is changed with each new batch of charcoal used.

#### 5.3.4 Internal Quality Control Checks and Frequency

The charcoal from every tenth exposed canister shall be recounted. Five percent of the samples analyzed shall be blanks (charcoal having no radioactivity added).

#### 5.3.5 Data Precision, Accuracy, and Completeness

The precision, accuracy, and completeness of measurements and analyses shall be within the following limits for samples measuring greater than 1.0 pCi/m<sup>2</sup>-s.

- < Precision: 10%
- < Accuracy: 10%
- < Completeness: At least 85% of the measurements must yield usable results

ELI has performed a method detection limit (MDL) study using EPA's standard MDL definition and procedure. In addition, the following precision calculation is utilized at the laboratory at a 90% (2-sigma) confidence level:

$$\frac{2 \times \sqrt{\text{SampleCount} + \text{BackgroundCount}}}{\text{SampleCount} - \text{BackgroundCount}}$$

#### 5.4 Reporting

The results of the individual flux measurements, the approximate locations on the pile, and the mean radon flux for each region and the mean radon flux for the total stack shall be included in the emission test report. Any conditions or unusual event that occurred during the measurements that could significantly affect the results should be reported.

ELI will provide the company with a report that will include a minimum of the following:

- < number and laboratory ID of collectors placed;
- < date and time of collectors placed, retrieved, and charcoal counted;
- < map of location of collectors (provided by company);
- < radon flux calculations for each detector, region, and total tailings impoundments;

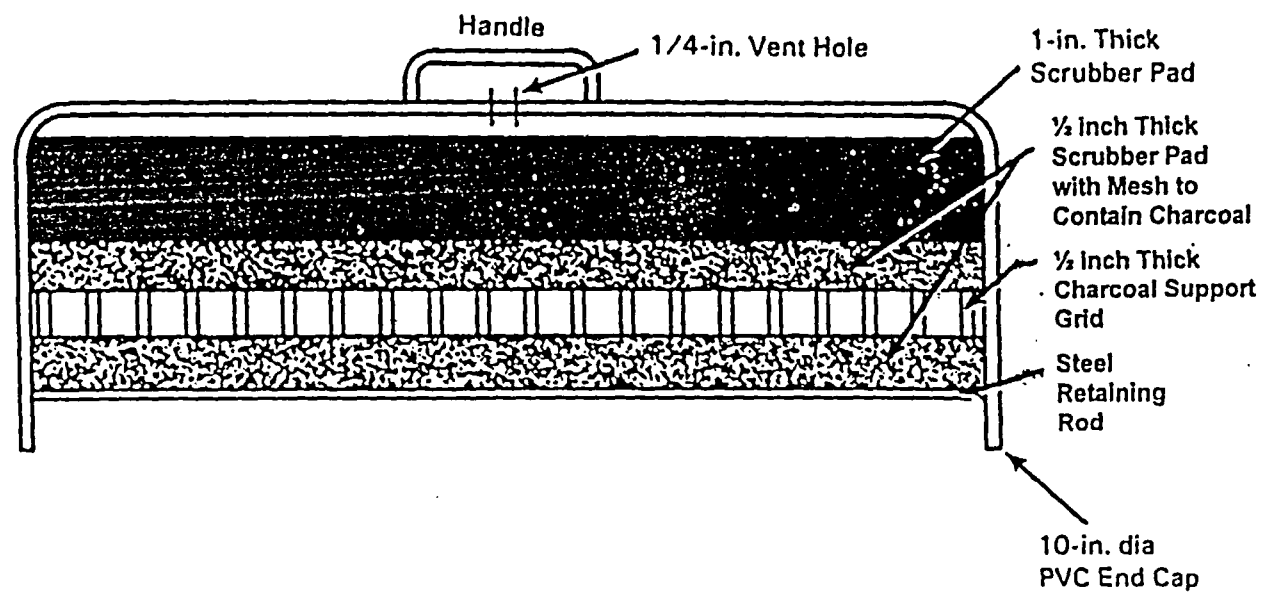
- < spectrum print out for each detector, if requested; and
- < quality assurance data will be provided upon request. This data will consist of duplicates, blanks, standards, and geometry verification.

## 6.0 REFERENCES

- 6.1 EPA Method 115, per 40 Code of Federal Regulations (CFR), *Part 61, Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants; Radionuclides; Final Rule and Notice of Reconsideration*, December 15, 1989.
- 6.2 EPA's publication 520/5-85-029, *Radon Flux Measurements on Gardinier and Royster Phosphogypsum Piles Near Tampa and Mulberry, Florida*.
- 6.3 EPA publication 520/1-89-009, *Indoor Radon and Radon Decay Product Measurement Protocols*, updated and made into two documents;
- 6.4 EPA 402-R-92-004, *Indoor Radon and Radon Decay Products Measurement Device Protocols*, July 1992, and
- 6.5 EPA 402-R-92-003, *Protocols For Radon and Radon Decay Product Measurements In Homes*, June 1993.
- 6.6 EPA 520/5-87-005, *EERF Standard Operating Procedure for Rn-222 Measurement Using Charcoal Canisters*, June 1987.
- 6.7 Copies of ELI's Quality Assurance and certifications are available upon request.

## 7.0 ATTACHMENTS

- 7.1 Diagram of LAACC device
- 7.2 Chain of Custody
- 7.3 Field Notes Form
- 7.4 Example of Report
- 7.5 Memo to File regarding EPA's informal field and laboratory audit of ELI's LAACC Program.
- 7.6 Record of Acknowledgment/Signature Page



Large Area Radon Collector

7.1 DIAGRAM OF LARGE AREA COLLECTOR  
SOP ELL-C-50-907-01





# Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report

Page 1 of 2

Project: COMPANY NAME

Date Set: August 13, 1996

Location: Project Name

Date Remove: August 14, 1996

Report Date: September 10, 1996

Weather: \*Fair/Clear/min. temp 50 degrees F.

Date Counted: August 15, 1996

| Date Counted | Blank Charcoal cpm | Standard No. 1 cpm | Standard No. 2 cpm |
|--------------|--------------------|--------------------|--------------------|
| 08-15-96     | 98                 | 1701               | 3384               |
| 08-15-96     | 94                 | 1618               | 3421               |
| 08-15-96     | 90                 | 1698               | 3358               |
| Average      | 94                 | 1672               | 3388               |

| TRIP BLANKS  |                 |                         |
|--------------|-----------------|-------------------------|
| Date Counted | Canister No.    | Radon Flux**<br>pCi/m2s |
| 8-15-96      | Trip Blank - 1  | <0.5                    |
| 8-15-96      | Trip Blank - 2  | <0.5                    |
| 8-15-96      | Trip Blank - 3  | <0.5                    |
| 8-15-96      | Trip Blank - 4  | <0.5                    |
| 8-15-96      | Trip Blank - 5  | <0.5                    |
| 8-15-96      | Trip Blank - 6  | <0.5                    |
| 8-15-96      | Trip Blank - 7  | <0.5                    |
| 8-15-96      | Trip Blank - 8  | <0.5                    |
| 8-15-96      | Trip Blank - 9  | <0.5                    |
| 8-15-96      | Trip Blank - 10 | <0.5                    |
| 8-15-96      | Trip Blank - 11 | <0.5                    |
| 8-15-96      | Trip Blank - 12 | <0.5                    |
| 8-15-96      | Trip Blank - 13 | <0.5                    |
| 8-15-96      | Trip Blank - 14 | <0.5                    |
| 8-15-96      | Trip Blank - 15 | <0.5                    |
| 8-15-96      | Trip Blank - 16 | <0.5                    |
| 8-15-96      | Trip Blank - 17 | <0.5                    |
| 8-15-96      | Trip Blank - 18 | <0.5                    |
| 8-15-96      | Trip Blank - 19 | <0.5                    |
| 8-15-96      | Trip Blank - 20 | <0.5                    |
| 8-15-96      | Trip Blank - 21 | <0.5                    |
| 8-15-96      | Trip Blank - 22 | <0.5                    |
| 8-15-96      | Trip Blank - 23 | <0.5                    |
| 8-15-96      | Trip Blank - 24 | <0.5                    |
| 8-15-96      | Trip Blank - 25 | <0.5                    |

7.5 MEMO TO FILE REGARDING EPA'S UNOFFICIAL RADON FLUX AUDIT  
ELI SOP-50-907-01

*MEMORANDUM*

*Date: June 10, 1997*

*To: Energy Laboratories, Inc. File*

*From: Sheryl Garling with Energy Laboratories, Inc. - Casper, Wyoming*

*Subject: Summer of 1990 Unofficial Audit of ELI's Large Area Activated Charcoal Canister (LAACC) Program - From the Field to the Laboratory*

---

To date Energy Laboratories, Inc. (ELI) has not been officially audited by any regulatory agency regarding its Large Area Activated Charcoal Canister (LAACC -radon flux) program. On June 9, 1997 Milt Lammering with U.S. Environmental Protection Agency (EPA) in Denver was contacted to verify if there was any unofficial documentation made to file regarding ELI's radon flux program. His response was that during an unofficial audit no documentation is made if all aspects of the audit are acceptable to the agency.

To clarify the unofficial audit the following background information has been recorded:

Pathfinder Mines Corporation's Shirley Basin Operation scheduled to perform radon flux measurements for their tailings impoundment. They contacted the EPA's representative, Milt Lammering, and requested that he provide an on site audit of the program that ELI proposed. Milt Lammering and Bob Tower, EPA's Certification Officer for radiochemistry from Las Vegas, Nevada, visited the site during the time the collectors were deployed. They observed all aspects of the program from deployment to retrieval, charcoal transfer to and from collectors, and laboratory procedures for accepting samples, logging into laboratory, laboratory equipment, and analysis.

At no time, during the unofficial audit was there any comments or concerns regarding ELI's protocol. ELI designed the radon flux program from all the EPA documentation that was published at the time. The radon flux program has been maintained, since its inception, to the rigorous guidelines published by EPA.

To date, all ELI data submitted by clients, has not been questioned by the regulatory agencies overseeing the program.

For additional information please see SOP Section 6.0, *References*.





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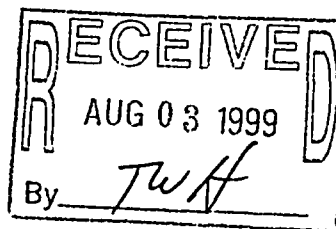
## Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Page 1 of 1

|              |                        |               |          |
|--------------|------------------------|---------------|----------|
| Project:     | Pathfinder Mines Corp. | Date Set:     | 07-26-99 |
| Location:    | Lucky McMine           | Date Remove:  | 07-27-99 |
| Report Date: | July 30, 1999          | Date Counted: | 07-28-99 |
| Weather:     | Clear, dry             |               |          |

Method: Pathfinder's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID    | LAACC # | Cannister # | Location | 07-26-99<br>Time Set | 07-27-99<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> |
|-----------|---------|-------------|----------|----------------------|-------------------------|----------------------------------|
| 99- 36245 | 46      | 17          | 54       | 9:30                 | 9:30                    | <0.5                             |
| 99- 36246 | 47      | 18          | 45       | 9:34                 | 9:34                    | <0.5                             |
| 99- 36246 | 47      | 18          | 45       | 9:34                 | 9:34                    | <0.5                             |
| 99- 36247 | 48      | 19          | 34       | 9:36                 | 9:36                    | <0.5                             |
| 99- 36248 | 49      | 21          | 44       | 9:39                 | 9:39                    | <0.5                             |
| 99- 36249 | 50      | 25          | 35       | 9:43                 | 9:43                    | <0.5                             |
| 99- 36250 | TB-3    | TB-3        | TB-3     | 12:00                | 12:00                   | <0.5                             |





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## Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report

Page 1 of 1

|              |                        |               |          |
|--------------|------------------------|---------------|----------|
| Project:     | Pathfinder Mines Corp. | Date Set:     | 07-26-99 |
| Location:    | Lucky McMine           | Date Remove:  | 07-27-99 |
| Report Date: | July 30, 1999          | Date Counted: | 07-28-99 |
| Weather:     | Clear, dry             |               |          |

| Trip Blank - Lab ID | Cannister # | Radon Flux - pCi/m <sup>2</sup> s* |
|---------------------|-------------|------------------------------------|
| 99- 36250           | TB1         | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 109                | 1398                  | 2673                  |

| Replicate<br>Lab ID | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------------------|--------------|-------------------------------------|---------------------|
| 99- 36246           | 07-28-99     | <0.5                                | 1.000               |

Average of recoveries:

1.000

Minimum Radon Flux for Pathfinder: <0.5 pCi/m<sup>2</sup>s

Maximum Radon Flux for Pathfinder: <0.5 pCi/m<sup>2</sup>s

Average Radon Flux for #17-25 <0.5 pCi/m<sup>2</sup>s

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.

Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By:

Reviewed By:

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COMPLETE ANALYTICAL SERVICES



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c.c. CNA  
2-182

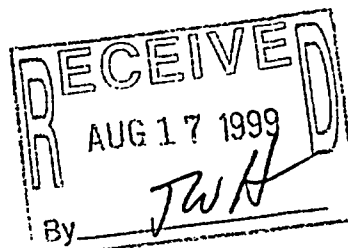
## Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Page 1 of 1

Project: Pathfinder Mines Corp. Date Set: 07-28-99  
Location: Lucky McMine Date Remove: 07-29-99  
Report Date: July 30, 1999 Date Counted: 07-30-99  
Weather: Sunny, hot

Method: Pathfinder's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID    | LAACC # | Cannister # | Location | 07-28-99<br>Time Set | 07-29-99<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> s |
|-----------|---------|-------------|----------|----------------------|-------------------------|------------------------------------|
| 99- 36481 | 76      | 11          | 55       | 9:52                 | 9:52                    | <0.5                               |
| 99- 36482 | 77      | 15          | 55       | 9:52                 | 9:52                    | <0.5                               |
| 99- 36483 | 78      | 16          | 25       | 10:09                | 10:09                   | <0.5                               |
| 99- 36484 | 80      | 17          | 21       | 10:27                | 10:27                   | <0.5                               |
| 99- 36484 | 80      | 17          | 21       | 10:27                | 10:27                   | <0.5                               |
| 99- 36485 | 123     | 18          | 16       | 10:43                | 10:43                   | <0.5                               |
| 99- 36486 | TB-3    | TB-3        | TB-3     | 12:00                | 12:00                   | <0.5                               |





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## Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report

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|              |                        |               |          |
|--------------|------------------------|---------------|----------|
| Project:     | Pathfinder Mines Corp. | Date Set:     | 07-28-99 |
| Location:    | Lucky McMine           | Date Remove:  | 07-29-99 |
| Report Date: | July 30, 1999          | Date Counted: | 07-30-99 |
| Weather:     | Sunny, hot             |               |          |

| Trip Blank - Lab ID | Canister # | Radon Flux - pCi/m <sup>2</sup> s* |
|---------------------|------------|------------------------------------|
| 99- 36486           | TB-3       | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 105                | 1522                  | 2984                  |

| Replicate Lab ID | Date Counted | Radon Flux pCi/m <sup>2</sup> s* | Recovery Decimal |
|------------------|--------------|----------------------------------|------------------|
| 99- 36484        | 07-30-99     | <0.5                             | 1.000            |

Average of recoveries: 1.000

Minimum Radon Flux for Pathfinder: <0.5 pCi/m<sup>2</sup>s

Maximum Radon Flux for Pathfinder: <0.5 pCi/m<sup>2</sup>s

Average Radon Flux for #11-18 <0.5 pCi/m<sup>2</sup>s

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.

Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By:

*DP Kaida*

Reviewed By:

*cal*

dpb r:\reports\clients.99\pathfinder\36481.xls

COMPLETE ANALYTICAL SERVICES

|                 |                        |
|-----------------|------------------------|
| Starting ID     | 35481                  |
| Starting LAACC# | 76                     |
| Project:        | Pathfinder Mines Corp. |
| Location:       | Lucky McMine           |
| Report date:    | July 30, 1999          |
| Weather:        | Sunny, hot             |

|          |         |         | Data 1       | Date Set        | 7/28/99 | $\lambda$ | 2.10E-06 |
|----------|---------|---------|--------------|-----------------|---------|-----------|----------|
|          |         |         |              | Date Removed    | 7/29/99 | Area      | 0.051    |
|          |         |         |              | Date Counted    | 7/30/99 | K         | 0.037    |
|          |         |         |              |                 |         | Eff.      | 0.00694  |
| Std1     | Average | Average | Average(1,2) | Std Counts      | 1507    |           |          |
| Std2     | 1532    | 1511    | 1522         | Bkg Counts      | 105     |           |          |
| Bkg      | 3034    | 2934    | 2994         | DPM, pCi        | 18210   | 2.22      | dis/pCi  |
| instrbkg | 106     | 103     | 105          | Count Time, min | 5       |           |          |

|        |                 |         |      |           |          |
|--------|-----------------|---------|------|-----------|----------|
| Data 2 | Date Set        | 7/28/99 |      | $\lambda$ | 2.10E-06 |
|        | Date Removed    | 7/29/99 |      | Area      | 0.051    |
|        | Date Counted    | 7/30/99 |      | K         | 0.037    |
|        |                 |         |      | Eff.      | 0.00694  |
|        | Std Counts      | 1507    |      |           |          |
|        | Bkg Counts      | 105     |      |           |          |
|        | DPM, pCi        | 18210   | 2.22 | dis/pCi   |          |
|        | Count Time, min | 5       |      |           |          |

| Lab ID | QA | LAACC # | Can ID | Field ID | Gross Counts | Net Counts | Net CP | Time Set | Time Removed | t1, sec | Time Count Start | t2, sec | t3, sec | pCi 222Rn-2 s-1 | Run # | Count Date | int 1 | int 2 | int 3 | int 4 |
|--------|----|---------|--------|----------|--------------|------------|--------|----------|--------------|---------|------------------|---------|---------|-----------------|-------|------------|-------|-------|-------|-------|
| 36481  | D1 | 76      | 11     | 55       | 121          | 17         | 3      | 9:52     | 9:52         | 86400   | 14:15            | 188580  | 188880  | <0.5            | 1     | 07-30-99   | 0.000 | 0.17  | 0.81  | 0.81  |
| 36482  |    | 77      | 15     | 55       | 129          | 25         | 5      | 9:52     | 9:52         | 86400   | 14:20            | 188880  | 189180  | <0.5            | 1     | 07-30-99   | 0.000 | 0.17  | 0.81  | 0.81  |
| 36483  |    | 78      | 16     | 25       | 151          | 47         | 9      | 10:09    | 10:09        | 86400   | 14:25            | 188160  | 188460  | <0.5            | 1     | 07-30-99   | 0.000 | 0.17  | 0.81  | 0.81  |
| 36484  |    | 80      | 17     | 21       | 191          | 87         | 17     | 10:27    | 10:27        | 86400   | 14:30            | 187380  | 187680  | <0.5            | 1     | 07-30-99   | 0.000 | 0.17  | 0.81  | 0.81  |
| 36484  |    | 80      | 17     | 21       | 149          | 45         | 9      | 10:27    | 10:27        | 86400   | 14:40            | 187980  | 188280  | <0.5            | 1     | 07-30-99   | 0.000 | 0.17  | 0.81  | 0.81  |
| 36485  |    | 123     | 18     | 16       | 150          | 46         | 9      | 10:43    | 10:43        | 86400   | 14:35            | 186720  | 187020  | <0.5            | 1     | 07-30-99   | 0.000 | 0.17  | 0.81  | 0.81  |
| 36486  |    | TB-3    | TB-3   | TB-3     | 132          | 28         | 6      | 12:00    | 12:00        | 86400   | 17:20            | 172800  | 173100  | <0.5            | 1     | 07-30-99   | 0.000 | 0.17  | 0.83  | 0.83  |



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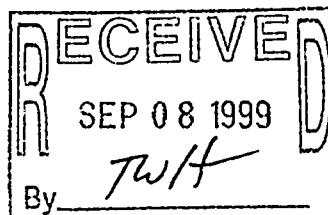
## Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Page 1 of 1

|              |                        |               |          |
|--------------|------------------------|---------------|----------|
| Project:     | Pathfinder Mines Corp. | Date Set:     | 08-23-99 |
| Location:    | Lucky McMine           | Date Remove:  | 08-24-99 |
| Report Date: | August 17, 1999        | Date Counted: | 08-25-99 |
| Weather:     | Clear, calm            |               |          |

Method: Pathfinder's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID      | LAACC # | Cannister # | Location | 08-23-99<br>Time Set | 08-24-99<br>Time Remove | Radon Flux<br>pCi/m <sup>2</sup> s |
|-------------|---------|-------------|----------|----------------------|-------------------------|------------------------------------|
| 99- 32520-1 | 47      | 5           | 47       | 10:29                | 10:29                   | <0.5                               |
| 99- 32520-1 | 47      | 5           | 47       | 10:29                | 10:29                   | <0.5                               |
| 99- 32521-2 | TB-17   | TB-17       | TB-17    | 16:38                | 16:38                   | <0.5                               |



**Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report**

Page 1 of 1

**Project:** Pathfinder Mines Corp.  
**Location:** Lucky McMine  
**Report Date:** August 17, 1999  
**Weather:** Clear, calm

**Date Set:** 08-23-99  
**Date Remove:** 08-24-99  
**Date Counted:** 08-25-99

| Trip Blank - Lab ID | Cannister # | Radon Flux - pCi/m <sup>2</sup> s* |
|---------------------|-------------|------------------------------------|
| 99- 32521-2         | TB-17       | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 87                 | 1344                  | 2550                  |

| Replicate<br>Lab ID | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------------------|--------------|-------------------------------------|---------------------|
| 99- 32520-1         | 08-25-99     | <0.5                                | 1.000               |

Average of recoveries:

1.000

Minimum Radon Flux for Pathfinder: <0.5 pCi/m<sup>2</sup>s

Maximum Radon Flux for Pathfinder: <0.5 pCi/m<sup>2</sup>s

Average Radon Flux for # 5 <0.5 pCi/m<sup>2</sup>s

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.

Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By:

Reviewed By:

June 1996





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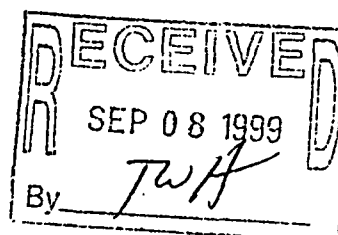
## Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Page 1 of 1

|              |                        |               |          |
|--------------|------------------------|---------------|----------|
| Project:     | Pathfinder Mines Corp. | Date Set:     | 08-17-99 |
| Location:    | Lucky McMine           | Date Remove:  | 08-18-99 |
| Report Date: | August 17, 1999        | Date Counted: | 08-23-99 |
| Weather:     | Mostly clear           |               |          |

Method: Pathfinder's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID | LAACC # | Cannister # | Location | 08-17-99<br>Time Set | 08-18-99<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> s |      |
|--------|---------|-------------|----------|----------------------|-------------------------|------------------------------------|------|
| 99-    | 32469-1 | 46          | 10       | 33                   | 8:54                    | 8:54                               | <0.5 |
| 99-    | 32469-2 | 47          | 40       | 46                   | 8:57                    | 8:57                               | <0.5 |
| 99-    | 32469-3 | 48          | 149      | 53                   | 9:00                    | 9:00                               | <0.5 |
| 99-    | 32469-3 | 48          | 149      | 53                   | 9:00                    | 9:00                               | <0.5 |
| 99-    | 32469-4 | TB16        | TB16     | TB16                 | 12:00                   | 12:00                              | <0.5 |



**Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report**

Page 1 of 1

|              |                        |               |          |
|--------------|------------------------|---------------|----------|
| Project:     | Pathfinder Mines Corp. | Date Set:     | 08-17-99 |
| Location:    | Lucky McMine           | Date Remove:  | 08-18-99 |
| Report Date: | August 17, 1999        | Date Counted: | 08-23-99 |
| Weather:     | Mostly clear           |               |          |

| Trip Blank - Lab ID | Cannister # | Radon Flux - pCi/m <sup>2</sup> s* |
|---------------------|-------------|------------------------------------|
| 99- 32469-4         | TB-16       | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 86                 | 1285                  | 2565                  |

| Replicate<br>Lab ID | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------------------|--------------|-------------------------------------|---------------------|
| 99- 32469-3         | 08-23-99     | <0.5                                | 1.000               |

Average of recoveries:

1.000

Minimum Radon Flux for Pathfinder: <0.5 pCi/m<sup>2</sup>sMaximum Radon Flux for Pathfinder: <0.5 pCi/m<sup>2</sup>sAverage Radon Flux for #10-149: <0.5 pCi/m<sup>2</sup>s\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.

Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By:

Reviewed By:

d:\reports\clients.99\pathfinder\32469.xls

Starting ID 32469,1  
 Starting LAACC# 46  
 Project: Pathfinder Mines Corp.  
 Location: Lucky McMine  
 Report date: August 17, 1999  
 Weather: Mostly clear

| Data 1  |      |      |      | Data Set        |         |      | 8/17/99 | $\lambda$ | 2.10E-06        | Data 2 |              |         | Data Set |         |  | 8/17/99 | $\lambda$ | 2.10E-06 |
|---------|------|------|------|-----------------|---------|------|---------|-----------|-----------------|--------|--------------|---------|----------|---------|--|---------|-----------|----------|
|         |      |      |      | Date Removed    | 8/18/99 | Area | 0.051   |           |                 |        | Date Removed | 8/18/99 | Area     | 0.051   |  |         |           |          |
|         |      |      |      | Date Counted    | 8/23/99 | K    | 0.037   |           |                 |        | Date Counted | 8/23/99 | K        | 0.037   |  |         |           |          |
|         |      |      |      | Eff.            | 0.00593 |      |         |           |                 |        |              | Eff.    | 0.00593  |         |  |         |           |          |
| Average | 1285 | 1285 | 1285 | Std Counts      | 1284    |      |         |           | Std Counts      | 1284   |              |         |          |         |  |         |           |          |
| Std1    | 1285 | 1285 | 1285 | Bkg Counts      | 86      |      |         |           | Bkg Counts      | 86     |              |         |          |         |  |         |           |          |
| Std2    | 2565 | 2565 | 2565 | DPM, pCi        | 18210   | 2.22 | dis/pCi |           |                 |        | DPM, pCi     | 18210   | 2.22     | dis/pCi |  |         |           |          |
| Bkg     | 86   | 86   | 86   | Count Time, min | 5       |      |         |           | Count Time, min | 5      |              |         |          |         |  |         |           |          |
| Instbkg |      |      |      |                 |         |      |         |           |                 |        |              |         |          |         |  |         |           |          |

| Lab ID  | QA | LAACC # | Can ID | Field ID | Gross Counts | Net Counts | Net CP | Time Set | Time Removed | t1, sec | Time Count Start | t2, sec | t3, sec | pCi 222Rn m-2 s-1 | Run # | Count Date | Int 1   | Int 2 | Int 3 | Int 4 |
|---------|----|---------|--------|----------|--------------|------------|--------|----------|--------------|---------|------------------|---------|---------|-------------------|-------|------------|---------|-------|-------|-------|
| 32469,1 |    | 46      | 10     | 33       | 132          | 46         | 9      | 8:54     | 8:54         | 86400   | 16:09            | 544500  | 544800  | <0.5              | 1     | 08-23-99   | 0.000   | 0.17  | 0.38  | 0.38  |
| 32469,2 |    | 47      | 40     | 46       | 136          | 50         | 10     | 8:57     | 8:57         | 86400   | 16:33            | 545760  | 546060  | <0.5              | 1     | 08-23-99   | 0.000   | 0.17  | 0.38  | 0.38  |
| 32469,3 | D1 | 48      | 149    | 53       | 107          | 21         | 4      | 16:38    | 16:38        | 86400   | 16:38            | 518400  | 518700  | <0.5              | 1     | 08-23-99   | 0.000   | 0.17  | 0.40  | 0.40  |
| 32469,3 |    | 48      | 149    | 53       | 107          | 21         | 4      | 16:38    | 16:38        | 86400   | 16:43            | 518700  | 519000  | <0.5              | 1     | 08-23-99   | 0.000   | 0.17  | 0.40  | 0.40  |
| 32469,4 |    | TB16    | TB16   | TB16     | 80           | (6)        | (1)    | 12:00    | 12:00        | 86400   | 17:00            | 536400  | 536700  | <0.5              | 1     | 08-23-99   | (0.000) | 0.17  | 0.39  | 0.39  |





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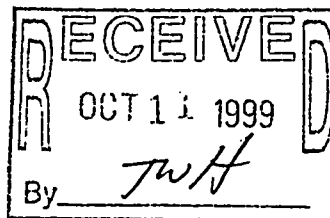
## Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Page 1 of 1

|              |                        |               |          |
|--------------|------------------------|---------------|----------|
| Project:     | Pathfinder Mines Corp. | Date Set:     | 09-22-99 |
| Location:    | Lucky McMine           | Date Remove:  | 09-23-99 |
| Report Date: | September 29, 1999     | Date Counted: | 09-27-99 |
| Weather:     | Clear and calm         |               |          |

Method: Pathfinder's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID      | LAACC # | Cannister # | Location | 09-22-99<br>Time Set | 09-23-99<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> s |
|-------------|---------|-------------|----------|----------------------|-------------------------|------------------------------------|
| 99- 33224,1 | 50      | 225         | 56       | 7:30                 | 7:30                    | 0.6                                |
| 99- 33224,2 | 49      | 128         | 66       | 7:37                 | 7:37                    | 0.7                                |
| 99- 33224,3 | 48      | 205         | 65       | 7:43                 | 7:43                    | 0.6                                |
| 99- 33224,4 | 47      | 315         | 57       | 7:48                 | 7:48                    | 0.8                                |
| 99- 33224,4 | 47      | 315         | 57       | 7:48                 | 7:48                    | 0.8                                |
| 99- 33224,5 | TB18    | TB18        | TB18     | 12:00                | 12:00                   | <0.5                               |



**Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report**

Page 1 of 1

Project: Pathfinder Mines Corp. Date Set: 09-22-99  
Location: Lucky McMine Date Remove: 09-23-99  
Report Date: September 29, 1999 Date Counted: 09-27-99  
Weather: Clear and calm

| Trip Blank - Lab ID | Cannister # | Radon Flux - pCi/m <sup>2</sup> s* |
|---------------------|-------------|------------------------------------|
| 99- 33224,5         | TB18        | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 94                 | 1313                  | 2558                  |

| Replicate<br>Lab ID | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------------------|--------------|-------------------------------------|---------------------|
| 99- 33224,4         | 09-27-99     | 0.8                                 | 1.12                |

Average of recoveries:

1.000

Minimum Radon Flux for Pathfinder: 0.6 pCi/m<sup>2</sup>sMaximum Radon Flux for Pathfinder: 0.8 pCi/m<sup>2</sup>sAverage Radon Flux for #56-57 0.7 pCi/m<sup>2</sup>s\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.

Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By:

Reviewed By:

## Input

Starting ID 33224,1  
 Starting LAACC# 50  
 Project: Pathfinder Mines Corp.  
 Location: Lucky McMine  
 Report date: September 29, 1999  
 Weather: Clear and calm

| Data 1               |      |      |      | Date Set 9/22/99     |            |              | $\lambda$ 2.10E-06   | Data 2 |      |                      | Date Set 9/22/99 |  |  | $\lambda$ 2.10E-06 |
|----------------------|------|------|------|----------------------|------------|--------------|----------------------|--------|------|----------------------|------------------|--|--|--------------------|
| Date Removed 9/23/99 |      |      |      | Date Removed 9/23/99 | Area 0.051 |              | Date Removed 9/23/99 |        |      | Date Removed 9/23/99 | Area 0.051       |  |  |                    |
| Date Counted 9/27/99 |      |      |      | Date Counted 9/27/99 | K 0.037    |              | Date Counted 9/27/99 |        |      | Date Counted 9/27/99 | K 0.037          |  |  |                    |
| Average(1,2)         |      |      |      | Eff. 0.00595         |            | Eff. 0.00595 |                      |        |      |                      |                  |  |  |                    |
| Std1                 | 1313 | 1313 | 1313 | Std Counts           | 1296       |              | Std Counts           | 1296   |      |                      |                  |  |  |                    |
| Std2                 | 2558 | 2558 | 2558 | Bkg Counts           | 94         |              | Bkg Counts           | 94     |      |                      |                  |  |  |                    |
| Bkg                  | 94   | 94   | 94   | DPM, pCi             | 18210      | 2.22         | DPM, pCi             | 18210  | 2.22 | dis/pCi              |                  |  |  |                    |
| Instrbkg             |      |      |      | Count Time, min      | 5          |              | Count Time, min      | 5      |      |                      |                  |  |  |                    |

| Lab ID  | QA | LAACC # | Can ID | Field ID | Gross Counts | Net Counts | Net CP | Time Set | Time Removed | t1, sec | Time Count Start | t2, sec | t3, sec | pCi 222Rn m-2 s-1 | Run # | Count Date | Int 1 | Int 2 | Int 3 | Int 4 |
|---------|----|---------|--------|----------|--------------|------------|--------|----------|--------------|---------|------------------|---------|---------|-------------------|-------|------------|-------|-------|-------|-------|
| 33224,1 |    | 50      | 225    | 56       | 169          | 75         | 15     | 7:30     | 7:30         | 86400   | 13:15            | 452700  | 453000  | 0.61              | 1     | 09-27-99   | 0.000 | 0.17  | 0.46  | 0.46  |
| 33224,2 |    | 49      | 128    | 66       | 177          | 83         | 17     | 7:37     | 7:37         | 86400   | 13:20            | 452580  | 452880  | 0.67              | 1     | 09-27-99   | 0.000 | 0.17  | 0.46  | 0.46  |
| 33224,3 |    | 48      | 205    | 65       | 168          | 74         | 15     | 7:43     | 7:43         | 86400   | 13:25            | 452520  | 452620  | 0.60              | 1     | 09-27-99   | 0.000 | 0.17  | 0.46  | 0.46  |
| 33224,4 | D1 | 47      | 315    | 57       | 198          | 104        | 21     | 7:48     | 7:48         | 86400   | 13:30            | 452520  | 452820  | 0.84              | 1     | 09-27-99   | 0.000 | 0.17  | 0.46  | 0.46  |
| 33224,4 |    | 47      | 315    | 57       | 187          | 93         | 19     | 7:48     | 7:48         | 86400   | 13:30            | 452520  | 452820  | 0.75              | 1     | 09-27-99   | 0.000 | 0.17  | 0.46  | 0.46  |
| 33224,5 |    | TB18    | TB18   | TB18     | 99           | 5          | 1      | 12:00    | 12:00        | 86400   | 12:00            | 432000  | 432300  | <0.5              | 1     | 09-27-99   | 0.000 | 0.17  | 0.46  | 0.46  |

Page        Of       

**Inst.:** \_\_\_\_\_ **Eff:** \_\_\_\_\_ **Tech:** \_\_\_\_\_

Min Temp: 43

**Inst. Back:** \_\_\_\_\_

Charcoal Back: 94 Lot: \_\_\_\_\_

Standard: 1 1213 Count:           

2 2558, ~~2558~~

Winn / 9/2/99 12:40





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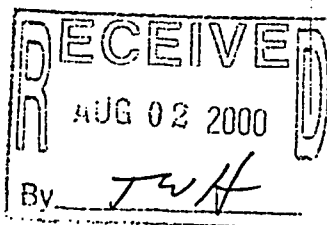
## Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Page 1 of 1

Project: Pathfinder Mines Corp. Date Set: 07-17-00  
Location: Lucky McMine Date Remove: 07-18-00  
Report Date: 7/21/00 Date Counted: 07-20-00  
Weather: Mostly clear, 50 degrees, 0.25 inches precipitation

Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID     | LAACC # | Cannister # | Location | 07-17-00<br>Time Set | 07-18-00<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> s |
|------------|---------|-------------|----------|----------------------|-------------------------|------------------------------------|
| 34496- 001 | 1       | 1           | 9        | 9:09                 | 9:09                    | <0.5                               |
| 34496- 002 | 2       | 2           | 10       | 9:14                 | 9:14                    | <0.5                               |
| 34496- 003 | 3       | 3           | 17       | 9:20                 | 9:20                    | <0.5                               |
| 34496- 004 | 4       | 4           | 29       | 9:24                 | 9:24                    | 0.7                                |
| 34496- 005 | 5       | 5           | 18       | 9:29                 | 9:29                    | <0.5                               |
| 34496- 005 | 5       | 5           | 18       | 9:29                 | 9:29                    | <0.5                               |
| 34496- 006 | TB1     | TB1         | TB1      | 12:00                | 12:00                   | <0.5                               |



**Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report**

Page 1 of 2

|              |   |               |          |
|--------------|---|---------------|----------|
| Project:     | Pathfinder Mines Corp.                              | Date Set:     | 07-17-00 |
| Location:    | Lucky McMine  | Date Remove:  | 07-18-00 |
| Report Date: | 7/21/00   | Date Counted: | 07-20-00 |
| Weather:     | Mostly clear, 50 degrees, 0.25 inches precipitation |               |          |

| Trip Blank - Lab ID | Cannister # | Radon Flux - pCi/m <sup>2</sup> s* |
|---------------------|-------------|------------------------------------|
| 34496- 6            | 7           | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 127                | 2185                  | 4344                  |

**Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report**

Page 2 of 2

Project: Pathfinder Mines Corp.  
Location: Lucky McMine  
Report Date: 7/21/00  
Weather: Mostly clear, 50 degrees, 0.25 inches precipitation

Date Set: 07-17-00  
Date Remove: 07-18-00  
Date Counted: 07-20-00

| Lab ID | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|--------|--------------|-------------------------------------|---------------------|
| 5      | 07-20-00     | <0.5                                | 1.000               |

Average of recoveries:

1.000

Minimum Radon Flux for Lucky McMine Project:

<0.5 pCi/m<sup>2</sup>s

Maximum Radon Flux for Lucky McMine Project:

0.68 pCi/m<sup>2</sup>s

Average Radon Flux for #1-5:

0.54 pCi/m<sup>2</sup>s\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.

Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By: *J. B. ...*

dpb r:\reports\clients.2000\pathfinder\lucky\_mcmine\laaccs\rc34496.xls

Reviewed By: *[Signature]*

TRACKING NO. PAGE NO.

34496R00003

## Page \_\_\_\_\_ Of \_\_\_\_\_

Location: Lucky M<sup>e</sup> Mine

**Inst.:** \_\_\_\_\_ **Eff:** \_\_\_\_\_ **Tech:** \_\_\_\_\_

Precip: .25"

Min Temp: 50°

**Inst. Back:** \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

**Standard:** \_\_\_\_\_ **Count:** \_\_\_\_\_

TRACKING NO. PAGE NO.

Input

Starting ID 1  
 Starting LAACC# 1  
 Project Pathfinder Mines Corp.  
 Location: Lucky McMine  
 Report date: 7/21/00  
 Weather: Mostly clear, 50 degrees, 0.25 inches precipitation

Data 1  
 Date Set 7/17/00  
 Date Removed 7/18/00  
 Date Counted 7/20/00  
 Std Counts 2179  
 Bkg Counts 127  
 DPM, pCi 18210  
 Count Time, min 5.00  
 8/10/99  
 8/11/99  
 Area K  
 Eff. 0.01015  
 2.10E-06  
 0.051  
 0.037  
 2,185.00  
 4,344.00  
 127.00  
 2.22  
 dis/pCi

Data 2  
 Date Set 8/10/99  
 Date Removed 8/11/99  
 Date Counted 8/12/99  
 Std Counts 778  
 Bkg Counts 102  
 DPM, pCi 18210  
 Count Time, min 5.00  
 8/10/99  
 8/11/99  
 Area K  
 Eff. 0.00334  
 2.10E-06  
 0.051  
 0.037  
 2.22  
 dis/pCi

| Lab ID | QA | LAACC # | Can ID | Field ID | Gross Counts | Net Counts | Net CPM | Time Set | Time Removed | t1, sec | Time Count Start | t2, sec | t3, sec | pCi 222Rn m-2 s-1 | Precision 2 sigma | Run # | Count Date | Int 1 | Int 2 | Int 3 | Int 4 |
|--------|----|---------|--------|----------|--------------|------------|---------|----------|--------------|---------|------------------|---------|---------|-------------------|-------------------|-------|------------|-------|-------|-------|-------|
| 001    |    | 1       | 1      | 9        | 162          | 35         | 7       | 9:09     | 9:09         | 86400   | 13:25            | 274560  | 274860  | <0.5              | 0.70              | 1     | 07-20-00   | 0.000 | 0.17  | 0.67  | 0.67  |
| 002    |    | 2       | 2      | 10       | 144          | 17         | 3       | 9:14     | 9:14         | 86400   | 13:30            | 274560  | 274860  | <0.5              | 1.09              | 1     | 07-20-00   | 0.000 | 0.17  | 0.67  | 0.67  |
| 003    |    | 3       | 3      | 17       | 214          | 87         | 17      | 9:20     | 9:20         | 86400   | 13:35            | 274500  | 274800  | <0.5              | 0.36              | 1     | 07-20-00   | 0.000 | 0.17  | 0.67  | 0.67  |
| 004    |    | 4       | 4      | 29       | 336          | 209        | 42      | 9:24     | 9:24         | 86400   | 13:40            | 274560  | 274860  | 0.68              | 0.19              | 1     | 07-20-00   | 0.000 | 0.17  | 0.67  | 0.67  |
| 005    | D1 | 5       | 5      | 18       | 150          | 23         | 5       | 9:29     | 9:29         | 86400   | 13:45            | 274560  | 274860  | <0.5              | 0.92              | 1     | 07-20-00   | 0.000 | 0.17  | 0.67  | 0.67  |
| 005    |    | 5       | 5      | 18       | 147          | 20         | 4       | 9:29     | 9:29         | 86400   | 13:50            | 274860  | 275160  | <0.5              | 1.00              | 1     | 07-20-00   | 0.000 | 0.17  | 0.84  | 0.67  |
| 006    | T1 | TB1     | TB1    | TB1      | 127          | 0          | 0       | 12:00    | 12:00        | 86400   | 13:55            | 266100  | 266400  | <0.5              | 2.49              | 1     | 07-20-00   | 0.000 | 0.17  | 0.69  | 0.69  |

cc CNA



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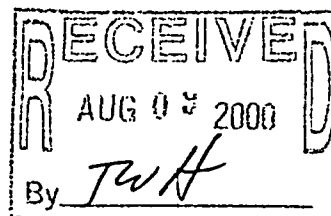
## Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Page 1 of 1

|              |   |               |          |
|--------------|---|---------------|----------|
| Project:     | Pathfinder Mines Corp.                          | Date Set:     | 07-26-00 |
| Location:    | Lucky McMine                                    | Date Remove:  | 07-27-00 |
| Report Date: | 7/31/2000                                       | Date Counted: | 07-28-00 |
| Weather:     | Partly cloudy, 55 degrees, trace precipitation. |               |          |

Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID     | LAACC # | Cannister # | Location | 07-26-00<br>Time Set | 07-27-00<br>Time Remove | Radon Flux<br>pCi/m <sup>2</sup> s |
|------------|---------|-------------|----------|----------------------|-------------------------|------------------------------------|
| 34721- 001 | 1       | 6           | 30       | 12:51                | 12:51                   | <0.5                               |
| 34721- 001 | 1       | 6           | 30       | 12:51                | 12:51                   | <0.5                               |
| 34721- 002 | 2       | 7           | 31       | 12:56                | 12:56                   | <0.5                               |
| 34721- 003 | 3       | 8           | 50       | 13:15                | 13:15                   | <0.5                               |
| 34721- 004 | 4       | 9           | 72       | 13:34                | 13:34                   | <0.5                               |
| 34721- 005 | 5       | 10          | 73       | 13:51                | 13:51                   | <0.5                               |
| 34721- 006 | TB1     | TB1         | TB1      | 12:00                | 12:00                   | <0.5                               |



**Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report**

Page 1 of 2

|              |   |               |          |
|--------------|---|---------------|----------|
| Project:     | Pathfinder Mines Corp.                          | Date Set:     | 07-26-00 |
| Location:    | Lucky McMine                                    | Date Remove:  | 07-27-00 |
| Report Date: | 7/31/2000                                       | Date Counted: | 07-28-00 |
| Weather:     | Partly cloudy, 55 degrees, trace precipitation. |               |          |

| Trip Blank - Lab ID | Canister # | Radon Flux - pCi/m <sup>3</sup> s* |
|---------------------|------------|------------------------------------|
| 34721- 6            | TB1        | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 126                | 2199                  | 4449                  |

**Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report**

Page 2 of 2

Project: Pathfinder Mines Corp.  
Location: Lucky McMine  
Report Date: 7/31/2000  
Weather: Partly cloudy, 55 degrees, trace precipitation.

Date Set: 07-26-00  
Date Remove: 07-27-00  
Date Counted: 07-28-00

| Lab ID  | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------|--------------|-------------------------------------|---------------------|
| 34721-1 | 07-28-00     | <0.5                                | 1.000               |

Average of recoveries: 1.000

Minimum Radon Flux for Lucky McMine Project: <0.5 pCi/m<sup>2</sup>s  
Maximum Radon Flux for Lucky McMine Project: <0.5 pCi/m<sup>2</sup>s  
Average Radon Flux for #6-10: <0.5 pCi/m<sup>2</sup>s

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.  
Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By:

dpb r:\reports\clients.2000\pathfinder\lucky\_mcmine\laaccs\rc34721.xls

Reviewed By:

TRACKING NO. PAGE NO.

34721R000003



Input

Starting ID 1  
 Starting LAACC# 1  
 Project: Pathfinder Mines Corp.  
 Location: Lucky McMine  
 Report date: 7/31/2000  
 Weather: Partly cloudy, 55 degrees, trace precipitation.

Data 1  
 Date Set 7/26/00  
 Date Removed 7/27/00  
 Date Counted 7/28/00  
 Std Counts 2212  
 Bkg Counts 126  
 DPM, pCi 18210  
 Count Time, ml 5.00  
 λ 2.10E-06  
 Area 0.051  
 K 0.037  
 Eff. 0.01032

Data 2  
 Date Set 8/10/99  
 Date Removed 8/11/99  
 Date Counted 8/12/99  
 Std Counts 778  
 Bkg Counts 102  
 DPM, pCi 18210  
 Count Time, min 5.00  
 λ 2.10E-06  
 Area 0.051  
 K 0.037  
 Eff. 0.00334

| Lab ID | QA | LAACC # | Can ID | Field ID | Gross Counts | Net Counts | Net CP | Time Set | Time Removed | t1, sec | Time Count Start | t2, sec | t3, sec | pCi 222Rn m-2 s-1 | Precision 2 sigma | Run # | Count Date | Int 1 | Int 2 | Int 3 | Int 4 |
|--------|----|---------|--------|----------|--------------|------------|--------|----------|--------------|---------|------------------|---------|---------|-------------------|-------------------|-------|------------|-------|-------|-------|-------|
| 001    | D1 | 1       | 6      | 30       | 210          | 84         | 17     | 12:51    | 12:51        | 86400   | 15:00            | 180540  | 180840  | <0.5              | 0.38              | 1     | 07-28-00   | 0.000 | 0.17  | 0.82  | 0.82  |
| 001    |    | 1       | 6      | 30       | 202          | 76         | 15     | 12:51    | 12:51        | 86400   | 15:05            | 180840  | 181140  | <0.5              | 0.40              | 1     | 07-28-00   | 0.000 | 0.17  | 0.82  | 0.82  |
| 002    |    | 2       | 7      | 31       | 198          | 70         | 14     | 12:56    | 12:56        | 86400   | 15:10            | 180840  | 181140  | <0.5              | 0.43              | 1     | 07-28-00   | 0.000 | 0.17  | 0.82  | 0.82  |
| 003    |    | 3       | 8      | 50       | 205          | 79         | 16     | 13:15    | 13:15        | 86400   | 15:15            | 180000  | 180300  | <0.5              | 0.39              | 1     | 07-28-00   | 0.000 | 0.17  | 0.82  | 0.82  |
| 004    |    | 4       | 9      | 72       | 222          | 96         | 19     | 13:34    | 13:34        | 86400   | 15:20            | 179160  | 179460  | <0.5              | 0.34              | 1     | 07-28-00   | 0.000 | 0.17  | 0.82  | 0.82  |
| 005    |    | 5       | 10     | 73       | 172          | 46         | 9      | 13:51    | 13:51        | 86400   | 15:25            | 178440  | 178740  | <0.5              | 0.58              | 1     | 07-28-00   | 0.000 | 0.17  | 0.84  | 0.82  |
| 006    | T1 | TB1     | TB1    | TB1      | 140          | 14         | 3      | 12:00    | 12:00        | 86400   | 15:30            | 185400  | 185700  | <0.5              | 1.23              | 1     | 07-28-00   | 0.000 | 0.17  | 0.81  | 0.81  |

## Page \_\_\_\_\_ Of \_\_\_\_\_

*Inst.:* \_\_\_\_\_ *Eff:* \_\_\_\_\_ *Tech:* \_\_\_\_\_

**Inst. Back:** \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

**Standard:** \_\_\_\_\_ **Count:** \_\_\_\_\_

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3172 300007

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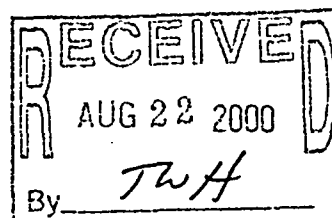
### Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Project: Pathfinder Mines Corp.  
Location: Lucky McMine  
Report Date: August 2, 2000  
Weather: Clear, light wind, 61 degrees, no precipitation.

Date Set: 07-31-00  
Date Remove: 08-01-00  
Date Counted: 08-02-00

Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID     | LAACC # | Cannister # | Location | 07-31-00<br>Time Set | 08-01-00<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> |
|------------|---------|-------------|----------|----------------------|-------------------------|----------------------------------|
| 34829- 001 | 1       | 11          | 20       | 11:00                | 11:00                   | <0.5                             |
| 34829- 002 | 2       | 12          | 19       | 11:04                | 11:04                   | <0.5                             |
| 34829- 003 | 3       | 13          | 27       | 11:07                | 11:07                   | <0.5                             |
| 34829- 004 | 4       | 14          | 32       | 11:16                | 11:16                   | 1.4                              |
| 34829- 004 | 4       | 14          | 32       | 11:16                | 11:16                   | 1.3                              |
| 34829- 005 | 5       | 15          | 49       | 11:22                | 11:22                   | <0.5                             |
| 34829- 006 | TB1     | TB1         | TB1      | 12:00                | 12:00                   | <0.5                             |





Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report

Project: Pathfinder Mines Corp.  
Location: Lucky McMine  
Report Date: August 2, 2000  
Weather: Clear, light wind, 61 degrees, no precipitation.

Date Set: 07-31-00  
Date Remove: 08-01-00  
Date Counted: 08-02-00

| Trip Blank - Lab ID | Cannister # | Radon Flux - pCi/m <sup>2</sup> s* |
|---------------------|-------------|------------------------------------|
| 34829- 6            | TB1         | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 165                | 2231                  | 4210                  |



Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report

Project: Pathfinder Mines Corp.  
Location: Lucky McMine  
Report Date: August 2, 2000  
Weather: Clear, light wind, 61 degrees, no precipitation.

Date Set: 07-31-00  
Date Remove: 08-01-00  
Date Counted: 08-02-00

| Lab ID  | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------|--------------|-------------------------------------|---------------------|
| 34829-4 | 08-02-00     | 1.3                                 | 0.928               |

Average of recoveries:

1.000

|  |      |                      |
|--|------|----------------------|
| Minimum Radon Flux for Lucky McMine Project: | <0.5 | pCi/m <sup>2</sup> s |
| Maximum Radon Flux for Lucky McMine Project: | 1.4  | pCi/m <sup>2</sup> s |
| Average Radon Flux for #11-15:               | 0.68 | pCi/m <sup>2</sup> s |

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.  
Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By:

*R.A. Gering*  
ROGER GERING

Reviewed By:

*Sheryl Gering*  
SHERYL GERING  
ADMINISTRATIVE SUPERVISOR

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34829R00003

SOP ELI-C-50-907-01

Page 1 Of 1

Location: Lucky Mc Mine

**Inst.:** \_\_\_\_\_ **Eff:** \_\_\_\_\_ **Tech:** \_\_\_\_\_

Min Temp: 61°

**Inst. Back:** \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

**Standard:** \_\_\_\_\_ **Count:** \_\_\_\_\_

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| 311829       | 00001   |

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## Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

Project: Pathfinder Mines Corporation

Location: Lucky McMine

Report Date: August 17, 2000

Weather: Hazy, hot, no precipitation, min temp 61°F

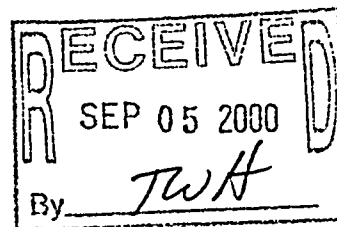
Date Set: 08-14-00

Date Remove: 08-15-00

Date Counted: 08-17-00

Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID     | LAACC #        | Cannister # | Location | 08-14-00<br>Time Set | 08-15-00<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> s |
|------------|----------------|-------------|----------|----------------------|-------------------------|------------------------------------|
| 34829- 001 | 1              | 20          | 89       | 13:03                | 13:03                   | <0.5                               |
| 34829- 002 | 2              | 21          | 90       | 13:15                | 13:15                   | <0.5                               |
| 34829- 003 | 3              | 22          | 91       | 13:26                | 13:26                   | <0.5                               |
| 34829- 004 | 4              | 23          | 92       | 13:32                | 13:32                   | <0.5                               |
| 34829- 005 | 5              | 24          | 93       | 13:43                | 13:43                   | <0.5                               |
| 34829- 005 | Laboratory Dup | 24          | 93       | 13:43                | 13:43                   | <0.5                               |
| 34829- 006 | TB1            | TB1         | TB1      | 12:00                | 12:00                   | <0.5                               |





Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report

Project: Pathfinder Mines Corporation  
Location: Lucky McMine  
Report Date: August 17, 2000  
Weather: Hazy, hot, no precipitation, min temp 61°F

Date Set: 08-14-00  
Date Remove: 08-15-00  
Date Counted: 08-17-00

| Trip Blank - Lab ID | Canister # | Radon Flux - pCi/m <sup>3</sup> s* |
|---------------------|------------|------------------------------------|
| 34829- 6            | TB1        | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 128                | 2207                  | 4195                  |





Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report

Project: Pathfinder Mines Corporation  
Location: Lucky McMine  
Report Date: August 17, 2000  
Weather: Hazy, hot, no precipitation, min temp 61°F

Date Set: 08-14-00  
Date Remove: 08-15-00  
Date Counted: 08-17-00

| Lab ID  | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------|--------------|-------------------------------------|---------------------|
| 35284-5 | 08-17-00     | <0.5                                | 1.000               |

Average of recoveries: 1.000

Minimum Radon Flux for Lucky McMine Project: <0.5 pCi/m<sup>2</sup>s  
Maximum Radon Flux for Lucky McMine Project: <0.5 pCi/m<sup>2</sup>s  
Average Radon Flux for #20-24: <0.5 pCi/m<sup>2</sup>s

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.  
Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By:

STEVEN E. CARLSSON  
CHANCE SUPERVISOR

Reviewed By:

cc CNA



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### Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

Project: Pathfinder Mines Corporation

Location: Lucky McMine

Report Date: August 28, 2000

Weather: Clear, hot, .02" precipitation, min. temp 54°F

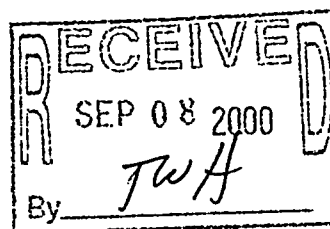
Date Set: 08-17-00

Date Remove: 08-18-00

Date Counted: 08-23-00

Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID   | LAACC #       | Canister # | Location | 08-17-00<br>Time Set | 08-18-00<br>Time Remove | Radon Flux<br>pCi/m <sup>2</sup> s |
|----------|---------------|------------|----------|----------------------|-------------------------|------------------------------------|
| 35409- 1 | 1             | 25         | 102      | 12:59                | 12:59                   | <0.5                               |
| 35409- 2 | 2             | 26         | 103      | 13:06                | 13:06                   | <0.5                               |
| 35409- 3 | 3             | 27         | 104      | 13:11                | 13:11                   | <0.5                               |
| 35409- 3 | Lab Duplicate | 27         | 104      | 13:11                | 13:11                   | <0.5                               |
| 35409- 4 | 4             | 28         | 105      | 13:19                | 13:19                   | <0.5                               |
| 35409- 5 | 5             | 29         | 106      | 13:27                | 13:27                   | <0.5                               |
| 35409- 6 | TB1           | TB1        | TB1      | 12:00                | 12:00                   | <0.5                               |



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35409R00001



**Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report**

Project: Pathfinder Mines Corporation  
Location: Lucky McMine  
Report Date: August 28, 2000  
Weather: Clear, hot, .02" precipitation, min. temp 54°F

Date Set: 08-17-00  
Date Remove: 08-18-00  
Date Counted: 08-23-00

| Trip Blank - Lab ID | Canister # | Radon Flux - pCi/m <sup>3</sup> s* |
|---------------------|------------|------------------------------------|
| 35409- 6            | TB1        | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 131                | 2262                  | 4469                  |



Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report

Project: Pathfinder Mines Corporation  
Location: Lucky McMine  
Report Date: August 28, 2000  
Weather: Clear, hot, .02" precipitation, min. temp 54°F

Date Set: 08-17-00  
Date Remove: 08-18-00  
Date Counted: 08-23-00

| Lab ID  | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------|--------------|-------------------------------------|---------------------|
| 35409-3 | 08-23-00     | < 0.5                               | 1.000               |

Average of recoveries:

1.000

|  |       |                      |
|--|-------|----------------------|
| Minimum Radon Flux for Lucky McMine Project: | < 0.5 | pCi/m <sup>2</sup> s |
| Maximum Radon Flux for Lucky McMine Project: | < 0.5 | pCi/m <sup>2</sup> s |
| Average Radon Flux for #25-29:               | < 0.5 | pCi/m <sup>2</sup> s |

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.  
Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By:

STEVEN E. CARLSTEN  
ORGANICS SUPERVISOR

Reviewed By:

R.A. GILLING  
LABORATORY SUPERVISOR

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35409R00003

Page        Of       

Location: Lucky Mc Mine

**Inst.:** \_\_\_\_\_ **Eff:** \_\_\_\_\_ **Tech:** \_\_\_\_\_

Min Temp: 54°

**Inst. Back:** \_\_\_\_\_

Charcoal Back: 131 Lot:

Standard: 2262 Count:

4769

| TRACING NO. | PAGE NO |
|-------------|---------|
| 35409H00005 |         |

Input

Starting LAACC# 1  
 Project: Pathfinder Mines Corporation  
 Location: Lucky Mc Mine  
 Report date: August 28, 2000  
 Weather: Clear, hot, .02" precipitation, min temp 54°F

Data 1  
 Date Set 8/17/00  
 Date Removed 8/18/00  
 Date Counted 8/23/00  
 Std Counts 2249  
 Bkg Counts 131  
 DPM, pCi 18210  
 Count Time, ml 5.00  
 8/17/00 8/18/00  
 λ 2.10E-06  
 Area K 0.051  
 Eff. 0.01048  
 2.22 dis/pCi

Data 2  
 Date Set 8/10/99  
 Date Removed 8/11/99  
 Date Counted 8/12/99  
 Std Counts 778  
 Bkg Counts 102  
 DPM, pCi 18210  
 Count Time, min 5.00  
 8/10/99 8/11/99  
 λ 2.10E-06  
 Area K 0.051  
 Eff. 0.00334  
 2.22 dis/pCi

| Lab ID | QA | LAACC # | Can ID | Field ID | Gross Counts | Net Counts | Net CP | Time Set | Time Removed | t1, sec | Time Count Start | t2, sec | t3, sec | pCi 222Rn m-2 s-1 | Precision 2 sigma | Run # | Count Date | Int 1   | Int 2 | Int 3 | Int 4 |
|--------|----|---------|--------|----------|--------------|------------|--------|----------|--------------|---------|------------------|---------|---------|-------------------|-------------------|-------|------------|---------|-------|-------|-------|
| 001    |    | 1       | 25     | 102      | 195          | 64         | 13     | 12:59    | 12:59        | 86400   | 11:00            | 511280  | 511580  | <0.5              | 0.45              | 1     | 08-23-00   | 0.000   | 0.17  | 0.41  | 0.41  |
| 002    |    | 2       | 26     | 103      | 174          | 43         | 9      | 13:06    | 13:06        | 86400   | 11:05            | 511140  | 511440  | <0.5              | 0.59              | 1     | 08-23-00   | 0.000   | 0.17  | 0.41  | 0.41  |
| 003    | D1 | 3       | 27     | 104      | 163          | 32         | 6      | 13:11    | 13:11        | 86400   | 11:10            | 511140  | 511440  | <0.5              | 0.72              | 1     | 08-23-00   | 0.000   | 0.17  | 0.41  | 0.41  |
| 003    |    | 3       | 27     | 104      | 159          | 28         | 6      | 13:11    | 13:11        | 86400   | 11:15            | 511440  | 511740  | <0.5              | 0.78              | 1     | 08-23-00   | 0.000   | 0.17  | 0.41  | 0.41  |
| 004    |    | 4       | 28     | 105      | 176          | 45         | 9      | 13:19    | 13:19        | 86400   | 11:30            | 511680  | 512160  | <0.5              | 0.57              | 1     | 08-23-00   | 0.000   | 0.17  | 0.41  | 0.41  |
| 005    |    | 5       | 29     | 106      | 159          | 28         | 6      | 13:27    | 13:27        | 86400   | 11:35            | 511680  | 511980  | <0.5              | 0.78              | 1     | 08-23-00   | 0.000   | 0.17  | 0.84  | 0.41  |
| 006    | T1 | TB1     | TB1    | TB1      | 128          | (5)        | (1)    | 12:00    | 12:00        | 86400   | 11:40            | 517200  | 517500  | <0.5              | 3.28              | 1     | 08-23-00   | (0.000) | 0.17  | 0.41  | 0.40  |

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**Large Area Activated Charcoal Canister (LAACC) Radon Flux Report**

|   |                               |
|---|-------------------------------|
| <b>Project:</b> Pathfinder Mines Corporation                  | <b>Date Set:</b> 09-06-00     |
| <b>Location:</b> Lucky McMine                                 | <b>Date Remove:</b> 09-07-00  |
| <b>Report Date:</b> September 11, 2000                        | <b>Date Counted:</b> 09-08-00 |
| <b>Weather:</b> Mostly clear, no precipitation, min temp 37°F |                               |

**Method:** Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID     | LAACC #        | Canister # | Location | 09-06-00<br>Time Set | 09-07-00<br>Time Remove | Radon Flux<br>pCi/m <sup>2</sup> s |
|------------|----------------|------------|----------|----------------------|-------------------------|------------------------------------|
| 35876- 001 | 1              | 30         | 71       | 10:36                | 10:36                   | <0.5                               |
| 35876- 002 | 2              | 31         | 64       | 10:53                | 10:53                   | <0.5                               |
| 35876- 003 | 3              | 32         | 82       | 11:27                | 11:27                   | <0.5                               |
| 35876- 004 | 4              | 33         | 81       | 11:36                | 11:36                   | <0.5                               |
| 35876- 004 | Laboratory dup | 33         | 81       | 11:36                | 11:36                   | <0.5                               |
| 35876- 005 | 5              | 34         | 80       | 11:46                | 11:46                   | <0.5                               |
| 35876- 006 | TB5            | TB5        | TB5      | 12:00                | 12:00                   | <0.5                               |

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 By *JWA*



**Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report**

**Project:** Pathfinder Mines Corporation  
**Location:** Lucky McMine  
**Report Date:** September 11, 2000  
**Weather:** Mostly clear, no precipitation, min temp 37°F

**Date Set:** 09-06-00  
**Date Remove:** 09-07-00  
**Date Counted:** 09-08-00

| <b>Trip Blank - Lab ID</b> | <b>Canister #</b> | <b>Radon Flux - pCi/m<sup>2</sup>s*</b> |
|----------------------------|-------------------|---|
| 35876- 6                   | TB5               | <0.5                                    |

| <b>Blank Charcoal cpm</b> | <b>Standard Number 1 cpm</b> | <b>Standard Number 2 cpm</b> |
|---------------------------|------------------------------|------------------------------|
| 116                       | 802                          | 1435                         |





### Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report

Project: Pathfinder Mines Corporation  
Location: Lucky McMine  
Report Date: September 11, 2000  
Weather: Mostly clear, no precipitation, min temp 37°F

Date Set: 09-06-00  
Date Remove: 09-07-00  
Date Counted: 09-08-00

| Lab ID  | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------|--------------|-------------------------------------|---------------------|
| 35876-4 | 09-08-00     | <0.5                                | 1.000               |

Average of recoveries:

1.000

|  |      |                      |
|--|------|----------------------|
| Minimum Radon Flux for Lucky McMine Project: | <0.5 | pCi/m <sup>2</sup> s |
| Maximum Radon Flux for Lucky McMine Project: | <0.5 | pCi/m <sup>2</sup> s |
| Average Radon Flux for #30-34                | <0.5 | pCi/m <sup>2</sup> s |

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.  
Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By:

*R.A. Gering*  
ROGER GERGING  
LABORATORY SUPERVISOR

Reviewed By:

*Cathy [Signature]*  
CATHY [Signature]  
PROJECT MANAGER

Input

1  
 Starting LAACC# 1  
 Project: Pathfinder Mines Corporation  
 Location: Lucky McMine  
 Report date: September 11, 2000  
 Weather: Mostly clear, no precipitation, min temp 37°F

Data 1  
 Date Set 9/6/00 9/6/00 1 2.10E-06  
 Date Removed 9/7/00 9/7/00 Area 0.051  
 Date Counted 9/8/00 K 0.037  
 Eff. 0.01001  
 Std Counts 2152  
 Bkg Counts 128  
 DPM, pCi 18210 2.22 dis/pCi  
 Count Time, min 5.00

Data 2  
 Date Set 9/6/00 9/6/00 1 2.10E-06  
 Date Removed 9/7/00 9/7/00 Area 0.051  
 Date Counted 9/8/00 K 0.037  
 Eff. 0.00319  
 Std Counts 780  
 Bkg Counts 116  
 DPM, pCi 18210 2.22 dis/pCi  
 Count Time, min 5.00

| Lab ID | QA | LAACC # | Can ID | Field ID | Gross Counts | Net Counts | Net CP | Time Set | Time Removed | t1, sec | Time Count Start | t2, sec | t3, sec | pCi 222Rn m-2 s-1 | Precision 2 sigma | Run # | Count Date | Int 1 | Int 2 | Int 3 | Int 4 |
|--------|----|---------|--------|----------|--------------|------------|--------|----------|--------------|---------|------------------|---------|---------|-------------------|-------------------|-------|------------|-------|-------|-------|-------|
| 001    |    | 1       | 30     | 71       | 159          | 43         | 9      | 10:36    | 10:36        | 86400   | 20:20            | 207840  | 208140  | <0.5              | 0.91              | 2     | 09-08-00   | 0.000 | 0.17  | 0.78  | 0.77  |
| 002    |    | 2       | 31     | 64       | 140          | 24         | 5      | 10:53    | 10:53        | 86400   | 20:25            | 207120  | 207420  | <0.5              | 1.80              | 2     | 09-08-00   | 0.000 | 0.17  | 0.78  | 0.78  |
| 003    |    | 3       | 32     | 82       | 155          | 39         | 8      | 11:27    | 11:27        | 86400   | 20:30            | 205380  | 205680  | <0.5              | 1.01              | 2     | 09-08-00   | 0.000 | 0.17  | 0.78  | 0.78  |
| 004    | D1 | 4       | 33     | 81       | 285          | 169        | 34     | 11:36    | 11:36        | 86400   | 20:35            | 205140  | 205440  | <0.5              | 0.25              | 2     | 09-08-00   | 0.000 | 0.17  | 0.78  | 0.78  |
| 004    |    | 4       | 33     | 81       | 248          | 132        | 26     | 11:36    | 11:36        | 86400   | 20:40            | 205440  | 205740  | <0.5              | 0.31              | 2     | 09-08-00   | 0.000 | 0.17  | 0.78  | 0.78  |
| 005    |    | 5       | 34     | 80       | 145          | 29         | 6      | 11:46    | 11:46        | 86400   | 20:45            | 205140  | 205440  | <0.5              | 1.42              | 2     | 09-08-00   | 0.000 | 0.17  | 0.84  | 0.78  |
| 006    | T1 | TB5     | TB5    | TB5      | 130          | 14         | 3      | 12:00    | 12:00        | 86400   | 20:50            | 204600  | 204900  | <0.5              | 3.97              | 2     | 09-08-00   | 0.000 | 0.17  | 0.78  | 0.78  |

Page 1 of 1

Location: Lucky Mc Mine

**Inst. Back:** \_\_\_\_\_

Min Temp: 37° F

Charcoal Back: 116 Lot:

Standard:  $\frac{1}{2} \frac{802}{14.35}$  Count: \_\_\_\_\_

| TRACKING NO. | PAGE NO. |
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| 33676        | 105      |

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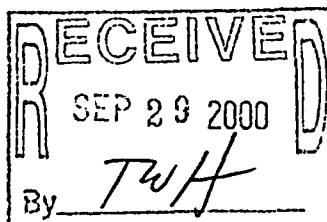
### Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

Project: Pathfinder Mines Corporation  
Location: Lucky McMine  
Report Date: September 20, 2000  
Weather: Partly cloudy, no precipitation, min temp 47°F

Date Set: 09-12-00  
Date Remove: 09-13-00  
Date Counted: 09-14-00

Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID    | LAACC #        | Canister # | Location | 09-12-00<br>Time Set | 09-13-00<br>Time Remove | Radon Flux<br>pCi/m <sup>2</sup> s |
|-----------|----------------|------------|----------|----------------------|-------------------------|------------------------------------|
| 36026- 1  | 1              | 280        | 78       | 12:43                | 12:43                   | 2.7                                |
| 36026- 2  | 2              | 281        | 94       | 12:48                | 12:48                   | 0.9                                |
| 36026- 3  | 3              | 282        | 95       | 12:53                | 12:53                   | 1.3                                |
| 36026- 4  | 4              | 283        | 96       | 12:56                | 12:56                   | 1.1                                |
| 36026- 5  | 5              | 284        | 97       | 13:02                | 13:02                   | 1.5                                |
| 36026- 6  | 86             | 285        | 98       | 13:06                | 13:06                   | <0.5                               |
| 36026- 7  | 87             | 286        | 99       | 13:12                | 13:12                   | 1.7                                |
| 36026- 8  | 88             | 287        | 40       | 13:20                | 13:20                   | 0.7                                |
| 36026- 8  | Laboratory dup | 287        | 40       | 13:20                | 13:20                   | 0.7                                |
| 36026- 9  | 89             | 288        | 41       | 13:24                | 13:24                   | 0.6                                |
| 36026- 10 | 90             | 289        | 58       | 13:29                | 13:29                   | <0.5                               |
| 36026- 11 | 91             | 290        | 59       | 13:33                | 13:33                   | 1.2                                |
| 36026- 12 | 92             | 291        | 60       | 13:36                | 13:36                   | 0.7                                |
| 36026- 13 | 93             | 292        | 62       | 13:41                | 13:41                   | 1.0                                |
| 36026- 14 | 94             | 293        | 85       | 13:45                | 13:45                   | 0.8                                |
| 36026- 15 | 95             | 294        | 86       | 13:52                | 13:52                   | 4.4                                |
| 36026- 16 | 96             | 295        | 110      | 13:55                | 13:55                   | 5.0                                |
| 36026- 16 | Laboratory dup | 295        | 110      | 13:55                | 13:55                   | 4.9                                |
| 36026- 17 | 97             | 296        | 111      | 13:59                | 13:59                   | 0.6                                |
| 36026- 18 | 98             | 297        | 113      | 14:03                | 14:03                   | 0.9                                |
| 36026- 19 | 99             | 298        | 114      | 14:06                | 14:06                   | <0.5                               |
| 36026- 20 | 100            | 299        | 115      | 14:09                | 14:09                   | 1.5                                |
| 36026- 21 | TB1            | TB1        | TB1      | 12:00                | 12:00                   | <0.5                               |



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COMPLETE ANALYTICAL SERVICES

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36026R00001



**Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report**

**Project:** Pathfinder Mines Corporation  
**Location:** Lucky McMine  
**Report Date:** September 20, 2000  
**Weather:** Partly cloudy, no precipitation, min temp 47°F

**Date Set:** 09-12-00  
**Date Remove:** 09-13-00  
**Date Counted:** 09-14-00

| Trip Blank - Lab ID | Canister # | Radon Flux - pCi/m <sup>2</sup> s* |
|---------------------|------------|------------------------------------|
| 36026- 21           | TB1        | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 130                | 2403                  | 4473                  |



|  |                        |
|--|------------------------|
| Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report |                        |
| Project: Pathfinder Mines Corporation  | Date Set: 09-12-00     |
| Location: Lucky Mc Mine  | Date Remove: 09-13-00  |
| Report Date: September 20, 2000  | Date Counted: 09-14-00 |
| Weather: Partly cloudy, no precipitation, min temp 47°F                            |                        |

| Lab ID   | Date Counted | Radon Flux,<br>pCi/m <sup>3</sup> s | Recovery<br>Decimal |
|----------|--------------|-------------------------------------|---------------------|
| 36026-8  | 09-14-00     | 0.7                                 | 0.940               |
| 36026-16 | 09-14-00     | 4.9                                 | 0.980               |

Average of recoveries:

0.960

Minimum Radon Flux for Lucky Mc Mine Project: <0.5 pCi/m<sup>2</sup>s

Maximum Radon Flux for Lucky Mc Mine Project: 5.00 pCi/m<sup>2</sup>s

Average Radon Flux for #280-299 1.51 pCi/m<sup>2</sup>s

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.

Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By:

*R.A. Gault*  
ROGER GAULT  
LABORATORY SUPERVISOR

Reviewed By:

*Cathy*  
CATHY FORSTNER  
PROJECT MANAGER

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36026R00003

Input

1  
Starting LAACC# 1  
Project: Pathfinder Mines Corporation  
Location: Lucky Mc Mine  
Report date: September 20, 2000  
Weather: Partly cloudy, no precipitation, min temp 47°F

Data 1  
Date Set 9/12/00  
Date Removed 9/13/00  
Date Counted 9/14/00  
Std Counts 2320  
Bkg Counts 130  
DPM, pCi 18210  
Count Time, ml 5.00  
λ 2.10E-06  
Area K 0.051  
Eff. 0.037  
0.01063

Data 2  
Date Set 9/8/00  
Date Removed 9/7/00  
Date Counted 9/8/00  
Std Counts 780  
Bkg Counts 116  
DPM, pCi 18210  
Count Time, min 5.00  
λ 2.10E-06  
Area K 0.051  
Eff. 0.037  
0.00319

| Lab ID | QA | LAACC # | Can ID | Field ID | Gross Counts | Net Counts | Net CP | Time Set | Time Removed | t1, sec | Time Count Start | t2, sec | t3, sec | pCi 222Rn m-2 s-1 | Precision 2 sigma | Run # | Count Date | Int 1 | Int 2 | Int 3 | Int 4 |
|--------|----|---------|--------|----------|--------------|------------|--------|----------|--------------|---------|------------------|---------|---------|-------------------|-------------------|-------|------------|-------|-------|-------|-------|
| 001    |    | 1       | 280    | 78       | 221          | 105        | 21     | 12:43    | 12:43        | 86400   | 15:15            | 700320  | 700620  | 2.67              | 0.38              | 2     | 09-14-00   | 0.000 | 0.17  | 0.28  | 0.28  |
| 002    |    | 2       | 281    | 94       | 241          | 125        | 25     | 12:48    | 12:48        | 86400   | 15:20            | 700320  | 700620  | 0.93              | 0.32              | 2     | 09-14-00   | 0.000 | 0.17  | 0.28  | 0.28  |
| 003    |    | 3       | 282    | 95       | 288          | 170        | 34     | 12:53    | 12:53        | 86400   | 15:25            | 700320  | 700620  | 1.27              | 0.25              | 2     | 09-14-00   | 0.000 | 0.17  | 0.28  | 0.28  |
| 004    |    | 4       | 283    | 96       | 258          | 142        | 28     | 12:58    | 12:58        | 86400   | 15:30            | 700440  | 700740  | 1.06              | 0.29              | 2     | 09-14-00   | 0.000 | 0.17  | 0.28  | 0.28  |
| 005    |    | 5       | 284    | 97       | 317          | 201        | 40     | 13:02    | 13:02        | 86400   | 15:35            | 700380  | 700680  | 1.50              | 0.22              | 2     | 09-14-00   | 0.000 | 0.17  | 0.28  | 0.28  |
| 006    |    | 86      | 285    | 98       | 255          | 139        | 28     | 13:06    | 13:06        | 86400   | 15:40            | 700440  | 700740  | <0.5              | 0.29              | 2     | 09-14-00   | 0.000 | 0.17  | 0.84  | 0.28  |
| 007    |    | 87      | 286    | 99       | 347          | 231        | 48     | 13:12    | 13:12        | 86400   | 15:45            | 700380  | 700680  | 1.73              | 0.19              | 2     | 09-14-00   | 0.000 | 0.17  | 0.28  | 0.28  |
| 008    | D1 | 88      | 287    | 40       | 215          | 99         | 20     | 13:20    | 13:20        | 86400   | 15:50            | 700200  | 700500  | 0.74              | 0.40              | 2     | 09-14-00   | 0.000 | 0.17  | 0.28  | 0.28  |
| 008    |    | 88      | 287    | 40       | 209          | 93         | 19     | 13:20    | 13:20        | 86400   | 15:55            | 700500  | 700800  | 0.70              | 0.42              | 2     | 09-14-00   | 0.000 | 0.17  | 0.28  | 0.28  |
| 009    |    | 89      | 288    | 41       | 191          | 75         | 15     | 13:24    | 13:24        | 86400   | 16:00            | 707780  | 708080  | 0.57              | 0.52              | 2     | 09-14-00   | 0.000 | 0.17  | 0.27  | 0.27  |
| 010    |    | 90      | 289    | 58       | 175          | 59         | 12     | 13:29    | 13:29        | 86400   | 8:25             | 759360  | 759660  | <0.5              | 0.68              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 011    |    | 91      | 290    | 59       | 262          | 148        | 29     | 13:33    | 13:33        | 86400   | 8:30             | 759420  | 759720  | 1.24              | 0.28              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 012    |    | 92      | 291    | 60       | 194          | 78         | 16     | 13:36    | 13:36        | 86400   | 8:35             | 759540  | 759840  | 0.66              | 0.50              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 013    |    | 93      | 292    | 62       | 237          | 121        | 24     | 13:41    | 13:41        | 86400   | 8:40             | 759540  | 759840  | 1.02              | 0.33              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 014    |    | 94      | 293    | 85       | 208          | 92         | 18     | 13:45    | 13:45        | 86400   | 8:45             | 759600  | 759900  | 0.78              | 0.43              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 015    |    | 95      | 294    | 86       | 641          | 525        | 105    | 13:52    | 13:52        | 86400   | 8:50             | 759480  | 759780  | 4.44              | 0.11              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 016    | D2 | 96      | 295    | 110      | 704          | 588        | 118    | 13:55    | 13:55        | 86400   | 8:55             | 759600  | 759900  | 4.96              | 0.10              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 016    |    | 96      | 295    | 110      | 692          | 576        | 115    | 13:55    | 13:55        | 86400   | 9:00             | 759600  | 760200  | 4.88              | 0.10              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 017    |    | 97      | 296    | 111      | 187          | 71         | 14     | 13:59    | 13:59        | 86400   | 9:05             | 759960  | 760260  | 0.60              | 0.55              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 018    |    | 98      | 297    | 113      | 225          | 109        | 22     | 14:03    | 14:03        | 86400   | 9:10             | 760020  | 760320  | 0.92              | 0.37              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 019    |    | 99      | 298    | 114      | 173          | 57         | 11     | 14:06    | 14:06        | 86400   | 9:15             | 760140  | 760440  | <0.5              | 0.69              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 020    |    | 100     | 299    | 115      | 297          | 181        | 36     | 14:09    | 14:09        | 86400   | 9:20             | 760260  | 760560  | 1.53              | 0.24              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |
| 021    | T1 | TB1     | TB1    | TB1      | 147          | 31         | 6      | 12:00    | 12:00        | 86400   | 9:25             | 768300  | 768600  | <0.5              | 1.37              | 2     | 09-15-00   | 0.000 | 0.17  | 0.24  | 0.24  |

# LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page 1 of 2

Client: PATFINDER MINES CORP.

Location: LUCKY MC MINE

Inst.: \_\_\_\_\_ Eff: \_\_\_\_\_ Tech: \_\_\_\_\_

Weather Condition: Partly cloudy

Precip: NONE

Min Temp: 47°

Inst. Back: \_\_\_\_\_

Charcoal Back: 180 Lot: \_\_\_\_\_

Standard: 2403 Count: \_\_\_\_\_

4473

| LAACC Unit # | Charcoal Can # | Location I.D. / Station | Mo/Day/Yr<br>24 hr time set | Mo/Day/Yr<br>24 hr time removed | Site Personnel Initials | Lab Sample Number | Date/Time Start  | Count Min | Gross Counts | Comments         |
|--------------|----------------|-------------------------|-----------------------------|---------------------------------|-------------------------|-------------------|------------------|-----------|--------------|------------------|
| 1            | 280            | 78                      | 9/12 1243                   | 9/13 1243                       | Cl                      | 36026-1           | 9-14-00<br>15:15 | 5         | 221          |                  |
| 2            | 281            | 94                      | 9/12 1248                   | 9/13 1248                       | Cl                      | 2                 | 20               | L         | 241          |                  |
| 3            | 282            | 95                      | 9/12 1253                   | 9/13 1253                       | Cl                      | 3                 | 25               | all       | 286          |                  |
| 4            | 283            | 96                      | 9/12 1256                   | 9/13 1256                       | Cl                      | 4                 | 30               |           | 258          |                  |
| 5            | 284            | 97                      | 9/12 1302                   | 9/13 1302                       | Cl                      | 5                 | 35               |           | 317          |                  |
| 86           | 285            | 98                      | 9/12 1306                   | 9/13 1306                       | Cl                      | 6                 | 40               |           | 255          |                  |
| 87           | 286            | 99                      | 9/12 1312                   | 9/13 1312                       | Cl                      | 7                 | 45               |           | 347          |                  |
| 88           | 287            | 40                      | 9/12 1320                   | 9/13 1320                       | Cl                      | 8                 | 50               |           | 215          | 209 15:35 change |
| 89           | 288            | 41                      | 9/12 1324                   | 9/13 1324                       | Cl                      | 9                 | 18:00            |           | 191          |                  |
| 90           | 289            | 58                      | 9/12 1329                   | 9/13 1329                       | Cl                      | 10                | 4:45-00<br>8:25  |           | 175          |                  |
| 91           | 290            | 59                      | 9/12 1333                   | 9/13 1333                       | Cl                      | 11                | 30               |           | 262          |                  |
| 92           | 291            | 60                      | 9/12 1336                   | 9/13 1336                       | Cl                      | 12                | 35               |           | 194          |                  |
| 93           | 292            | 62                      | 9/12 1341                   | 9/13 1341                       | Cl                      | 13                | 40               |           | 237          |                  |
| 94           | 293            | 85                      | 9/12 1345                   | 9/13 1345                       | Cl                      | 14                | 48               |           | 208          |                  |
| 95           | 294            | 86                      | 9/12 1352                   | 9/13 1352                       | Cl                      | 15                | 50               |           | 646          |                  |
| 96           | 295            | 110                     | 9/12 1355                   | 9/13 1355                       | Cl                      | 16                | 55               |           | 704          | 692 9:00 day     |
| 97           | 296            | 111                     | 9/12 1359                   | 9/13 1359                       | Cl                      | 17                | 9:05             |           | 187          |                  |

360268000005

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Page 2 of 2

**Inst.:** \_\_\_\_\_ **Eff:** \_\_\_\_\_ **Tech:** \_\_\_\_\_

**Inst. Back:** \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

**Standard:** \_\_\_\_\_ **Count:** \_\_\_\_\_

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061026N000007



|  |                        |
|--|------------------------|
| Large Area Activated Charcoal Canister (LAACC) Radon Flux Report |                        |
| Project: Pathfinder Mines Corporation                            | Date Set: 09-10-01     |
| Location: Lucky McMine   | Date Removed: 09-11-01 |
| Report Date: September 18, 2001                                  | Date Counted: 09-12-01 |
| Weather: Clear, calm, no precipitation, min temp 46°F            |                        |

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Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID       | LAACC #        | Canister # | Location | 09-10-01<br>Time Set | 09-11-01<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> |
|--------------|----------------|------------|----------|----------------------|-------------------------|----------------------------------|
| C01090283 1  | 1              | 121        | 4        | 10:17                | 10:17                   | <0.5                             |
| C01090283 2  | 2              | 122        | 28       | 10:29                | 10:29                   | <0.5                             |
| C01090283 3  | 3              | 123        | 26       | 10:34                | 10:34                   | <0.5                             |
| C01090283 4  | 4              | 124        | 37       | 10:40                | 10:40                   | <0.5                             |
| C01090283 5  | 5              | 125        | 36       | 10:44                | 10:44                   | <0.5                             |
| C01090283 6  | 6              | 126        | 43       | 10:48                | 10:48                   | <0.5                             |
| C01090283 7  | 7              | 127        | 42       | 10:51                | 10:51                   | <0.5                             |
| C01090283 8  | 8              | 128        | 48       | 11:01                | 11:01                   | <0.5                             |
| C01090283 9  | 9              | 129        | 51       | 11:10                | 11:10                   | <0.5                             |
| C01090283 10 | 10             | 130        | 52       | 11:15                | 11:15                   | <0.5                             |
| C01090283 10 | Laboratory dup | 130        | 52       | 11:15                | 11:15                   | <0.5                             |
| C01090283 11 | 11             | 131        | 70       | 11:22                | 11:22                   | <0.5                             |
| C01090283 12 | 12             | 132        | 69       | 11:28                | 11:28                   | <0.5                             |
| C01090283 13 | 13             | 133        | 68       | 11:36                | 11:36                   | <0.5                             |
| C01090283 14 | 14             | 134        | 67       | 11:42                | 11:42                   | <0.5                             |
| C01090283 15 | 16             | 136        | 74       | 12:48                | 12:48                   | <0.5                             |
| C01090283 16 | 17             | 137        | 75       | 13:00                | 13:00                   | <0.5                             |
| C01090283 17 | 18             | 138        | 76       | 13:07                | 13:07                   | 0.7                              |
| C01090283 18 | 19             | 139        | 77       | 13:14                | 13:14                   | <0.5                             |
| C01090283 19 | 20             | 140        | 83       | 13:23                | 13:23                   | <0.5                             |
| C01090283 19 | Laboratory dup | 140        | 83       | 13:23                | 13:23                   | <0.5                             |
| C01090283 20 | 21             | 141        | 83DUP    | 13:23                | 13:23                   | <0.5                             |
| C01090283 21 | 22             | 142        | 84       | 13:27                | 13:27                   | <0.5                             |

|   |  |                               |  |
|---|--|-------------------------------|--|
| <b>Large Area Activated Charcoal Canister (LAACC) Radon Flux Report</b> |  |                               |  |
| <b>Project:</b> Pathfinder Mines Corporation                            |  | <b>Date Set:</b> 09-10-01     |  |
| <b>Location:</b> Lucky Mc Mine  |  | <b>Date Removed:</b> 09-11-01 |  |
| <b>Report Date:</b> September 18, 2001                                  |  | <b>Date Counted:</b> 09-12-01 |  |
| <b>Weather:</b> Clear, calm, no precipitation, min temp 46°F            |  |                               |  |

Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID        | LAACC #        | Canister # | Location | 09-10-01<br>Time Set | 09-11-01<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> s |
|---------------|----------------|------------|----------|----------------------|-------------------------|------------------------------------|
| C01090283 022 | 23             | 143        | 87       | 13:31                | 13:31                   | <0.5                               |
| C01090283 023 | 24             | 144        | 88       | 13:34                | 13:34                   | <0.5                               |
| C01090283 024 | 25             | 145        | 107      | 13:39                | 13:39                   | <0.5                               |
| C01090283 025 | 26             | 146        | 108      | 13:43                | 13:43                   | <0.5                               |
| C01090283 026 | 27             | 147        | 109      | 13:47                | 13:47                   | <0.5                               |
| C01090283 027 | 28             | 148        | 112      | 13:52                | 13:52                   | <0.5                               |
| C01090283 028 | 29             | 149        | 100      | 14:05                | 14:05                   | <0.5                               |
| C01090283 029 | 30             | 150        | 101      | 14:09                | 14:09                   | <0.5                               |
| C01090283 029 | Laboratory dup | 150        | 101      | 14:09                | 14:09                   | <0.5                               |
| C01090283 030 | 31             | 151        | 125      | 7:41                 | 7:41                    | 0.9                                |
| C01090283 031 | 32             | 152        | 124      | 7:47                 | 7:47                    | <0.5                               |
| C01090283 032 | 33             | 153        | 123      | 7:52                 | 7:52                    | 1.0                                |
| C01090283 033 | 34             | 154        | 122      | 8:01                 | 8:01                    | 0.9                                |
| C01090283 034 | 35             | 155        | 121      | 8:07                 | 8:07                    | <0.5                               |
| C01090283 035 | 36             | 156        | 121DUP   | 8:07                 | 8:07                    | <0.5                               |
| C01090283 036 | 37             | 157        | 120      | 8:20                 | 8:20                    | 3.2                                |
| C01090283 037 | 38             | 158        | 119      | 8:35                 | 8:35                    | 1.1                                |
| C01090283 038 | 39             | 159        | 118      | 8:39                 | 8:39                    | <0.5                               |
| C01090283 039 | 40             | 160        | 117      | 8:43                 | 8:43                    | <0.5                               |
| C01090283 039 | Laboratory dup | 160        | 117      | 8:43                 | 8:43                    | <0.5                               |
| C01090283 040 | 41             | 161        | 116      | 8:47                 | 8:47                    | 0.8                                |
| C01090283 041 | 42             | 162        | 138      | 8:55                 | 8:55                    | 8.6                                |
| C01090283 042 | 43             | 163        | 135      | 9:01                 | 9:01                    | <0.5                               |
| C01090283 043 | 44             | 164        | 134      | 9:05                 | 9:05                    | <0.5                               |
| C01090283 044 | 45             | 165        | 133      | 9:08                 | 9:08                    | 1.1                                |
| C01090283 045 | T1             | T1         | T1       | 12:43                | 12:43                   | <0.5                               |
| C01090283 046 | T2             | T2         | T2       | 12:43                | 12:43                   | <0.5                               |
| C01090283 047 | T3             | T3         | T3       | 12:43                | 12:43                   | <0.5                               |

# Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report

Project: Pathfinder Mines Corporation  
 Location: Lucky McMine  
 Report Date: September 18, 2001  
 Weather: Clear, calm, no precipitation, min temp 46°F

Date Set: 09-10-01  
 Date Removed: 09-11-01  
 Date Counted: 09-12-01

| Lab ID        | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------------|--------------|-------------------------------------|---------------------|
| C01090283-010 | 09-12-01     | <0.5                                | 1.000               |
| C01090283-019 | 09-12-01     | <0.5                                | 1.000               |
| C01090283-029 | 09-12-01     | <0.5                                | 1.000               |
| C01090283-039 | 09-12-01     | <0.5                                | 1.000               |

Average of recoveries:

1.000

| Trip Blank - Lab ID | Canister # | Radon Flux - pCi/m <sup>2</sup> s* |
|---------------------|------------|------------------------------------|
| C01090283 45        | T1         | <0.5                               |
| C01090283 46        | T2         | <0.5                               |
| C01090283 47        | T3         | <0.5                               |

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 119                | 1825                  | 3634                  |

Minimum Radon Flux for Lucky McMine Project: <0.5 pCi/m<sup>2</sup>s  
 Maximum Radon Flux for Lucky McMine Project: 8.57 pCi/m<sup>2</sup>s  
 Average Radon Flux for #120-165 <=0.83 pCi/m<sup>2</sup>s

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.  
 Minimum temperature under 35 degrees Fahrenheit not acceptable.

# LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page 1 of 2

Client: PATHFINDER MINES CORP.

Location: Lucky Mc Mine

Inst.: \_\_\_\_\_ Eff: \_\_\_\_\_ Tech: \_\_\_\_\_

Weather Condition: Clear & Calm Precip: NONE

Min Temp: 46° F

Inst. Back: \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

Standard: \_\_\_\_\_ Count: \_\_\_\_\_

| LAACC Unit #  | Charcoal Can # | Location I.D. / Station | Mo/Day/Yr<br>24 hr time set | Mo/Day/Yr<br>24 hr time removed | Site Personnel Initials | Lab Sample Number    | Date/Time Start | Count Min | Gross Counts | Comments |
|---------------|----------------|-------------------------|-----------------------------|---------------------------------|-------------------------|----------------------|-----------------|-----------|--------------|----------|
| 1             | 121            | 4                       | 9/10/01<br>1017             | 9/11/01<br>1017                 | CA                      | 101090283-1          |                 |           |              |          |
| 2             | 122            | 28                      | 1029                        | 1029                            | CA                      | 2                    |                 |           |              |          |
| 3             | 123            | 26                      | 1034                        | 1034                            | CA                      | 3                    |                 |           |              |          |
| 4             | 124            | 37                      | 1040                        | 1040                            | CA                      | 4                    |                 |           |              |          |
| 5             | 125            | 36                      | 1044                        | 1044                            | CA                      | 5                    |                 |           |              |          |
| 6             | 126            | 43                      | 1048                        | 1048                            | CA                      | 6                    |                 |           |              |          |
| 7             | 127            | 42                      | 1051                        | 1051                            | CA                      | 7                    |                 |           |              |          |
| 8             | 128            | 48                      | 1101                        | 1101                            | CA                      | 8                    |                 |           |              |          |
| 9             | 129            | 51                      | 1110                        | 1110                            | CA                      | 9                    |                 |           |              |          |
| 10            | 130            | 52                      | 1115                        | 1115                            | CA                      | 10                   |                 |           |              |          |
| 11            | 131            | 70                      | 1122                        | 1122                            | CA                      | 11                   |                 |           |              |          |
| 12            | 132            | 69                      | 1128                        | 1128                            | CA                      | 12                   |                 |           |              |          |
| 13            | 133            | 68                      | 1136                        | 1136                            | CA                      | 13                   |                 |           |              |          |
| 14            | 134            | 67                      | 1142                        | 1142                            | CA                      | 201090283-14         |                 |           |              |          |
| <del>15</del> | <del>135</del> | <del>65</del>           | <del>1147</del>             | <del>1147</del>                 | <del>CA</del>           | <del>Destroyed</del> |                 |           |              |          |
| 16            | 136            | 74                      | 1248                        | 1248                            | CA                      | 101090283-15         |                 |           |              |          |
| 17            | 137            | 75                      | 1300                        | 1300                            | CA                      | 101090283-16         |                 |           |              |          |

# LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page 2 of 2

Client: PATHFINDER MINES CORP.

Location: LUCKY Mc MINE

Inst.: \_\_\_\_\_ Eff: \_\_\_\_\_ Tech: \_\_\_\_\_

Weather Condition: Clear & Sunny Precip: NONE

Min Temp: 46° F

Inst. Back: \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

Standard: \_\_\_\_\_ Count: \_\_\_\_\_

| LAACC Unit # | Charcoal Can # | Location I.D. / Station | Mo/Day/Yr 24 hr time set | Mo/Day/Yr 24 hr time removed | Site Personnel Initials | Lab Sample Number | Date/Time Start | Count Min | Gross Counts | Comments |
|--------------|----------------|-------------------------|--------------------------|------------------------------|-------------------------|-------------------|-----------------|-----------|--------------|----------|
| 18           | 138            | 76                      | 9/10/01 1307             | 9/11/01 1307                 | CL                      | 1010910283-17     |                 |           |              |          |
| 19           | 139            | 77                      | 1314                     | 1314                         | CL                      | 18                |                 |           |              |          |
| 20           | 140            | 83                      | 1323                     | 1323                         | CL                      | 19                |                 |           |              |          |
| 21           | 141            | 83 (dup)                | 1323                     | 1323                         | CL                      | 20                |                 |           |              |          |
| 22           | 142            | 84                      | 1327                     | 1327                         | CL                      | 21                |                 |           |              |          |
| 23           | 143            | 87                      | 1331                     | 1331                         | CL                      | 22                |                 |           |              |          |
| 24           | 144            | 88                      | 1334                     | 1334                         | CL                      | 23                |                 |           |              |          |
| 25           | 145            | 107                     | 1339                     | 1339                         | CL                      | 24                |                 |           |              |          |
| 26           | 146            | 108                     | 1343                     | 1343                         | CL                      | 25                |                 |           |              |          |
| 27           | 147            | 109                     | 1347                     | 1347                         | CL                      | 26                |                 |           |              |          |
| 28           | 148            | 112                     | 1352                     | 1352                         | CL                      | 27                |                 |           |              |          |
| 29           | 149            | 100                     | 1405                     | 1405                         | CL                      | 28                |                 |           |              |          |
| 30           | 150            | 101                     | 1409                     | 1409                         | CL                      | 1010910283-29     |                 |           |              |          |
|              |                |                         |                          |                              |                         |                   |                 |           |              |          |
|              |                |                         |                          |                              |                         |                   |                 |           |              |          |
|              |                |                         |                          |                              |                         |                   |                 |           |              |          |
|              |                |                         |                          |                              |                         |                   |                 |           |              |          |

# LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page 1 of 1

Client: PATHFINDER MINES CORP.

Location: Lucky Mc Mine

Inst.: \_\_\_\_\_ Eff: \_\_\_\_\_ Tech: \_\_\_\_\_

Weather Condition: Clear & calm Precip: None

Air Temp: 45° F

Inst. Back: \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

Standard: \_\_\_\_\_ Count: \_\_\_\_\_

| LAACC Unit # | Charcoal Can # | Location I.D. / Station | Mo/Day/Yr<br>24 hr time set | Mo/Day/Yr<br>24 hr time removed | Site Personnel Initials | Lab Sample Number | Date/Time Start | Count Min | Gross Counts | Comments |
|--------------|----------------|-------------------------|-----------------------------|---------------------------------|-------------------------|-------------------|-----------------|-----------|--------------|----------|
| 31           | 151            | 125                     | 9/11/01<br>741              | 9/12/01<br>741                  | OK                      | 301090283-30      |                 |           |              |          |
| 32           | 152            | 124                     | 747                         | 747                             | CL                      | 31                |                 |           |              |          |
| 33           | 153            | 123                     | 752                         | 752                             | CL                      | 32                |                 |           |              |          |
| 34           | 154            | 122                     | 801                         | 801                             | CL                      | 33                |                 |           |              |          |
| 35           | 155            | 121                     | 807                         | 807                             | CL                      | 34                |                 |           |              |          |
| 36           | 156            | 121 (Dup)               | 807                         | 807                             | CL                      | 35                |                 |           |              |          |
| 37           | 157            | 120                     | 820                         | 820                             | CL                      | 36                |                 |           |              |          |
| 38           | 158            | 119                     | 835                         | 835                             | CL                      | 37                |                 |           |              |          |
| 39           | 159            | 118                     | 839                         | 839                             | CL                      | 38                |                 |           |              |          |
| 40           | 160            | 117                     | 843                         | 843                             | CL                      | 39                |                 |           |              |          |
| 41           | 161            | 116                     | 847                         | 847                             | CL                      | 40                |                 |           |              |          |
| 42           | 162            | 138                     | 855                         | 855                             | CL                      | 41                |                 |           |              |          |
| 43           | 163            | 135                     | 901                         | 901                             | CL                      | 42                |                 |           |              |          |
| 44           | 164            | 134                     | 905                         | 905                             | CL                      | 43                |                 |           |              |          |
| 45           | 165            | 133                     | 908                         | 908                             | CL                      | 44                |                 |           |              |          |
|              |                |                         |                             |                                 |                         |                   |                 |           |              |          |
|              |                |                         |                             |                                 |                         |                   |                 |           |              |          |



## Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

**Project: Pathfinder Mines Corporation**

**Date Set: 09-12-01**

**Location: Lucky McMine**

Date Removed: 09-13-01

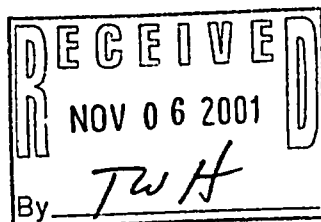
Report Date: September 19, 2001

**Date Counted: 09-14-01**

Weather: Overcast, calm, trace precipitation, min temp 45°F

**Method:** Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID       | LAACC #        | Canister # | Location | 09-12-01<br>Time Set | 09-13-01<br>Time Remove | Radon Flux<br>pCi/m <sup>2</sup> s |
|--------------|----------------|------------|----------|----------------------|-------------------------|------------------------------------|
| C01090344 1  | 46             | 166        | 132      | 10:14                | 10:14                   | <0.5                               |
| C01090344 2  | 47             | 167        | 131      | 10:20                | 10:20                   | <0.5                               |
| C01090344 3  | 48             | 168        | 130      | 10:25                | 10:25                   | <0.5                               |
| C01090344 4  | 49             | 169        | 130DUP   | 10:25                | 10:25                   | <0.5                               |
| C01090344 5  | 50             | 170        | 129      | 10:30                | 10:30                   | 0.5                                |
| C01090344 5  | Laboratory dup | 170        | 129      | 10:30                | 10:30                   | <0.5                               |
| C01090344 6  | 51             | 171        | 128      | 10:33                | 10:33                   | <0.5                               |
| C01090344 7  | 52             | 172        | 127      | 10:39                | 10:39                   | <0.5                               |
| C01090344 8  | 53             | 173        | 126      | 10:43                | 10:43                   | <0.5                               |
| C01090344 9  | 54             | 174        | 150      | 10:47                | 10:47                   | <0.5                               |
| C01090344 10 | 55             | 175        | 149      | 10:51                | 10:51                   | <0.5                               |
| C01090344 11 | 56             | 176        | 148      | 11:02                | 11:02                   | 5.4                                |
| C01090344 12 | 57             | 177        | 147      | 11:07                | 11:07                   | <0.5                               |
| C01090344 13 | 58             | 178        | 146      | 11:12                | 11:12                   | <0.5                               |
| C01090344 14 | 59             | 179        | 145      | 11:19                | 11:19                   | 0.8                                |
| C01090344 15 | 60             | 180        | 139      | 11:29                | 11:29                   | <0.5                               |
| C01090344 15 | Laboratory dup | 180        | 139      | 11:29                | 11:29                   | <0.5                               |
| C01090344 16 | 1              | 181        | 153      | 13:00                | 13:00                   | <0.5                               |
| C01090344 17 | 2              | 182        | 152      | 13:05                | 13:05                   | <0.5                               |
| C01090344 18 | 3              | 183        | 151      | 13:08                | 13:08                   | <0.5                               |
| C01090344 19 | T3             | T3         | T3       | 13:08                | 13:08                   | <0.5                               |
| C01090344 20 | T4             | T4         | T4       | 13:08                | 13:08                   | <0.5                               |







Weather: Overcast, calm, trace precipitation, min temp 45°F

dpb r:\reports\clients.2001\pathfinder\lucky\_mcmine\laaccs\C01090344.xls

7-10-1950 10:30

# LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page 1 of 2

Client: PATAFINDET MINES CORP.

Location: Lucky Mc Mine

Inst.: \_\_\_\_\_ Eff: \_\_\_\_\_ Tech: \_\_\_\_\_

Weather Conditions: OVERCAST & CALM Precip: TRACE

Min Temp: 45° F

Inst. Back: \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

Standard: \_\_\_\_\_ Count: \_\_\_\_\_

| LAACC Unit # | Charcoal Can # | Location I.D. / Station | Mo/Day/Yr<br>24 hr time set | Mo/Day/Yr<br>24 hr time removed | Site Personnel Initials | Lab Sample Number | Date/Time Start | Count Min | Gross Counts | Comments |
|--------------|----------------|-------------------------|-----------------------------|---------------------------------|-------------------------|-------------------|-----------------|-----------|--------------|----------|
| 46           | 166            | 132                     | 9/12/61<br>1014             | 9/13/61<br>1014                 | CL                      | CO1090344         | -001A           |           |              |          |
| 47           | 167            | 131                     | 1020                        | 1020                            | CL                      | "                 | -002A           |           |              |          |
| 48           | 168            | 130                     | 1025                        | 1025                            | CL                      | "                 | -003A           |           |              |          |
| 49           | 169            | 130 (DUP)               | 1025                        | 1025                            | CL                      | "                 | -004A           |           |              |          |
| 50           | 170            | 129                     | 1030                        | 1030                            | CL                      | "                 | -005A           |           |              |          |
| 51           | 171            | 128                     | 1033                        | 1033                            | CL                      | "                 | -006A           |           |              |          |
| 52           | 172            | 127                     | 1039                        | 1039                            | CL                      | "                 | -007A           |           |              |          |
| 53           | 173            | 126                     | 1043                        | 1043                            | CL                      | "                 | -008A           |           |              |          |
| 54           | 174            | 150                     | 1047                        | 1047                            | CL                      | "                 | -009A           |           |              |          |
| 55           | 175            | 149                     | 1051                        | 1051                            | CL                      | "                 | -010A           |           |              |          |
| 56           | 176            | 148                     | 1102                        | 1102                            | CL                      | "                 | -011A           |           |              |          |
| 57           | 177            | 147                     | 1107                        | 1107                            | CL                      | "                 | -012A           |           |              |          |
| 58           | 178            | 146                     | 1112                        | 1112                            | CL                      | "                 | -013A           |           |              |          |
| 59           | 179            | 145                     | 1119                        | 1119                            | CL                      | "                 | -014A           |           |              |          |
| 60           | 180            | 139                     | 1129                        | 1129                            | CL                      | "                 | -015A           |           |              |          |
| 1            | 181            | 153                     | 1300                        | 1300                            | CL                      | "                 | -016A           |           |              |          |
| 2            | 182            | 152                     | 1305                        | 1305                            | CL                      | "                 | -017A           |           |              |          |

Page 2 of 2

Location: Lucky Mc Mine

*Inst.:* \_\_\_\_\_ *Eff:* \_\_\_\_\_ *Tech:* \_\_\_\_\_

Min Temp: 45°

**Inst. Back:** \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

**Standard:** \_\_\_\_\_ **Count:** \_\_\_\_\_

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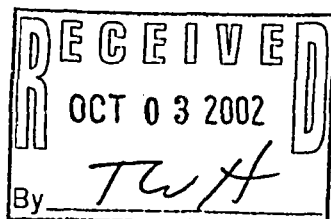
Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

Project: Pathfinder Mines Corporation  
Location: Lucky McMine  
Report Date: September 17, 2002  
Weather: Partly cloudy, windy, no precipitation, min temp 48°F

Date Set: 09-16-02  
Date Removed: 09-17-02  
Date Counted: 09-18-02

Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID        | LAACC #        | Canister # | Location | 09-16-02<br>Time Set | 09-17-02<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> s |
|---------------|----------------|------------|----------|----------------------|-------------------------|------------------------------------|
| C02090637 001 | 1              | 1          | 136      | 8:11                 | 8:11                    | 10.8                               |
| C02090637 001 | Laboratory dup | 1          | 136      | 8:11                 | 8:11                    | 10.5                               |
| C02090637 002 | 2              | 2          | 137      | 8:16                 | 8:16                    | <0.5                               |
| C02090637 003 | 3              | 3          | 140      | 8:19                 | 8:19                    | <0.5                               |
| C02090637 004 | 4              | 4          | 141      | 8:23                 | 8:23                    | 1.7                                |
| C02090637 005 | 5              | 5          | 142      | 8:27                 | 8:27                    | 6.6                                |
| C02090637 006 | 6              | 6          | 143      | 8:31                 | 8:31                    | 0.9                                |
| C02090637 007 | 7              | 7          | 144      | 8:36                 | 8:36                    | <0.5                               |
| C02090637 008 | 8              | 8          | 144DUP   | 8:37                 | 8:37                    | <0.5                               |
| C02090637 009 | 9              | 9          | 154      | 8:42                 | 8:42                    | <0.5                               |
| C02090637 010 | 10             | 10         | 155      | 8:46                 | 8:46                    | <0.5                               |
| C02090637 010 | Laboratory dup | 10         | 155      | 8:46                 | 8:46                    | <0.5                               |
| C02090637 011 | 11             | 11         | 156      | 8:50                 | 8:50                    | 0.8                                |
| C02090637 012 | 12             | 12         | 157      | 8:53                 | 8:53                    | <0.5                               |
| C02090637 013 | 13             | 13         | 158      | 8:57                 | 8:57                    | 1.2                                |
| C02090637 014 | 14             | 14         | 159      | 9:00                 | 9:00                    | 3.8                                |
| C02090637 015 | 15             | 15         | 160      | 9:04                 | 9:04                    | <0.5                               |
| C02090637 016 | 16             | 16         | 161      | 9:11                 | 9:11                    | <0.5                               |
| C02090637 017 | 17             | 17         | 161DUP   | 9:12                 | 9:12                    | <0.5                               |
| C02090637 018 | 18             | 18         | 162      | 9:15                 | 9:15                    | <0.5                               |
| C02090637 019 | 19             | 19         | 163      | 9:19                 | 9:19                    | 1.3                                |
| C02090637 020 | 20             | 20         | 164      | 9:23                 | 9:23                    | 1.5                                |
| C02090637 020 | Laboratory dup | 20         | 164      | 9:23                 | 9:23                    | 1.5                                |





Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

Project: Pathfinder Mines Corporation  
Location: Lucky McMine  
Report Date: September 17, 2002  
Weather: Partly cloudy, windy, no precipitation, min temp 48°F  
Date Set: 09-16-02  
Date Removed: 09-17-02  
Date Counted: 09-18-02

Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID        | LAACC # | Canister # | Location | 09-16-02<br>Time Set | 09-17-02<br>Time Remove | Radon Flux<br>pCi/m <sup>2</sup> s |
|---------------|---------|------------|----------|----------------------|-------------------------|------------------------------------|
| C02090637 021 | 21      | 21         | 165      | 9:27                 | 9:27                    | <0.5                               |
| C02090637 022 | 22      | 22         | 166      | 9:32                 | 9:32                    | <0.5                               |
| C02090637 023 | 23      | 23         | 167      | 9:38                 | 9:38                    | <0.5                               |
| C02090637 024 | 24      | 24         | 168      | 9:42                 | 9:42                    | <0.5                               |
| C02090637 025 | 25      | 25         | 169      | 9:46                 | 9:46                    | <0.5                               |
| C02090637 026 | 26      | 26         | 170      | 9:52                 | 9:52                    | <0.5                               |
| C02090637 027 | 27      | 27         | 171      | 9:56                 | 9:56                    | <0.5                               |
| C02090637 028 | 28      | 28         | 178      | 10:06                | 10:06                   | <0.5                               |
| C02090637 029 | 29      | 29         | 180      | 10:11                | 10:11                   | <0.5                               |
| C02090637 030 | 30      | 30         | 184      | 10:17                | 10:17                   | <0.5                               |
| C02090637 031 | TB1     | TB1        | TB1      | 12:00                | 12:00                   | <0.5                               |
| C02090637 032 | TB2     | TB2        | TB2      | 12:00                | 12:00                   | <0.5                               |
| C02090637 033 | TB3     | TB3        | TB3      | 12:00                | 12:00                   | <0.5                               |
| C02090637 034 | TB4     | TB4        | TB4      | 12:00                | 12:00                   | <0.5                               |
| C02090637 035 | TB5     | TB5        | TB5      | 12:00                | 12:00                   | <0.5                               |



**Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report**

Project: Pathfinder Mines Corporation      Date Set: 09-16-02  
Location: Lucky McMine      Date Removed: 09-17-02  
Report Date: September 17, 2002      Date Counted: 09-18-02  
Weather: Partly cloudy, windy, no precipitation, min temp 48°F

| Lab ID        | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s | Recovery<br>Decimal |
|---------------|--------------|------------------------------------|---------------------|
| C02090637-001 | 09-18-02     | 10.5                               | 0.966               |
| C02090637-010 | 09-18-02     | <0.5                               | 1.000               |
| C02090637-020 | 09-18-02     | 1.5                                | 1.023               |

Average of recoveries:

0.995

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 126                | 2077                  | 4205                  |
| 110                | 808                   | 1479                  |

Minimum Radon Flux for Lucky McMine Project: <0.5 pCi/m<sup>2</sup>s  
Maximum Radon Flux for Lucky McMine Project: 10.83 pCi/m<sup>2</sup>s  
Average Radon Flux for #1-30 1.30 pCi/m<sup>2</sup>s

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.  
Minimum temperature under 35 degrees Fahrenheit not acceptable.

# LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page 1 of 2

Client: PATHFINDER MINES CORP.

Location: Lucky Mc Mine

Inst.: \_\_\_\_\_ Eff: \_\_\_\_\_ Tech: \_\_\_\_\_

Weather Condition: PARTLY CLDY WINDY Precip: NONE

Min Temp: 48°

Inst. Back: \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

Standard: \_\_\_\_\_ Count: \_\_\_\_\_

| LAACC Unit # | Charcoal Can # | Location I.D. / Station | Mo/Day/Yr 24 hr time set | Mo/Day/Yr 24 hr time removed | Site Personnel Initials | Lab Sample Number | Date/Time Start | Count Min | Gross Counts | Comments |
|--------------|----------------|-------------------------|--------------------------|------------------------------|-------------------------|-------------------|-----------------|-----------|--------------|----------|
| 1            | 1              | 136                     | 9/16/02 8:11             | 9/17/02 8:11                 | CA                      |                   |                 |           |              |          |
| 2            | 2              | 137                     | 8:16                     | 8:16                         | CA                      |                   |                 |           |              |          |
| 3            | 3              | 140                     | 8:19                     | 8:19                         | CA                      |                   |                 |           |              |          |
| 4            | 4              | 141                     | 8:23                     | 8:23                         | CA                      |                   |                 |           |              |          |
| 5            | 5              | 142                     | 8:27                     | 8:27                         | CA                      |                   |                 |           |              |          |
| 6            | 6              | 143                     | 8:31                     | 8:31                         | CA                      |                   |                 |           |              |          |
| 7            | 7              | 144                     | 8:36                     | 8:36                         | CA                      |                   |                 |           |              |          |
| 8            | 8              | 144 (dup)               | 8:37                     | 8:37                         | CA                      |                   |                 |           |              |          |
| 9            | 9              | 154                     | 8:42                     | 8:42                         | CA                      |                   |                 |           |              |          |
| 10           | 10             | 155                     | 8:46                     | 8:46                         | CA                      |                   |                 |           |              |          |
| 11           | 11             | 156                     | 8:50                     | 8:50                         | CA                      |                   |                 |           |              |          |
| 12           | 12             | 157                     | 8:53                     | 8:53                         | CA                      |                   |                 |           |              |          |
| 13           | 13             | 158                     | 8:57                     | 8:57                         | CA                      |                   |                 |           |              |          |
| 14           | 14             | 159                     | 9:00                     | 9:00                         | CA                      |                   |                 |           |              |          |
| 15           | 15             | 160                     | 9:04                     | 9:04                         | CA                      |                   |                 |           |              |          |
| 16           | 16             | 161                     | 9:11                     | 9:11                         | CA                      |                   |                 |           |              |          |
| 17           | 17             | 161 (dup)               | 9:12                     | 9:12                         | CA                      |                   |                 |           |              |          |

90637R00005

TRACING NO. PAGE 10

# LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page 2 of 2

Client: PATIFINDER MINES CORP.

Location: LUCKY MC MINE

Inst.: \_\_\_\_\_ Eff: \_\_\_\_\_ Tech: \_\_\_\_\_

Weather Condition: PARTLY CLOUDY & WINDY Precip: \_\_\_\_\_

Min Temp: \_\_\_\_\_

Inst. Back: \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

Standard: \_\_\_\_\_ Count: \_\_\_\_\_

| LAACC Unit # | Charcoal Can # | Location I.D. / Station | Mo/Day/Yr<br>24 hr time set | Mo/Day/Yr<br>24 hr time removed | Site Personnel Initials | Lab Sample Number | Date/Time Start | Count Min | Gross Counts | Comments |
|--------------|----------------|-------------------------|-----------------------------|---------------------------------|-------------------------|-------------------|-----------------|-----------|--------------|----------|
| 18           | 18             | 162                     | 9/16/02<br>915              | 9/17/02<br>915                  | CA                      |                   |                 |           |              |          |
| 19           | 19             | 163                     | 919                         | 919                             | CA                      |                   |                 |           |              |          |
| 20           | 20             | 164                     | 923                         | 923                             | CA                      |                   |                 |           |              |          |
| 21           | 21             | 165                     | 927                         | 927                             | CA                      |                   |                 |           |              |          |
| 22           | 22             | 166                     | 932                         | 932                             | CA                      |                   |                 |           |              |          |
| 23           | 23             | 167                     | 938                         | 938                             | CA                      |                   |                 |           |              |          |
| 24           | 24             | 168                     | 942                         | 942                             | CA                      |                   |                 |           |              |          |
| 25           | 25             | 169                     | 946                         | 946                             | CA                      |                   |                 |           |              |          |
| 26           | 26             | 170                     | 952                         | 952                             | CA                      |                   |                 |           |              |          |
| 27           | 27             | 171                     | 956                         | 956                             | CA                      |                   |                 |           |              |          |
| 28           | 28             | 178                     | 1006                        | 1006                            | CA                      |                   |                 |           |              |          |
| 29           | 29             | 180                     | 1011                        | 1011                            | CA                      |                   |                 |           |              |          |
| 30           | 30             | 184                     | 1017                        | 1017                            | CA                      |                   |                 |           |              |          |
|              |                |                         |                             |                                 |                         |                   |                 |           |              |          |
|              |                |                         |                             |                                 |                         |                   |                 |           |              |          |
|              |                |                         |                             |                                 |                         |                   |                 |           |              |          |
|              |                |                         |                             |                                 |                         |                   |                 |           |              |          |
|              |                |                         |                             |                                 |                         |                   |                 |           |              |          |

90637R00006

LAACC NO. PAGE NO.



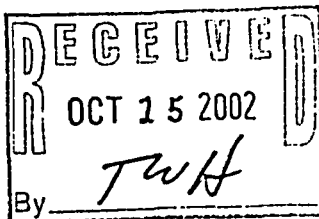


Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

Project: Pathfinder Mines Corporation Date Set: 09-23-02  
Location: Lucky McMine Date Removed: 09-24-02  
Report Date: September 24, 2002 Date Counted: 09-25-02  
Weather: Clear; calm; no precipitation, 37°F

Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID        | LAACC #        | Canister # | Location | 09-23-02<br>Time Set | 09-24-02<br>Time Remove | Radon Flux<br>pCi/m <sup>3</sup> |
|---------------|----------------|------------|----------|----------------------|-------------------------|----------------------------------|
| C02090836 001 | 1              | 166        | 186      | 8:50                 | 8:50                    | 0.9                              |
| C02090836 001 | Laboratory dup | 166        | 186      | 8:50                 | 8:50                    | 0.8                              |
| C02090836 002 | 2              | 167        | 186DUP   | 8:51                 | 8:51                    | <0.5                             |
| C02090836 003 | 3              | 168        | 188      | 8:58                 | 8:58                    | <0.5                             |
| C02090836 004 | 4              | 169        | 191      | 9:01                 | 9:01                    | <0.5                             |
| C02090836 005 | 5              | 170        | 193      | 9:03                 | 9:03                    | <0.5                             |
| C02090836 006 | 6              | 171        | 195      | 9:08                 | 9:08                    | 0.6                              |
| C02090836 007 | 7              | 172        | 201      | 9:12                 | 9:12                    | <0.5                             |
| C02090836 008 | 8              | 173        | 203      | 9:15                 | 9:15                    | <0.5                             |
| C02090836 009 | 9              | 174        | 203DUP   | 9:16                 | 9:16                    | 0.5                              |
| C02090836 010 | 10             | 175        | 208      | 9:22                 | 9:22                    | <0.5                             |
| C02090836 010 | Laboratory dup | 175        | 208      | 9:22                 | 9:22                    | <0.5                             |
| C02090836 011 | 11             | 176        | 211      | 9:26                 | 9:26                    | <0.5                             |
| C02090836 012 | 12             | 177        | 222      | 9:29                 | 9:29                    | <0.5                             |
| C02090836 013 | 13             | 178        | 224      | 9:32                 | 9:32                    | <0.5                             |
| C02090836 014 | 14             | 179        | 229      | 9:36                 | 9:36                    | <0.5                             |
| C02090836 015 | 15             | 180        | 233      | 9:40                 | 9:40                    | <0.5                             |
| C02090836 016 | 16             | 181        | 235      | 9:43                 | 9:43                    | <0.5                             |
| C02090836 017 | 17             | 182        | 236      | 9:47                 | 9:47                    | <0.5                             |
| C02090836 018 | 18             | 183        | 236DUP   | 9:48                 | 9:48                    | <0.5                             |
| C02090836 019 | 19             | 184        | 239      | 9:51                 | 9:51                    | <0.5                             |
| C02090836 020 | 20             | 185        | 220      | 9:56                 | 9:56                    | <0.5                             |
| C02090836 020 | Laboratory dup | 185        | 220      | 9:56                 | 9:56                    | <0.5                             |





Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

Project: Pathfinder Mines Corporation  
Location: Lucky McMine  
Report Date: September 24, 2002  
Weather: Clear, calm, no precipitation, 37°F  
Date Set: 09-23-02  
Date Removed: 09-24-02  
Date Counted: 09-25-02

Method: Pathfinder Mine employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

| Lab ID        | LAACC # | Canister # | Location | 09-23-02<br>Time Set | 09-24-02<br>Time Remove | Radon Flux<br>pCi/m <sup>2</sup> s |
|---------------|---------|------------|----------|----------------------|-------------------------|------------------------------------|
| C02090836 021 | 21      | 186        | 218      | 9:59                 | 9:59                    | <0.5                               |
| C02090836 022 | 22      | 187        | 209      | 10:02                | 10:02                   | <0.5                               |
| C02090836 023 | TB7     | TB7        | TB7      | 12:00                | 12:00                   | <0.5                               |
| C02090836 024 | TB8     | TB8        | TB8      | 12:00                | 12:00                   | <0.5                               |
| C02090836 025 | TB9     | TB9        | TB9      | 12:00                | 12:00                   | <0.5                               |
| C02090836 026 | TB10    | TB10       | TB10     | 12:00                | 12:00                   | <0.5                               |
| C02090836 027 | TB6     | TB6        | TB6      | 12:00                | 12:00                   | <0.5                               |



Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report

Project: Pathfinder Mines Corporation  
Location: Lucky McMine  
Report Date: September 24, 2002  
Weather: Clear, calm, no precipitation, 37°F

Date Set: 09-23-02  
Date Removed: 09-24-02  
Date Counted: 09-25-02

| Lab ID        | Date Counted | Radon Flux<br>pCi/m <sup>2</sup> s* | Recovery<br>Decimal |
|---------------|--------------|-------------------------------------|---------------------|
| C02090836-001 | 09-25-02     | 0.8                                 | 0.894               |
| C02090836-010 | 09-25-02     | <0.5                                | 1.000               |
| C02090836-020 | 09-25-02     | <0.5                                | 1.000               |

Average of recoveries:

0.960

| Blank Charcoal cpm | Standard Number 1 cpm | Standard Number 2 cpm |
|--------------------|-----------------------|-----------------------|
| 138                | 2176                  | 4185                  |

Minimum Radon Flux for Lucky McMine Project: <0.5 pCi/m<sup>2</sup>s  
Maximum Radon Flux for Lucky McMine Project: 0.85 pCi/m<sup>2</sup>s  
Average Radon Flux for #1-27 0.52 pCi/m<sup>2</sup>s

\* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m<sup>2</sup>s.  
Minimum temperature under 35 degrees Fahrenheit not acceptable.

# LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page 1 of 2

Client: PATHFINDER MINES CORP.

Location: LUCKY McILLINE

Inst.: \_\_\_\_\_ Eff: \_\_\_\_\_ Tech: \_\_\_\_\_

Weather Condition: Clear { Cal } Precip: NONE

Min Temp: 37°

Inst. Back: \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: \_\_\_\_\_

Standard: \_\_\_\_\_ Count: \_\_\_\_\_

| LAACC Unit # | Charcoal Can # | Location I.D. / Station | Mo/Day/Yr<br>24 hr time set | Mo/Day/Yr<br>24 hr time removed | Site Personnel Initials | Lab Sample Number | Date/Time Start | Count Min | Gross Counts | Comments |
|--------------|----------------|-------------------------|-----------------------------|---------------------------------|-------------------------|-------------------|-----------------|-----------|--------------|----------|
| 1            | 166            | 186                     | 9/23/02<br>850              | 9/24/02<br>850                  | CA                      | 0090836-001A      |                 |           |              |          |
| 2            | 167            | 186 (dup)               | 851                         | 851                             | CA                      | 002A              |                 |           |              |          |
| 3            | 188            | 188                     | 858                         | 858                             | CA                      | 003A              |                 |           |              |          |
| 4            | 169            | 191                     | 901                         | 901                             | CA                      | 004A              |                 |           |              |          |
| 5            | 170            | 193                     | 903                         | 903                             | CA                      | 005A              |                 |           |              |          |
| 6            | 171            | 195                     | 908                         | 908                             | CA                      | 006A              |                 |           |              |          |
| 7            | 172            | 201                     | 912                         | 912                             | CA                      | 007A              |                 |           |              |          |
| 8            | 173            | 203                     | 915                         | 915                             | CA                      | 008A              |                 |           |              |          |
| 9            | 174            | 203 (dup)               | 916                         | 916                             | CA                      | 009A              |                 |           |              |          |
| 10           | 175            | 208                     | 922                         | 922                             | CA                      | 010A              |                 |           |              |          |
| 11           | 176            | 211                     | 926                         | 926                             | CA                      | 011A              |                 |           |              |          |
| 12           | 177            | 222                     | 929                         | 929                             | CA                      | 012A              |                 |           |              |          |
| 13           | 178            | 224                     | 932                         | 932                             | CA                      | 013A              |                 |           |              |          |
| 14           | 179            | 229                     | 936                         | 936                             | CA                      | 014A              |                 |           |              |          |
| 15           | 180            | 233                     | 940                         | 940                             | CA                      | 015A              |                 |           |              |          |
| 16           | 181            | 235                     | 943                         | 943                             | CA                      | 016A              |                 |           |              |          |
| 17           | 182            | 236                     | 947                         | 947                             | CA                      | 017A              |                 |           |              |          |

Re'd @ Energy Labs  
 Dr. Jena J. Becken  
 about 12:10

*[Signature]*  
 June 1996

Page 2 of 2

Location: Lucy McNamee

**Inst.:** \_\_\_\_\_ **Eff:** \_\_\_\_\_ **Tech:** \_\_\_\_\_

Min Temp: 37°

**Inst. Back:** \_\_\_\_\_

Charcoal Back: \_\_\_\_\_ Lot: ..

**Standard:** \_\_\_\_\_ **Count:** \_\_\_\_\_

[illegible]

**RADON BARRIER CLAY  
MATERIAL ANALYSES  
FOR RA-226  
LABORATORY REPORTS**

**ENERGY LABORATORIES, INC.**

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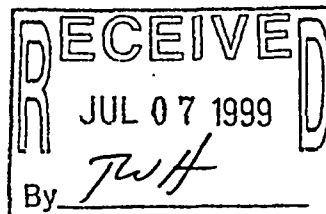
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cc JDW  
CWA**LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION**

Project:  
Sample ID:  
Laboratory ID:  
Sample Matrix:  
Sample Date/Time:  
Date Received:  
Report Date:

| Lucky McMine |          |
|--------------|----------|
| RS1          | RS2      |
| 99-30081     | 99-30082 |
| Soil         |          |
| 06-10-99     |          |
| 06-14-99     |          |
| July 2, 1999 |          |

| Radiometric        |                   | Method | Detection Limit | Units | Results |      |
|--------------------|-------------------|--------|-----------------|-------|---------|------|
| Radium-226         | <sup>226</sup> Ra | 903.0  | 0.01            | pCi/g | 1.24    | 1.70 |
| Radium Precision ± |                   |        |                 |       | 0.12    | 0.14 |



Note: Radon barrier composite samples analyzed to confirm the barrier clay did not make a significant contribution to radon flux. Samples were taken from completed barrier over mill ore pad and mill site south end.

lmh r:\Reports\Clients.99\Pathfinder\Lucky\_McMine\Soil\rc30082.xls

**COMPLETE ANALYTICAL SERVICES**



# RADIOCHEMICAL QUALITY ASSURANCE REPORT - PATHFINDER MINES CORPORATION

Laboratory ID Range:

99-30081-30082

Sample Matrix:

Soil

Sample Date / Time:

06-10-99

Date Received:

06-14-99

Report Date:

July 2, 1999

| Method | Duplicate<br>Precision<br>(Percent) | Spike<br>Recovery<br>(Percent) | LCS<br>Recovery<br>(Percent) | Method<br>Blank<br>(pCi/L) | Date<br>Analyzed | Analyst |
|--------|-------------------------------------|--------------------------------|------------------------------|----------------------------|------------------|---------|
|--------|-------------------------------------|--------------------------------|------------------------------|----------------------------|------------------|---------|

Laboratory #:

99-29880

99-29509

RA-128

RA-128

Radium-226:

903.0

96

99

106

<0.01

06-29-99

RS

Report Approved By:

lmh r:\Reports\Clients.99\Pathfinder\Lucky\_McMine\Soil\rc30082.xls

Reviewed By:

Rale





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Helena • Rapid City

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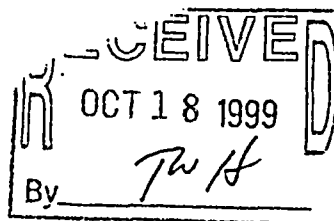
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### LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION

Project:  
Sample ID:  
Laboratory ID:  
Sample Matrix:  
Sample Date/Time:  
Date Received:  
Report Date:

| Lucky McMine                      |          |          |             |
|-----------------------------------|----------|----------|-------------|
| RS-3                              | RS-4     | RS-5     | West Barrow |
| 99-35302                          | 99-35303 | 99-35304 | 99-35305    |
| Water                             |          |          |             |
| 06-23-99                          | 07-02-99 | 07-02-99 | 06-15-99    |
| 07-15-99                          |          |          |             |
| August 5, 1999 (Revised 10-13-99) |          |          |             |

| Radiometric        |                   | Method | Detection Limit | Units | Results |      |      |      |
|--------------------|-------------------|--------|-----------------|-------|---------|------|------|------|
| Radium-226         | <sup>226</sup> Ra | 903.0  | 0.01            | pCi/g | 1.11    | 4.01 | 1.23 | 1.21 |
| Radium Precision ± |                   |        |                 |       | 0.07    | 0.12 | 0.07 | 0.07 |





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cc: CNA

## LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION

Project:  
Sample ID:  
Laboratory ID:  
Sample Matrix:  
Sample Date:  
Date Received:  
Report Date:

Lucky McMine

RS-6

32268-001

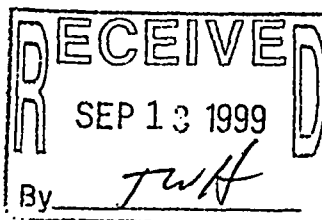
Soil

08-12-99

08-13-99

September 3, 1999

| Radiometric        |                   | Method | Reporting Limit | Units | Results |
|--------------------|-------------------|--------|-----------------|-------|---------|
| Radium-226         | <sup>226</sup> Ra | 903.0  | 0.01            | pCi/g | 0.97    |
| Radium Precision ± |                   |        |                 |       | 0.11    |





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## LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION

Project:  
Sample ID:  
Laboratory ID:  
Sample Matrix:  
Sample Date:  
Date Received:  
Report Date:

|                   |
|-------------------|
| Lucky McMine      |
| RS-7              |
| 32268-002         |
| Soil              |
| 08-12-99          |
| 08-13-99          |
| September 3, 1999 |

| Radiometric        |                   | Method | Reporting Limit | Units | Results |
|--------------------|-------------------|--------|-----------------|-------|---------|
| Radium-226         | <sup>226</sup> Ra | 903.0  | 0.01            | pCi/g | 0.96    |
| Radium Precision ± |                   |        |                 |       | 0.11    |



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## LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION

Project:  
Sample ID:  
Laboratory ID:  
Sample Matrix:  
Sample Date:  
Date Received:  
Report Date:

|                   |
|-------------------|
| Lucky McMine      |
| RS-8              |
| 32268-003         |
| Soil              |
| 08-12-99          |
| 08-13-99          |
| September 3, 1999 |

| Radiometric        |                   | Method | Reporting Limit | Units | Results |
|--------------------|-------------------|--------|-----------------|-------|---------|
| Radium-226         | <sup>226</sup> Ra | 903.0  | 0.01            | pCi/g | 1.29    |
| Radium Precision ± |                   |        |                 |       | 0.13    |



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## LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION

Project:  
Sample ID:  
Laboratory ID:  
Sample Matrix:  
Sample Date:  
Date Received:  
Report Date:

|                      |
|----------------------|
| Lucky McMine         |
| East Barrow          |
| 32268-004            |
| Soil                 |
| 06-21-99 to 07-23-99 |
| 08-13-99             |
| September 3, 1999    |

| Radiometric        |                   | Method | Reporting Limit | Units | Results |
|--------------------|-------------------|--------|-----------------|-------|---------|
| Radium-226         | <sup>226</sup> Ra | 903.0  | 0.01            | pCi/g | 0.94    |
| Radium Precision ± |                   |        |                 |       | 0.11    |



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## LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION

Project:  
Sample ID:  
Laboratory ID:  
Sample Matrix:  
Sample Date:  
Date Received:  
Report Date:

|                      |
|----------------------|
| Lucky McMine         |
| West Barrow          |
| 32268-005            |
| Soil                 |
| 07-12-99 to 08-06-99 |
| 08-13-99             |
| September 3, 1999    |

| Radiometric        |                   | Method | Reporting Limit | Units | Results |
|--------------------|-------------------|--------|-----------------|-------|---------|
| Radium-226         | <sup>226</sup> Ra | 903.0  | 0.01            | pCi/g | 0.95    |
| Radium Precision ± |                   |        |                 |       | 0.11    |



# RADIOCHEMICAL QUALITY ASSURANCE REPORT - PATHFINDER MINES CORPORATION

Laboratory ID Range:

32268-001-005

Sample Matrix:

Soil

Date Received:

08-13-99

Report Date:

September 3, 1999

| Method | Relative<br>Percent<br>Difference <sup>1</sup> | Spike<br>Recovery<br>(Percent) <sup>2</sup> | LCS<br>Recovery<br>(Percent) | Method<br>Blank<br>(pCi/g) | Date<br>Analyzed | Analyst |
|--------|--|---|------------------------------|----------------------------|------------------|---------|
|--------|--|---|------------------------------|----------------------------|------------------|---------|

Laboratory #:

32421-001

32325-001

RA-179

Radium-226:

903.0

26.5

89

94

<0.01

08-30-99

RS

- (1) These values are an assessment of analytical precision. The acceptance range is 0-20% for sample results above 10 times the reporting limit. This range is not applicable to samples with results below 10 times the reporting limit.
- (2) These values are an assessment of analytical accuracy. They are a percent recovery of the spike addition. ELI performs a matrix spike on 10 percent of all samples for each analytical method.

Report Approved By:

*O. Baida*

Reviewed By: *L. C.*

r:\Reports\Clients.99\Pathfinder\Lucky McMine\Soil\rc32268-001-005.xls

Log In No. 99-32268

Log In. No.



# ENERGY LABORATORIES, INC.

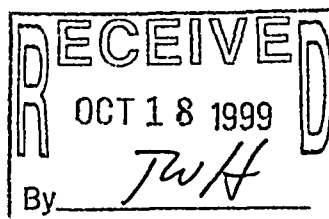
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 E-mail: energy@trib.com • FAX: (307) 234-1639  
 PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

## LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION

Project:  
 Sample ID:  
 Laboratory ID:  
 Sample Matrix:  
 Sample Date:  
 Date Received:  
 Report Date:

|                 |
|-----------------|
| Lucky McMine    |
| East Barrow     |
| 33073-001       |
| Soil            |
| 08-27-99        |
| 09-20-99        |
| October 7, 1999 |

| Radiometric        |                   | Method | Reporting Limit | Units | Results |
|--------------------|-------------------|--------|-----------------|-------|---------|
| Radium-226         | <sup>226</sup> Ra | 903.0  | 0.01            | pCi/g | 1.55    |
| Radium Precision ± |                   |        |                 |       | 0.13    |







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### LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION

Project:  
Sample ID:  
Laboratory ID:  
Sample Matrix:  
Sample Date:  
Date Received:  
Report Date:

|                 |
|-----------------|
| Lucky McMine    |
| West Barrow     |
| 33073-002       |
| Soil            |
| 09-03-99        |
| 09-20-99        |
| October 7, 1999 |

| Radiometric        |                   | Method | Reporting Limit | Units | Results |
|--------------------|-------------------|--------|-----------------|-------|---------|
| Radium-226         | <sup>226</sup> Ra | 903.0  | 0.01            | pCi/g | 1.15    |
| Radium Precision ± |                   |        |                 |       | 0.12    |



# RADIOCHEMICAL QUALITY ASSURANCE REPORT - PATHFINDER MINES CORPORATION

Laboratory ID Range:

33073-001-002

Sample Matrix:

Soil

Date Received:

09-20-99

Report Date:

October 7, 1999

|               | Method    | Relative<br>Percent<br>Difference <sup>1</sup> | Spike<br>Recovery<br>(Percent) <sup>2</sup> | LCS<br>Recovery<br>(Percent) | Method<br>Blank<br>(pCi/g) | Date<br>Analyzed | Analyst |
|---------------|-----------|--|---|------------------------------|----------------------------|------------------|---------|
| Laboratory #: | 33000-001 | 33001-004                                      |   |                              | RA-211                     |                  |         |
| Radium-226:   | 903.0     | 17.0   | 92  | 110                          | <0.01                      | 10-04-99         | RS      |

- (1) These values are an assessment of analytical precision. The acceptance range is 0-20% for sample results above 10 times the reporting limit. This range is not applicable to samples with results below 10 times the reporting limit.
- (2) These values are an assessment of analytical accuracy. They are a percent recovery of the spike addition. ELI performs a matrix spike on 10 percent of all samples for each analytical method.

Report Approved By: *OT Landa*

Reviewed By: *ELI*



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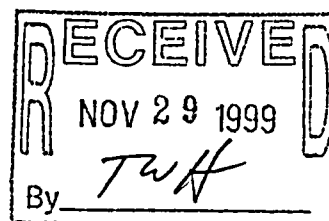
PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

### LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION

Project:  
Sample ID:  
Laboratory ID:  
Sample Matrix:  
Sample Date/Time:  
Date Received:  
Report Date:

|                   |
|-------------------|
| Lucky McMine      |
| East Barrow       |
| 34046-001         |
| Soil              |
| 09-24-99          |
| 10-28-99          |
| November 19, 1999 |

| Radiometric        |                   | Method | Reporting Limit | Units | Results |
|--------------------|-------------------|--------|-----------------|-------|---------|
| Radium-226         | <sup>226</sup> Ra | 903.0  | 0.01            | pCi/g | 0.90    |
| Radium Precision ± |                   |        |                 |       | 0.10    |





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PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

### LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION

Project:  
Sample ID:  
Laboratory ID:  
Sample Matrix:  
Sample Date/Time:  
Date Received:  
Report Date:

|                   |
|-------------------|
| Lucky McMine      |
| West Barrow       |
| 34046-002         |
| Soil              |
| 10-01-99          |
| 10-28-99          |
| November 19, 1999 |

| Radiometric        |                   | Method | Reporting Limit | Units | Results |
|--------------------|-------------------|--------|-----------------|-------|---------|
| Radium-226         | <sup>226</sup> Ra | 903.0  | 0.01            | pCi/g | 1.20    |
| Radium Precision ± |                   |        |                 |       | 0.11    |



# RADIOCHEMICAL QUALITY ASSURANCE REPORT - PATHFINDER MINES

Laboratory ID Range:

Sample Matrix:

Sample Date / Time:

Date Received:

Report Date:

34046-001-002

Soil

09-24-99

10-28-99

November 19, 1999

Laboratory #:

Radium-226:

| Method | Relative<br>Percent<br>Difference <sup>1</sup> | Spike<br>Recovery<br>(Percent) <sup>2</sup> | LCS<br>Recovery<br>(Percent) | Method<br>Blank<br>(pCi/g) | Date<br>Analyzed | Analyst |
|--------|--|---|------------------------------|----------------------------|------------------|---------|
|        | 33972-001                                      | 33972-002                                   |                              | RA-253                     |                  |         |
| 903.0  | 15.1   | 101   | 109                          | <0.01                      | 11-15-99         | RS      |

Digestion:

|        | Volume | Units | Grams |  |          |     |
|--------|--------|-------|-------|--|----------|-----|
| SW3050 | 0.95   | Liter | 20    |  | 11-08-99 | RCB |

(1) These values are an assessment of analytical precision. The acceptance range is 0-20% for sample results above 10 times the reporting limit. This range is not applicable to samples with results below 10 times the reporting limit.

(2) These values are an assessment of analytical accuracy. They are a percent recovery of the spike addition. ELI performs a matrix spike on 10 percent of all samples for each analytical method.

Report Approved By:

rs r:\reports\clients.99\Pathfinder\Lucky\_McMine\Soil\Qa\rc34046-001-002.xls

Reviewed By:

TRACKING NO. PAGE NO.

34046R00003



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PHONE: (307) 235-0515 • TOLL FREE: (888) 235-0515

### LABORATORY ANALYSIS REPORT

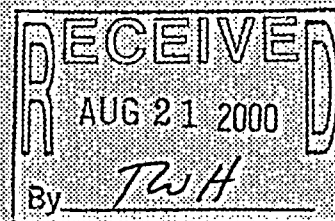
Client: PATHFINDER MINES CORPORATION - Lucky McMine

Project: None

Contact: Tom Hardgrove

Sample Matrix: Solid, soil

Report Date: August 14, 2000



| Laboratory ID | Sample Date          | Sample ID   | Radium-226,<br>pCi/g | Radium-226<br>Precision $\pm$ | Digestion |
|---------------|----------------------|-------------|----------------------|-------------------------------|-----------|
| 34492-1       | 09-27-99 to 10-22-99 | East Barrow | 0.79                 | 0.05                          | -         |
| 34492-2       | 10-03-99 to 10-22-99 | West Barrow | 0.98                 | 0.06                          | -         |
| 34492-3       | 05-01-00 to 06-02-00 | West Barrow | 1.05                 | 0.06                          | -         |
| 34492-4       | 06-12-00 to 07-14-00 | East Barrow | 1.03                 | 0.06                          | -         |
| 34492-5       | 06-05-00 to 07-14-00 | West Barrow | 1.00                 | 0.06                          | -         |

*An barrier clay - routine composite samples*

| Quality Assurance Data |          |          |
|------------------------|----------|----------|
| Method                 | 903.0    | SW 3050  |
| Reporting Limit        | 0.01     | -        |
| Duplicate <sup>1</sup> | 4.7      | -        |
| Spike <sup>2</sup>     | 97       | -        |
| Batch ID               | RA-190   | -        |
| Analyst                | rs       | dj       |
| Date Analyzed          | 08-07-00 | 07-24-00 |

#### NOTES:

- (1) These values are an assessment of analytical precision. The acceptance range is 0-20% for sample results above 10 times the reporting limit. This range is not applicable to samples with results below 10 times the reporting limit.
- (2) These values are an assessment of analytical accuracy. They are a percent recovery of the spike addition. ELI performs a matrix spike on 10 percent of all samples for each analytical method.

Report Approved By: *[Signature]*

Reviewed By:

lmh r\reports\clients2000\pathfinder\lucky\_mcmine\solid\soil\rc34492-1.xls

COMPLETE ANALYTICAL SERVICES

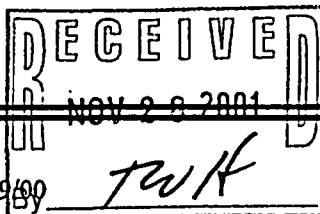
TRACKING NO. PAGE NO.

34492R00001



LABORATORY ANALYTICAL REPORT

Client: Pathfinder Mines Corp  
Project: Lucky Mc Mine



Lab Order: C01100685  
Report Date: 11/19/01

Lab ID: C01100685-001

Client Sample ID: East Barrow 7/15/00 to 9/29/00

Collection Date: 07/15/00

Date Received: 10/23/01

Matrix: SOIL

| Analyses             | Result | Units | Qual | MCL/ |     | Method | Analysis Date / By  |
|----------------------|--------|-------|------|------|-----|--------|---------------------|
|                      |        |       |      | RL   | QCL |        |                     |
| RADIONUCLIDES        |        |       |      |      |     |        |                     |
| Radium 226           | 1.0    | pCi/g |      | 0.10 |     | E903.0 | 11/12/01 11:36 / rs |
| Radium 226 precision | 0.10   | ±     |      |      |     | E903.0 | 11/12/01 11:36 / rs |

Lab ID: C01100685-002

Client Sample ID: West Barrow 7/15/00 to 9/29/00

Collection Date: 07/15/00

Date Received: 10/23/01

Matrix: SOIL

| Analyses             | Result | Units | Qual | MCL/ |     | Method | Analysis Date / By  |
|----------------------|--------|-------|------|------|-----|--------|---------------------|
|                      |        |       |      | RL   | QCL |        |                     |
| RADIONUCLIDES        |        |       |      |      |     |        |                     |
| Radium 226           | 0.80   | pCi/g |      | 0.10 |     | E903.0 | 11/12/01 12:36 / rs |
| Radium 226 precision | 0.10   | ±     |      |      |     | E903.0 | 11/12/01 12:36 / rs |

Lab ID: C01100685-003

Client Sample ID: West Barrow 5/1/01 to 6/29/01

Collection Date: 07/15/00

Date Received: 10/23/01

Matrix: SOIL

| Analyses             | Result | Units | Qual | MCL/ |     | Method | Analysis Date / By  |
|----------------------|--------|-------|------|------|-----|--------|---------------------|
|                      |        |       |      | RL   | QCL |        |                     |
| RADIONUCLIDES        |        |       |      |      |     |        |                     |
| Radium 226           | 1.0    | pCi/g |      | 0.10 |     | E903.0 | 11/12/01 13:37 / rs |
| Radium 226 precision | 0.10   | ±     |      |      |     | E903.0 | 11/12/01 13:37 / rs |

Lab ID: C01100685-004

Client Sample ID: East Barrow 10/18/01

Collection Date: 10/18/01

Date Received: 10/23/01

Matrix: SOIL

| Analyses             | Result | Units | Qual | MCL/ |     | Method | Analysis Date / By  |
|----------------------|--------|-------|------|------|-----|--------|---------------------|
|                      |        |       |      | RL   | QCL |        |                     |
| RADIONUCLIDES        |        |       |      |      |     |        |                     |
| Radium 226           | 0.90   | pCi/g |      | 0.10 |     | E903.0 | 11/12/01 14:37 / rs |
| Radium 226 precision | 0.10   | ±     |      |      |     | E903.0 | 11/12/01 14:37 / rs |

Report Definitions: ND - Not detected at the reporting limit  
MCL - Maximum contaminant level

RL - Analyte reporting level  
QCL - Quality control limit

Note: Borrow and Placed Clay Source Term for Ra-226

TRACKING NO. PAGE NO.  
10685R00002



## LABORATORY ANALYTICAL REPORT

Client: Pathfinder Mines Corp  
Project: Lucky Mc Mine

Lab Order: C01100685  
Report Date: 11/19/01

Lab ID: C01100685-005  
Client Sample ID: West Barrow 10/18/01

Collection Date: 10/18/01  
Date Received: 10/23/01  
Matrix: SOIL

| Analyses             | Result | Units | Qual | MCL/ |     | Method | Analysis Date / By  |
|----------------------|--------|-------|------|------|-----|--------|---------------------|
|                      |        |       |      | RL   | QCL |        |                     |
| RADIONUCLIDES        |        |       |      |      |     |        |                     |
| Radium 226           | 0.90   | pCi/g |      | 0.10 |     | E903.0 | 11/12/01 15:37 / rs |
| Radium 226 precision | 0.10   | ±     |      |      |     | E903.0 | 11/12/01 15:37 / rs |

Lab ID: C01100685-006  
Client Sample ID: #1 Basin 10/18/2001

Collection Date: 10/18/01  
Date Received: 10/23/01  
Matrix: SOIL

| Analyses             | Result | Units | Qual | MCL/ |     | Method | Analysis Date / By  |
|----------------------|--------|-------|------|------|-----|--------|---------------------|
|                      |        |       |      | RL   | QCL |        |                     |
| RADIONUCLIDES        |        |       |      |      |     |        |                     |
| Radium 226           | 1.0    | pCi/g |      | 0.10 |     | E903.0 | 11/12/01 16:38 / rs |
| Radium 226 precision | 0.10   | ±     |      |      |     | E903.0 | 11/12/01 16:38 / rs |

Lab ID: C01100685-007  
Client Sample ID: #2 Basin 10/18/2001

Collection Date: 10/18/01  
Date Received: 10/23/01  
Matrix: SOIL

| Analyses             | Result | Units | Qual | MCL/ |     | Method | Analysis Date / By  |
|----------------------|--------|-------|------|------|-----|--------|---------------------|
|                      |        |       |      | RL   | QCL |        |                     |
| RADIONUCLIDES        |        |       |      |      |     |        |                     |
| Radium 226           | 1.0    | pCi/g |      | 0.10 |     | E903.0 | 11/12/01 17:38 / rs |
| Radium 226 precision | 0.10   | ±     |      |      |     | E903.0 | 11/12/01 17:38 / rs |

Lab ID: C01100685-008  
Client Sample ID: #2A Basin 10/18/2001

Collection Date: 10/18/01  
Date Received: 10/23/01  
Matrix: SOIL

| Analyses             | Result | Units | Qual | MCL/ |     | Method | Analysis Date / By  |
|----------------------|--------|-------|------|------|-----|--------|---------------------|
|                      |        |       |      | RL   | QCL |        |                     |
| RADIONUCLIDES        |        |       |      |      |     |        |                     |
| Radium 226           | 0.90   | pCi/g |      | 0.10 |     | E903.0 | 11/12/01 18:38 / rs |
| Radium 226 precision | 0.10   | ±     |      |      |     | E903.0 | 11/12/01 18:38 / rs |

Report Definitions: ND - Not detected at the reporting limit  
MCL - Maximum contaminant level

RL - Analyte reporting level  
QCL - Quality control limit

TRACKING NO. PAGE NO.  
10685R00003





## LABORATORY ANALYTICAL REPORT

**Client:** Pathfinder Mines Corp  
**Project:** Lucky Mc Mine

**Lab Order:** C01100685  
**Report Date:** 11/19/01

**Lab ID:** C01100685-009  
**Client Sample ID:** #3 Basin 10/18/2001

**Collection Date:** 10/18/01  
**Date Received:** 10/23/01  
**Matrix:** SOIL

| Analyses             | Result | Units | Qual | MCL/ |     | Method | Analysis Date / By  |
|----------------------|--------|-------|------|------|-----|--------|---------------------|
|                      |        |       |      | RL   | QCL |        |                     |
| <b>RADIONUCLIDES</b> |        |       |      |      |     |        |                     |
| Radium 226           | 1.0    | pCi/g |      | 0.10 |     | E903.0 | 11/12/01 19:39 / rs |
| Radium 226 precision | 0.10   | ±     |      |      |     | E903.0 | 11/12/01 19:39 / rs |

**Report  
Definitions:**

ND - Not detected at the reporting limit  
MCL - Maximum contaminant level

RL - Analyte reporting level  
QCL - Quality control limit

TRACKING NO. PAGE NO.  
10685R00004

**LIMESTONE ANALYSIS  
FOR RA-226  
LABORATORY REPORT**

**ENERC. LABORATORIES, INC.**

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**LABORATORY ANALYSIS REPORT - PATHFINDER MINES CORPORATION - LUCKY MCMINE**

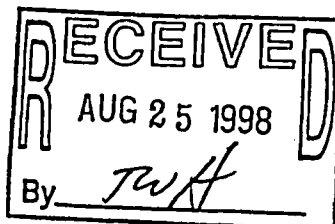
Sample ID:  
Laboratory ID:  
Sample Matrix:  
Sample Date/Time:  
Report Date:

**LIMESTONE**

|                 |
|-----------------|
| Filter Bed      |
| 98-45488        |
| Soil            |
| 07-24-98        |
| August 17, 1998 |

| Radiometrics |                   | Method    | Units | Reporting Limit | Results |
|--------------|-------------------|-----------|-------|-----------------|---------|
| Radium 226   | <sup>226</sup> Ra | EPA 903.0 | pCi/g | 0.01            | 0.90    |
| Precision ±  |                   |           |       |                 | 0.10    |

| Quality Assurance               |  |          |
|---------------------------------|--|----------|
| Matrix Duplicate <sup>1</sup> : |  | 103      |
| Matrix Spike <sup>2</sup> :     |  | 98       |
| Analyst:                        |  | RS       |
| Date Analyzed:                  |  | 08/12/98 |



# APPENDIX

F

| Point # | Point ID          | Comment          | Rock Mulch d50 (Inches) |       |       |
|---------|-------------------|------------------|-------------------------|-------|-------|
|         |                   |                  | 1.000                   | 1.630 | 2.170 |
| 1       | N 784200 E 804800 |                  | 0.200                   |       |       |
| 2       | N 784400 E 804800 |                  | 0.360                   |       |       |
| 3       | N 784400 E 805000 |                  | 0.260                   |       |       |
| 4       | N 784400 E 805200 |                  | 0.300                   |       |       |
| 5       | N 784400 E 805400 |                  | 0.350                   |       |       |
| 6       | N 784400 E 805600 |                  |                         | 0.370 |       |
| 7       | N 784400 E 805800 |                  |                         | 0.360 |       |
| 8       | N 784600 E 805000 |                  | 0.290                   |       |       |
| 9       | N 784600 E 805200 |                  | 0.500                   |       |       |
| 10      | N 784600 E 805400 |                  |                         |       | 0.340 |
| 11      | N 784600 E 805600 | Edge of 1ft rock |                         |       |       |
| 12      | N 784800 E 805000 |                  | 0.400                   |       |       |
| 13      | N 784800 E 805200 |                  | 0.470                   |       |       |
| 14      | N 784800 E 805400 |                  | 0.200                   |       |       |
| 15      | N 784800 E 805600 |                  |                         | 0.200 |       |
| 16      | N 784800 E 805800 |                  |                         | 1.400 |       |
| 17      | N 785000 E 805000 |                  | 0.370                   |       |       |
| 18      | N 785000 E 805200 |                  | 0.250                   |       |       |
| 19      | N 785000 E 805400 |                  |                         | 0.108 |       |
| 20      | N 785000 E 805600 |                  |                         | 0.420 |       |
| 21      | N 785200 E 805000 |                  |                         | 0.310 |       |
| 22      | N 785200 E 805200 |                  |                         | 0.650 |       |
| 23      | N 785200 E 805400 |                  |                         | 0.550 |       |
| 24      | N 785200 E 805600 |                  |                         | 0.550 |       |
| 25      | N 785200 E 805800 |                  |                         | 0.250 |       |
| 26      | N 785400 E 805000 | Road             |                         |       |       |
| 27      | N 785400 E 805200 |                  |                         | 0.350 |       |
| 28      | N 785400 E 805400 |                  |                         | 0.280 |       |
| 29      | N 785400 E 805600 |                  |                         | 0.300 |       |
| 30      | N 785400 E 805800 |                  |                         | 2.083 |       |
| 31      | N 785400 E 806000 |                  |                         | 0.720 |       |
| 32      | N 785600 E 805200 |                  |                         | 0.470 |       |
| 33      | N 785600 E 805400 | Road             |                         |       |       |
| 34      | N 785600 E 805600 |                  |                         | 0.400 |       |
| 35      | N 785600 E 805800 |                  |                         | 0.550 |       |
| 36      | N 785600 E 806000 |                  |                         | 0.340 |       |
| 37      | N 785600 E 806200 |                  |                         | 0.370 |       |
| 38      | N 785600 E 806400 |                  |                         | 1.150 |       |
| 39      | N 785800 E 805200 |                  |                         | 0.460 |       |
| 40      | N 785800 E 805400 | Edge             |                         |       |       |
| 41      | N 785800 E 805600 | Edge             |                         |       |       |
| 42      | N 785800 E 805800 | Edge             |                         |       |       |
| 43      | N 785800 E 806000 |                  |                         | 0.370 |       |
| 44      | N 785800 E 806200 |                  |                         | 0.380 |       |
| 45      | N 785800 E 806400 |                  |                         | 0.230 |       |
| 46      | N 785800 E 806600 |                  |                         | 0.450 |       |
| 47      | N 785800 E 806800 |                  | 0.450                   |       |       |
| 48      | N 786000 E 805200 |                  |                         | 0.400 |       |
| 49      | N 786000 E 805400 | Edge             |                         |       |       |
| 50      | N 786000 E 805600 |                  |                         | 0.260 |       |
| 51      | N 786000 E 805800 |                  |                         | 0.225 |       |
| 52      | N 786000 E 806000 |                  |                         | 0.300 |       |
| 53      | N 786000 E 806200 |                  |                         | 0.370 |       |

| Point # | Point ID          | Comment           | Rock Mulch d50 (Inches) |       |       |
|---------|-------------------|-------------------|-------------------------|-------|-------|
|         |                   |                   | 1.000                   | 1.630 | 2.170 |
| 54      | N 786000 E 806400 |                   |                         | 0.570 |       |
| 55      | N 786000 E 806600 | Heap Leach Sump   |                         |       |       |
| 56      | N 786000 E 807000 |                   | 0.380                   |       |       |
| 57      | N 786200 E 805400 |                   |                         | 0.300 |       |
| 58      | N 786200 E 805600 |                   |                         | 0.420 |       |
| 59      | N 786200 E 805800 |                   |                         | 0.230 |       |
| 60      | N 786200 E 806000 |                   |                         | 0.480 |       |
| 61      | N 786200 E 806200 |                   |                         | 0.270 |       |
| 62      | N 786200 E 806400 |                   |                         | 0.420 |       |
| 63      | N 786200 E 806600 | Heap Leach Sump   |                         |       |       |
| 64      | N 786200 E 806800 |                   |                         | 0.310 |       |
| 65      | N 786200 E 807000 |                   | 0.500                   |       |       |
| 66      | N 786200 E 807200 |                   | 0.500                   |       |       |
| 67      | N 786400 E 804800 |                   | 0.360                   |       |       |
| 68      | N 786400 E 805000 | Marked as fill    |                         |       |       |
| 69      | N 786400 E 805200 |                   |                         | 0.300 |       |
| 70      | N 786400 E 805400 |                   |                         | 0.180 |       |
| 71      | N 786400 E 805600 |                   |                         | 0.400 |       |
| 72      | N 786400 E 805800 |                   |                         | 0.380 |       |
| 73      | N 786400 E 806000 |                   |                         | 0.460 |       |
| 74      | N 786400 E 806200 |                   |                         | 0.300 |       |
| 75      | N 786400 E 806400 |                   |                         | 0.280 |       |
| 76      | N 786400 E 806600 |                   |                         | 0.330 |       |
| 77      | N 786400 E 807000 |                   | 0.270                   |       |       |
| 78      | N 786400 E 807200 |                   | 0.500                   |       |       |
| 79      | N 786600 E 804400 | Off Rock          |                         |       |       |
| 80      | N 786600 E 804600 |                   |                         |       | 0.750 |
| 81      | N 786600 E 804800 | Off Rock          |                         |       |       |
| 82      | N 786600 E 805000 |                   |                         |       | 0.450 |
| 83      | N 786600 E 805200 |                   |                         | 0.470 |       |
| 84      | N 786600 E 805400 |                   |                         | 0.600 |       |
| 85      | N 786600 E 805600 |                   |                         | 0.430 |       |
| 86      | N 786600 E 805800 |                   |                         | 0.470 |       |
| 87      | N 786600 E 806000 |                   |                         | 0.370 |       |
| 88      | N 786600 E 806200 |                   |                         | 0.330 |       |
| 89      | N 786600 E 806400 |                   |                         | 0.330 |       |
| 90      | N 786600 E 806600 |                   |                         | 0.440 |       |
| 91      | N 786600 E 806800 |                   |                         | 0.480 |       |
| 92      | N 786600 E 807200 |                   | 0.270                   |       |       |
| 93      | N 786800 E 804200 | Off Rock          |                         |       |       |
| 94      | N 786800 E 804400 |                   |                         |       | 0.430 |
| 95      | N 786800 E 804600 | Rock @ Top of Hub |                         |       | 0.308 |
| 96      | N 786800 E 804800 |                   |                         |       | 0.450 |
| 97      | N 786800 E 805000 |                   | 0.330                   |       |       |
| 98      | N 786800 E 805200 |                   | 0.270                   |       |       |
| 99      | N 786800 E 805400 |                   | 0.250                   |       |       |
| 100     | N 786800 E 805600 |                   |                         | 0.500 |       |
| 101     | N 786800 E 805800 |                   |                         | 0.330 |       |
| 102     | N 786800 E 806000 |                   |                         | 0.410 |       |
| 103     | N 786800 E 806200 |                   |                         | 0.440 |       |
| 104     | N 786800 E 806400 |                   |                         | 0.450 |       |
| 105     | N 786800 E 806600 |                   |                         | 0.390 |       |
| 106     | N 786800 E 807000 |                   |                         | 0.217 |       |

| Point # | Point ID          | Comment           | Rock Mulch d50 (Inches) |       |       |
|---------|-------------------|-------------------|-------------------------|-------|-------|
|         |                   |                   | 1.000                   | 1.630 | 2.170 |
| 107     | N 787000 E 804000 | Swamp             |                         |       |       |
| 108     | N 787000 E 804200 |                   |                         |       | 0.490 |
| 109     | N 787000 E 804400 |                   |                         |       | 0.500 |
| 110     | N 787000 E 804600 |                   |                         |       | 0.420 |
| 111     | N 787000 E 804800 | No Rock           |                         |       |       |
| 112     | N 787000 E 805000 |                   | 0.270                   |       |       |
| 113     | N 787000 E 805200 |                   | 0.360                   |       |       |
| 114     | N 787000 E 805400 |                   |                         | 0.360 |       |
| 115     | N 787000 E 805600 |                   |                         | 0.310 |       |
| 116     | N 787000 E 805800 |                   | 0.150                   |       |       |
| 117     | N 787000 E 806000 |                   | 0.380                   |       |       |
| 118     | N 787000 E 806200 |                   |                         | 0.380 |       |
| 119     | N 787000 E 806400 |                   |                         | 0.350 |       |
| 120     | N 787000 E 806600 |                   |                         |       | 0.450 |
| 121     | N 787000 E 806800 |                   | 0.320                   |       |       |
| 122     | N 787000 E 807000 |                   |                         | 0.240 |       |
| 123     | N 787200 E 804000 | No Rock           |                         |       |       |
| 124     | N 787200 E 804200 |                   |                         |       | 0.590 |
| 125     | N 787200 E 804400 |                   |                         |       | 0.260 |
| 126     | N 787200 E 804600 | No Rock           |                         |       |       |
| 127     | N 787200 E 804800 |                   |                         | 0.400 |       |
| 128     | N 787200 E 805000 |                   | 0.320                   |       |       |
| 129     | N 787200 E 805200 |                   | 0.300                   |       |       |
| 130     | N 787200 E 805400 | Thin Area         | 0.100                   |       |       |
| 131     | N 787200 E 805600 |                   |                         | 0.450 |       |
| 132     | N 787200 E 805800 |                   | 0.500                   |       |       |
| 133     | N 787200 E 806000 |                   | 0.350                   |       |       |
| 134     | N 787200 E 806200 |                   |                         |       | 0.450 |
| 135     | N 787200 E 806400 |                   | 0.280                   |       |       |
| 136     | N 787200 E 806600 |                   | 0.340                   |       |       |
| 137     | N 787200 E 806800 |                   | 0.390                   |       |       |
| 138     | N 787200 E 807000 |                   |                         | 0.300 |       |
| 139     | N 787400 E 804000 |                   |                         |       | 0.242 |
| 140     | N 787400 E 804200 |                   |                         |       | 0.260 |
| 141     | N 787400 E 804400 | No Rock           |                         |       |       |
| 142     | N 787400 E 804600 |                   |                         | 0.200 |       |
| 143     | N 787400 E 804800 |                   |                         | 0.500 |       |
| 144     | N 787400 E 805000 |                   | 0.250                   |       |       |
| 145     | N 787400 E 805200 |                   | 0.200                   |       |       |
| 146     | N 787400 E 805400 |                   | 0.170                   |       |       |
| 147     | N 787400 E 805600 | FB no Rock        | 0.500                   |       |       |
| 148     | N 787400 E 805800 |                   | 0.158                   |       |       |
| 149     | N 787400 E 806000 |                   | 0.330                   |       |       |
| 150     | N 787400 E 806200 |                   | 0.210                   |       |       |
| 151     | N 787400 E 806400 | Offset            | 0.192                   |       |       |
| 152     | N 787400 E 806600 |                   | 0.183                   |       |       |
| 153     | N 787400 E 806800 |                   | 0.210                   |       |       |
| 154     | N 787400 E 807000 |                   |                         | 0.540 |       |
| 155     | N 787600 E 803800 | Hub @ top of Rock |                         |       | 0.250 |
| 156     | N 787600 E 804000 |                   |                         |       | 0.420 |
| 157     | N 787600 E 804200 |                   |                         |       | 0.330 |
| 158     | N 787600 E 804400 | Thin Area         | 0.100                   |       |       |
| 159     | N 787600 E 804600 |                   | 0.270                   |       |       |

| Point # | Point ID          | Comment   | Rock Mulch d50 (Inches) |       |       |
|---------|-------------------|-----------|-------------------------|-------|-------|
|         |                   |           | 1.000                   | 1.630 | 2.170 |
| 160     | N 787600 E 804800 |           |                         | 0.450 |       |
| 161     | N 787600 E 805000 |           | 0.320                   |       |       |
| 162     | N 787600 E 805200 |           | 0.210                   |       |       |
| 163     | N 787600 E 805400 | Rock Pile |                         |       |       |
| 164     | N 787600 E 805600 |           | 0.300                   |       |       |
| 165     | N 787600 E 805800 |           | 0.330                   |       |       |
| 166     | N 787600 E 806000 |           | 0.217                   |       |       |
| 167     | N 787600 E 806600 |           | 0.250                   |       |       |
| 168     | N 787600 E 806800 |           | 0.210                   |       |       |
| 169     | N 787600 E 807000 |           | 0.290                   |       |       |
| 170     | N 787600 E 807200 |           |                         | 0.550 |       |
| 171     | N 787800 E 803200 | Thin Area |                         |       | 0.225 |
| 172     | N 787800 E 803800 |           |                         |       | 0.400 |
| 173     | N 787800 E 804000 |           |                         |       | 0.360 |
| 174     | N 787800 E 804200 |           |                         |       | 0.400 |
| 175     | N 787800 E 804400 |           | 0.330                   |       |       |
| 176     | N 787800 E 804600 |           | 0.650                   |       |       |
| 177     | N 787800 E 804800 |           | 0.290                   |       |       |
| 178     | N 787800 E 805000 |           | 0.430                   |       |       |
| 179     | N 787800 E 805200 |           | 0.420                   |       |       |
| 180     | N 787800 E 805400 | Road      |                         |       |       |
| 181     | N 787800 E 805600 |           | 0.280                   |       |       |
| 182     | N 787800 E 805800 |           | 0.290                   |       |       |
| 183     | N 787800 E 806000 |           | 0.300                   |       |       |
| 184     | N 787800 E 806200 | Topsoil   |                         |       |       |
| 185     | N 787800 E 806800 |           | 0.340                   |       |       |
| 186     | N 787800 E 807000 |           | 0.400                   |       |       |
| 187     | N 787800 E 807200 |           |                         | 0.550 |       |
| 188     | N 788000 E 803200 | Topsoil   |                         |       |       |
| 189     | N 788000 E 803800 |           |                         | 0.290 |       |
| 190     | N 788000 E 804000 |           |                         | 0.350 |       |
| 191     | N 788000 E 804200 |           |                         |       | 0.267 |
| 192     | N 788000 E 804400 |           | 0.480                   |       |       |
| 193     | N 788000 E 804600 |           | 0.400                   |       |       |
| 194     | N 788000 E 804800 |           | 0.540                   |       |       |
| 195     | N 788000 E 805000 |           |                         | 0.250 |       |
| 196     | N 788000 E 805200 |           | 0.290                   |       |       |
| 197     | N 788000 E 805400 | Road      |                         |       |       |
| 198     | N 788000 E 805600 |           | 0.410                   |       |       |
| 199     | N 788000 E 805800 |           | 0.280                   |       |       |
| 200     | N 788000 E 806000 |           | 0.280                   |       |       |
| 201     | N 788000 E 806200 |           |                         |       | 0.380 |
| 202     | N 788000 E 806600 |           |                         |       | 0.300 |
| 203     | N 788200 E 803200 |           |                         | 0.180 |       |
| 204     | N 788200 E 803400 |           |                         | 0.570 |       |
| 205     | N 788200 E 803600 | Topsoil   |                         |       |       |
| 206     | N 788200 E 803800 |           |                         | 0.350 |       |
| 207     | N 788200 E 804000 |           |                         | 0.450 |       |
| 208     | N 788200 E 804200 |           |                         | 0.330 |       |
| 209     | N 788200 E 804400 |           |                         |       | 0.550 |
| 210     | N 788200 E 804800 |           |                         | 0.490 |       |
| 211     | N 788200 E 805000 |           |                         | 0.250 |       |
| 212     | N 788200 E 805200 |           |                         | 0.300 |       |



| Point # | Point ID          | Comment      | Rock Mulch d50 (Inches) |       |       |
|---------|-------------------|--------------|-------------------------|-------|-------|
|         |                   |              | 1.000                   | 1.630 | 2.170 |
| 213     | N 788200 E 805400 | Road         |                         |       |       |
| 214     | N 788200 E 805600 |              | 0.320                   |       |       |
| 215     | N 788200 E 805800 |              | 0.310                   |       |       |
| 216     | N 788200 E 806000 |              | 0.290                   |       |       |
| 217     | N 788400 E 803800 |              |                         |       | 0.480 |
| 218     | N 788400 E 804000 |              |                         | 0.300 |       |
| 219     | N 788400 E 804200 |              |                         | 0.310 |       |
| 220     | N 788400 E 804400 |              |                         |       | 0.520 |
| 221     | N 788400 E 804600 |              | 0.340                   |       |       |
| 222     | N 788400 E 804800 |              |                         | 0.350 |       |
| 223     | N 788400 E 805000 |              |                         | 0.350 |       |
| 224     | N 788400 E 805200 |              |                         | 0.460 |       |
| 225     | N 788400 E 805400 |              |                         | 0.250 |       |
| 226     | N 788400 E 805600 |              | 0.330                   |       |       |
| 227     | N 788400 E 805800 |              | 0.260                   |       |       |
| 228     | N 788400 E 806000 |              | 0.550                   |       |       |
| 229     | N 788400 E 806200 |              | 0.200                   |       |       |
| 230     | N 788400 E 806400 |              | 0.280                   |       |       |
| 231     | N 788400 E 806600 |              | 0.280                   |       |       |
| 232     | N 788400 E 806800 |              | 0.480                   |       |       |
| 233     | N 788600 E 803000 | Lots of dirt |                         |       | 0.350 |
| 234     | N 788600 E 803800 |              |                         | 0.260 |       |
| 235     | N 788600 E 804000 |              |                         | 0.220 |       |
| 236     | N 788600 E 804200 |              |                         | 0.250 |       |
| 237     | N 788600 E 804400 |              |                         | 0.280 |       |
| 238     | N 788600 E 804600 |              |                         |       | 0.290 |
| 239     | N 788600 E 805400 |              |                         | 0.220 |       |
| 240     | N 788600 E 805600 |              |                         | 0.330 |       |
| 241     | N 788600 E 805800 |              | 0.310                   |       |       |
| 242     | N 788600 E 806000 |              | 0.220                   |       |       |
| 243     | N 788600 E 806200 |              | 0.270                   |       |       |
| 244     | N 788600 E 806400 |              | 0.310                   |       |       |
| 245     | N 788600 E 806600 |              | 0.270                   |       |       |
| 246     | N 788800 E 803000 | No Rock      |                         |       |       |
| 247     | N 788800 E 803200 | .5 RR        |                         |       |       |
| 248     | N 788800 E 803400 |              | 0.310                   |       |       |
| 249     | N 788800 E 803800 | Topsoil      |                         |       |       |
| 250     | N 788800 E 804000 | Thin Area    |                         | 0.200 |       |
| 251     | N 788800 E 804200 |              |                         | 0.350 |       |
| 252     | N 788800 E 804400 |              |                         | 0.330 |       |
| 253     | N 788800 E 804600 |              |                         | 0.460 |       |
| 254     | N 788800 E 804800 | Thin Area    |                         | 0.192 |       |
| 255     | N 788800 E 805600 |              |                         |       | 0.350 |
| 256     | N 788800 E 805800 |              |                         | 0.400 |       |
| 257     | N 788800 E 806000 |              |                         | 0.330 |       |
| 258     | N 788800 E 806200 |              | 0.300                   |       |       |
| 259     | N 788800 E 806400 |              | 0.220                   |       |       |
| 260     | N 789000 E 803000 |              |                         |       | 0.650 |
| 261     | N 789000 E 803200 | Topsoil      |                         |       |       |
| 262     | N 789000 E 804200 | Topsoil      |                         |       |       |
| 263     | N 789000 E 804400 |              | 0.250                   |       |       |
| 264     | N 789000 E 804600 |              | 0.310                   |       |       |
| 265     | N 789000 E 805000 |              |                         | 0.460 |       |

| Point # | Point ID          | Comment        | Rock Mulch d50 (Inches) |       |       |
|---------|-------------------|----------------|-------------------------|-------|-------|
|         |                   |                | 1.000                   | 1.630 | 2.170 |
| 266     | N 789000 E 806200 | Submerged      |                         |       |       |
| 267     | N 789200 E 803000 | Windblown Fill |                         |       | 0.342 |
| 268     | N 789200 E 803200 |                |                         |       | 0.300 |
| 269     | N 789200 E 804200 |                |                         | 0.200 |       |
| 270     | N 789200 E 804400 | Topsoil        |                         |       |       |
| 271     | N 789200 E 804600 | Topsoil        |                         |       |       |
| 272     | N 789200 E 804800 |                | 0.370                   |       |       |
| 273     | N 789200 E 805000 |                |                         | 0.200 |       |
| 274     | N 789200 E 805200 |                |                         | 0.330 |       |
| 275     | N 789200 E 806000 |                |                         | 0.300 |       |
| 276     | N 789200 E 806200 | Off Rock       |                         |       |       |
| 277     | N 789400 E 803200 |                |                         |       | 0.400 |
| 278     | N 789400 E 803400 | Lots of dirt   |                         |       | 0.350 |
| 279     | N 789400 E 804800 | Topsoil        |                         |       |       |
| 280     | N 789400 E 805000 |                |                         | 0.340 |       |
| 281     | N 789400 E 805200 |                |                         | 0.320 |       |
| 282     | N 789400 E 805400 |                |                         | 0.350 |       |
| 283     | N 789400 E 805600 |                |                         | 0.330 |       |
| 284     | N 789400 E 805800 |                |                         | 0.370 |       |
| 285     | N 789400 E 806000 | Off Rock       |                         |       |       |
| 286     | N 789600 E 803200 |                |                         |       | 0.310 |
| 287     | N 789600 E 803400 |                |                         |       | 0.330 |
| 288     | N 789600 E 803600 |                |                         |       | 0.380 |
| 289     | N 789600 E 804200 | Topsoil        |                         |       |       |
| 290     | N 789600 E 804400 | Topsoil        |                         |       |       |
| 291     | N 789600 E 804600 | Topsoil        |                         |       |       |
| 292     | N 789600 E 804800 | Topsoil        |                         |       |       |
| 293     | N 789600 E 805000 |                |                         | 0.240 |       |
| 294     | N 789600 E 805200 |                |                         | 0.310 |       |
| 295     | N 789800 E 803400 |                |                         |       | 0.350 |
| 296     | N 789800 E 803600 |                |                         |       | 0.460 |
| 297     | N 789800 E 803800 |                |                         |       | 0.317 |
| 298     | N 789800 E 805000 | Topsoil        |                         |       |       |
| 299     | N 789800 E 805200 |                |                         | 0.230 |       |
| 300     | N 790000 E 803400 | Off Rock       |                         |       |       |
| 301     | N 790000 E 803600 |                |                         |       | 0.480 |
| 302     | N 790000 E 803800 |                |                         |       | 0.290 |
| 303     | N 790000 E 804000 |                |                         |       | 0.550 |
| 304     | N 790000 E 804200 |                |                         |       | 0.340 |
| 305     | N 790000 E 804400 |                |                         |       | 0.380 |
| 306     | N 790000 E 804600 |                |                         |       | 0.580 |
| 307     | N 790000 E 804800 |                |                         |       | 0.360 |
| 308     | N 790000 E 805000 |                |                         |       | 0.450 |
| 309     | N 790200 E 803400 |                |                         | 0.320 |       |
| 310     | N 790200 E 803600 | RB at low spot |                         |       | 0.275 |
| 311     | N 790200 E 803800 |                |                         |       | 0.300 |
| 312     | N 790200 E 804000 |                |                         |       | 0.370 |
| 313     | N 790200 E 804200 |                |                         |       | 0.350 |
| 314     | N 790200 E 804400 |                |                         |       | 0.550 |
| 315     | N 790200 E 804600 |                |                         |       | 0.258 |
| 316     | N 790200 E 804800 |                |                         |       | 0.400 |
| 317     | N 790400 E 803400 |                |                         | 0.250 |       |
| 318     | N 790400 E 803600 | Thin Spots     |                         | 0.225 |       |

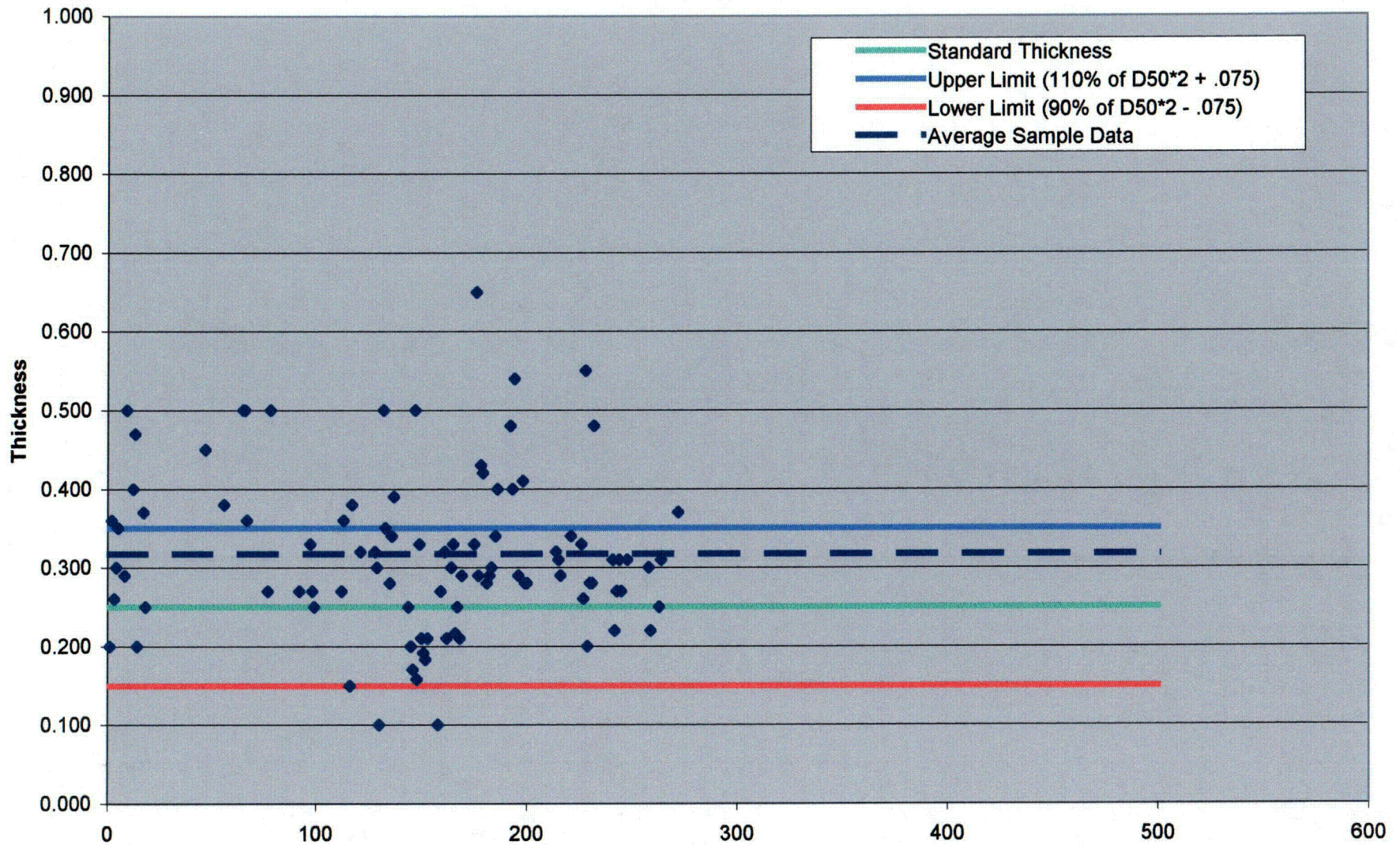
| Point # | Point ID          | Comment  | Rock Mulch d50 (Inches) |       |       |
|---------|-------------------|----------|-------------------------|-------|-------|
|         |                   |          | 1.000                   | 1.630 | 2.170 |
| 319     | N 790400 E 803800 |          |                         |       | 0.340 |
| 320     | N 790400 E 804000 |          |                         |       | 0.330 |
| 321     | N 790400 E 804200 |          |                         |       | 0.317 |
| 322     | N 790400 E 804400 |          |                         |       | 0.300 |
| 323     | N 790400 E 804600 |          |                         |       | 0.320 |
| 324     | N 790600 E 803600 |          |                         | 0.200 |       |
| 325     | N 790600 E 803800 |          |                         | 0.220 |       |
| 326     | N 790600 E 804000 |          |                         | 0.220 |       |
| 327     | N 790600 E 804200 |          |                         | 0.220 |       |
| 328     | N 790600 E 804400 |          |                         |       | 0.300 |
| 329     | N 790800 E 803600 |          |                         | 0.250 |       |
| 330     | N 790800 E 803800 |          |                         | 0.200 |       |
| 331     | N 790800 E 804000 |          |                         | 0.200 |       |
| 332     | N 790800 E 804200 |          |                         | 0.217 |       |
| 333     | N 790800 E 804400 |          |                         |       | 0.350 |
| 334     | N 790800 E 804600 |          |                         | 0.260 |       |
| 335     | N 791000 E 803600 |          |                         | 0.250 |       |
| 336     | N 791000 E 803800 |          |                         | 0.250 |       |
| 337     | N 791000 E 804000 |          |                         | 0.220 |       |
| 338     | N 791000 E 804200 |          |                         | 0.280 |       |
| 339     | N 791000 E 804400 |          |                         | 0.300 |       |
| 340     | N 791200 E 803600 |          |                         | 0.200 |       |
| 341     | N 791200 E 803800 |          |                         | 0.260 |       |
| 342     | N 791200 E 804000 |          |                         | 0.190 |       |
| 343     | N 791200 E 804200 |          |                         | 0.500 |       |
| 344     | N 791200 E 804400 |          |                         | 0.300 |       |
| 345     | N 791400 E 804000 |          |                         | 0.300 |       |
| 346     | N 791400 E 804200 |          |                         | 0.330 |       |
| 347     | N 791400 E 804400 |          |                         | 0.260 |       |
| 348     | N 791600 E 804200 |          |                         | 0.260 |       |
| 349     | N 791600 E 804400 |          |                         | 0.500 |       |
| 350     | N 791600 E 804600 | Off Rock |                         |       |       |
| 351     | N 792000 E 804800 | Off Rock |                         |       |       |
| 352     | N 792400 E 804600 | Off Rock |                         |       |       |
| 353     | N 792400 E 805000 |          |                         | 0.300 |       |
| 354     | N 792600 E 803800 |          |                         | 0.350 |       |
| 355     | N 792600 E 804000 |          |                         | 0.200 |       |
| 356     | N 792600 E 804400 |          |                         | 0.200 |       |
| 357     | N 792600 E 804600 | Channel  |                         |       |       |
| 358     | N 792600 E 805000 |          |                         | 0.225 |       |
| 359     | N 792600 E 805200 |          |                         | 0.550 |       |
| 360     | N 792800 E 803800 |          |                         | 0.350 |       |
| 361     | N 792800 E 804000 |          |                         | 0.320 |       |
| 362     | N 792800 E 804400 |          |                         | 0.270 |       |
| 363     | N 792800 E 804600 |          |                         | 0.200 |       |
| 364     | N 792800 E 805000 |          |                         | 0.250 |       |
| 365     | N 793000 E 804400 |          |                         | 0.250 |       |
| 366     | N 793000 E 804600 |          |                         | 0.300 |       |
| 367     | N 793000 E 804800 |          |                         | 0.360 |       |
| 368     | N 793200 E 804000 |          |                         | 0.400 |       |
| 369     | N 793200 E 804400 |          |                         | 0.240 |       |
| 370     | N 793400 E 804000 |          |                         | 0.350 |       |
| 371     | N 793400 E 804200 |          |                         | 0.200 |       |

| Point # | Point ID          | Comment           | Rock Mulch d50 (Inches) |       |       |
|---------|-------------------|-------------------|-------------------------|-------|-------|
|         |                   |                   | 1.000                   | 1.630 | 2.170 |
| 372     | N 793400 E 804400 |                   |                         | 0.250 |       |
| 373     | N 793400 E 804600 |                   |                         | 0.300 |       |
| 374     | N 793400 E 804800 |                   |                         | 0.250 |       |
| 375     | N 793600 E 803200 | Off Rock          |                         |       |       |
| 376     | N 793600 E 803400 | Off Rock          |                         |       |       |
| 377     | N 793600 E 804000 |                   |                         | 0.250 |       |
| 378     | N 793600 E 804200 |                   |                         | 0.450 |       |
| 379     | N 793600 E 804400 |                   |                         | 0.600 |       |
| 380     | N 793600 E 804600 |                   |                         | 0.600 |       |
| 381     | N 793600 E 804800 |                   |                         | 0.260 |       |
| 382     | N 793800 E 803200 | Off Rock          |                         |       |       |
| 383     | N 793800 E 803400 | Offset            |                         | 0.208 |       |
| 384     | N 793800 E 803600 |                   |                         | 0.180 |       |
| 385     | N 793800 E 804000 |                   |                         | 0.200 |       |
| 386     | N 793800 E 804200 | Hub BELOW Rock    |                         | 0.225 |       |
| 387     | N 793800 E 804400 |                   |                         | 0.208 |       |
| 388     | N 793800 E 804600 |                   |                         | 0.500 |       |
| 389     | N 793800 E 804800 |                   |                         | 0.240 |       |
| 390     | N 794000 E 803200 | Off Rock          |                         |       |       |
| 391     | N 794000 E 803400 |                   |                         | 0.250 |       |
| 392     | N 794000 E 803600 | Rock @ top of Hub |                         | 0.167 |       |
| 393     | N 794000 E 803800 |                   |                         | 0.200 |       |
| 394     | N 794000 E 804000 |                   |                         | 0.250 |       |
| 395     | N 794000 E 804200 |                   |                         | 0.430 |       |
| 396     | N 794000 E 804600 |                   |                         | 0.270 |       |
| 397     | N 794000 E 804800 |                   |                         | 0.230 |       |
| 398     | N 794200 E 803000 |                   |                         | 0.250 |       |
| 399     | N 794200 E 803200 |                   |                         | 0.290 |       |
| 400     | N 794200 E 803400 |                   |                         | 0.300 |       |
| 401     | N 794200 E 803600 | RB Thin Area      |                         | 0.225 |       |
| 402     | N 794200 E 803800 | Rock @ top of Hub |                         | 0.200 |       |
| 403     | N 794200 E 804000 | Rock @ top of Hub |                         | 0.217 |       |
| 404     | N 794200 E 804200 |                   |                         |       | 0.350 |
| 405     | N 794200 E 804400 |                   |                         | 0.350 |       |
| 406     | N 794200 E 804600 |                   |                         | 0.250 |       |
| 407     | N 794200 E 804800 |                   |                         | 0.220 |       |
| 408     | N 794400 E 803400 |                   |                         | 0.280 |       |
| 409     | N 794400 E 803600 |                   |                         | 0.340 |       |
| 410     | N 794400 E 803800 | Rock @ top of Hub |                         | 0.158 |       |
| 411     | N 794400 E 804000 |                   |                         | 0.200 |       |
| 412     | N 794400 E 804200 |                   |                         |       | 0.350 |
| 413     | N 794400 E 804400 |                   |                         | 0.250 |       |
| 414     | N 794400 E 804600 |                   |                         | 0.270 |       |
| 415     | N 794400 E 804800 |                   |                         | 0.250 |       |
| 416     | N 794600 E 803600 | Off Rock          |                         |       |       |
| 417     | N 794600 E 803800 |                   |                         |       | 0.300 |
| 418     | N 794600 E 804000 |                   |                         |       | 0.400 |
| 419     | N 794600 E 804200 |                   |                         | 0.350 |       |
| 420     | N 794600 E 804400 |                   |                         | 0.250 |       |
| 421     | N 794600 E 804600 |                   |                         | 0.200 |       |
| 422     | N 794800 E 804200 |                   |                         | 0.170 |       |
| 423     | N 794800 E 804400 |                   |                         | 0.200 |       |
| 424     | N 795000 E 804200 |                   |                         | 0.260 |       |

| Point # | Point ID          | Comment                            | Rock Mulch d50 (Inches) |       |       |
|---------|-------------------|------------------------------------|-------------------------|-------|-------|
|         |                   |                                    | 1.000                   | 1.630 | 2.170 |
| 425     | N 795000 E 804600 | Off Rock                           |                         |       |       |
| 426     | N 795200 E 804400 |                                    |                         | 0.190 |       |
|         |                   |                                    |                         |       |       |
|         |                   | Count                              | 95                      | 211   | 68    |
|         |                   | Max                                | 0.650                   | 2.083 | 0.750 |
|         |                   | Min                                | 0.100                   | 0.108 | 0.225 |
|         |                   | Average Sample Data                | 0.318                   | 0.340 | 0.383 |
|         |                   |                                    |                         |       |       |
|         |                   | Standard Thickness                 | 0.250                   | 0.272 | 0.362 |
|         |                   | Average % of Standard              | 127%                    | 125%  | 106%  |
|         |                   |                                    |                         |       |       |
|         |                   | Upper Limit (110% of D50*2 + .075) | 0.350                   | 0.374 | 0.473 |
|         |                   | Count Above Limit                  | 29                      | 57    | 12    |
|         |                   | % Above Limit                      | 30.5%                   | 27.0% | 17.6% |
|         |                   |                                    |                         |       |       |
|         |                   |                                    |                         |       |       |
|         |                   | Lower Limit (90% of D50*2 - .075)  | 0.150                   | 0.170 | 0.251 |
|         |                   | Count Below Limit                  | 2                       | 3     | 3     |
|         |                   | % Below Limit                      | 2.1%                    | 1.4%  | 4.4%  |

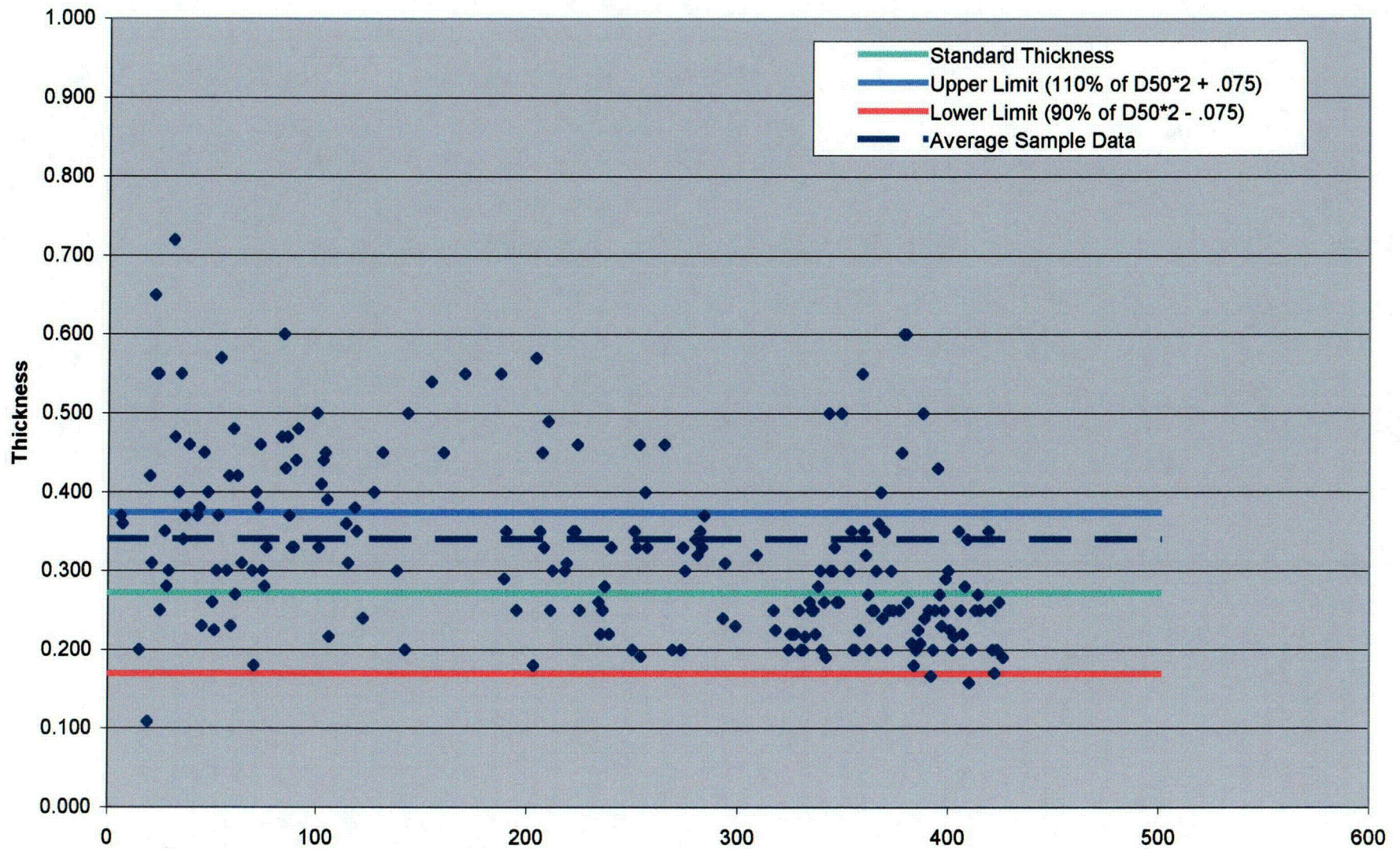


# 1.0 in Rock Sampling



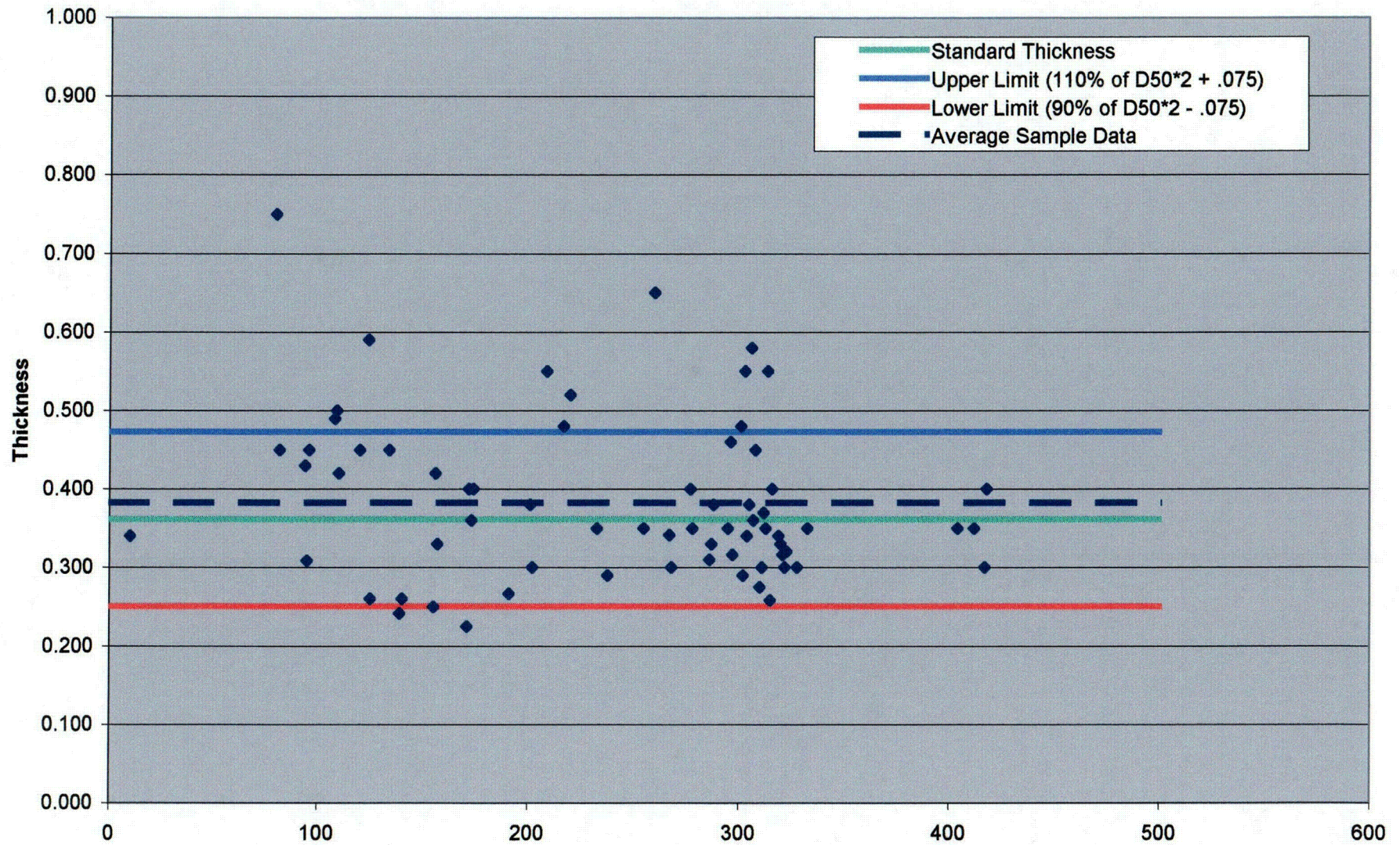


# 1.63 in Rock Sampling





## 2.17 in Rock Sampling





**THIS PAGE IS AN  
OVERSIZED DRAWING OR  
FIGURE,  
THAT CAN BE VIEWED AT  
THE RECORD TITLED:**

**“Exhibit F-1  
Rock Mulch Verification  
Sample Location”**

**WITHIN THIS PACKAGE  
OR BY SEARCHING USING**

**D- 02**

# APPENDIX

G

# **LIMESTONE SIZE TESTING**

**1998**

# **FILTER BED MATERIAL**

**1998**

SUBJECT Rock gradation samples - Filter PROJECT NO. 8152m PAGE           
 CLIENT Pathfinder DATE 2-27-98 BY           
 PROJECT Limestone Testing CHECKED          BY         

Pink #1 D<sub>50</sub> 2.17" sample wt. 250.16  
3.47" 3" 2 1/2" 2" 1.5" pan ✓  
 wt. ret Ø 6.66 91.11 92.46 93.11 15.22  
 % ret Ø 2.7 36.4 37.4 17.2 6.3  
 % pass 100 97.3 63.9 22.5 6.3 -

Red #1 D<sub>50</sub> 1.63" sample wt. 169.40  
2 1/2" 2" 1 1/2" pan  
 wt. ret Ø 17.87 85.31 66.22 ✓  
 % ret Ø 10.5 50.4 39.1  
 % pass 100 89.5 39.1

Blue #1 D<sub>50</sub> 1" sample wt. 56.18  
1 1/2" 1 1/4" 1" 3/4" pan  
 wt. ret Ø 4.92 14.93 21.58 14.75 ✓  
 % ret Ø 8.8 26.6 38.4 26.2  
 % pass 100 91.2 61.6 26.2

Crushed Limestone filter (Nom. max. part. size = 1")  
#1 Sample size = 27.58  
1" pan ✓  
 wt. ret Ø 27.58  
 % pass 100%

SUBJECT Crushed Limestone Filler

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 5-11-98 BY JLB

PROJECT Limestone Test

CHECKED BY

Sample # 1

total sample wt. 50.35

#1  
50.35

|              | 1"  | pan |
|--------------|-----|-----|
| Wt. retained | 0   | 100 |
| % retained   | 0   | 100 |
| % passing    | 100 | 0   |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 5-11-96

BY JLB

PROJECT Limestone Test

CHECKED

BY

Sample # 3

total sample wt. 54.60

|              | 1"  | pan |
|--------------|-----|-----|
| Wt. retained | 0   | 100 |
| % retained   | 0   | 100 |
| % passing    | 100 | 0   |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 6-26-98 BY

PROJECT Lucky McMine Reclamation

CHECKED BY

Sample # 4

Total Sample Wt. \_\_\_\_\_

|                 | 1 5/8" | Pen |
|-----------------|--------|-----|
| Weight Retained | 0      | 100 |
| % Retained      | 0      | 100 |
| % Passing       | 100    | 0   |



SUBJECT Crushed Limestone Filler

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 7-16 98

BY JPM

PROJECT Limestone Test

CHECKED

BY

Sample # 5

total sample wt. 5716s

|              | 1"  | pan  |
|--------------|-----|------|
| wt. retained | 0   | 57.0 |
| % retained   | 0   | 100  |
| % passing    | 100 | 0    |

SUBJECT Crushed Limestone FilterPROJECT NO. 815-2RM PAGECLIENT PathfinderDATE 7-29BY JPMPROJECT Limestone Test

CHECKED

BY

Sample # 10total sample wt. 32.5

|              | 1"     | pan  |
|--------------|--------|------|
| Wt. retained | -0-    | 32.5 |
| % retained   | -0-    | 100% |
| % passing    | 100.0% |      |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 8-5-98

BY JPM

PROJECT Limestone Test

CHECKED

BY

Sample # 7

total sample wt. 33.7

|              | 1"   | pan  |
|--------------|------|------|
| wt. retained |      |      |
| % retained   | 0%   | 100% |
| % passing    | 100% | 0%   |

SUBJECT Crushed Limestone FilterPROJECT NO. 815-2RM PAGECLIENT PathfinderDATE 8-14-98BY JRMPROJECT Limestone Test

CHECKED

BY

Sample # 8total sample wt. 28.0

|              | 1"   | pan  |
|--------------|------|------|
| wt. retained |      |      |
| % retained   | 0%   | 100% |
| % passing    | 100% | 0%   |

SUBJECT Crushed Limestone FillerPROJECT NO. 8152RM PAGECLIENT PathfinderDATE 9-23-98BY JPMPROJECT Limestone Test

CHECKED

BY

Sample # 9  
(stockpile)total sample wt. 37.6

|              | <u>1 1/2"</u> | <u>pan</u> |
|--------------|---------------|------------|
| wt. retained |               |            |
| % retained   | <u>0</u>      | <u>100</u> |
| % passing    | <u>100</u>    | <u>0</u>   |

SUBJECT Crushed Limestone Filler

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 10-12-98

BY JPM

PROJECT Limestone Test

CHECKED

BY

Sample # 10

total sample wt. 45

|              | <u>1 1/2"</u> | <u>pan</u> |
|--------------|---------------|------------|
| wt. retained | - 0 -         | 45.0       |
| % retained   | - 0 -         | 100.0      |
| % passing    | 100.0         | - 0 -      |

SUBJECT Crushed Limestone FillerPROJECT NO. 815-2Rm PAGECLIENT PathfinderDATE 10-26-98BY JPMPROJECT Limestone Test

CHECKED

BY

Sample # 11  
(stockpile)total sample wt. 51.0

|              | <u>1 1/2"</u> | <u>pan</u>   |
|--------------|---------------|--------------|
| Wt. retained | <u>- 0 -</u>  | <u>51.0</u>  |
| % retained   | <u>- 0 -</u>  | <u>100.0</u> |
| % passing    | <u>100.0</u>  | <u>- 0 -</u> |

SUBJECT Crushed Limestone FillerPROJECT NO. 8152RM PAGECLIENT PathfinderDATE 10-26-98BY JPMPROJECT Limestone Test

CHECKED

BY

Sample # 12total sample wt. 37.3

|              | <u>1 1/2"</u> | <u>pan</u>  |
|--------------|---------------|-------------|
| wt. retained |               |             |
| % retained   | <u>0</u>      | <u>100%</u> |
| % passing    | <u>100%</u>   | <u>0</u>    |



SUBJECT Crushed Limestone Filter

PROJECT NO. 8152 RM PAGE

CLIENT Pathfinder

DATE 11-3-98

BY JPM

PROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 13

Total Sample Wt. 58.45

|                 | 1 5/8" | Pan   |
|-----------------|--------|-------|
| Weight Retained | -0-    | 58.45 |
| % Retained      | -0-    | 100.0 |
| % Passing       | 100.0  | -0-   |

SUBJECT Crushed Limestone Filter BreakdownPROJECT NO. 8152 RM

PAGE

CLIENT PathfinderDATE 11-9-98BY JPMPROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 14Total Sample Wt. 50.95

|              |       |       |      |      |      |      |      |       |
|--------------|-------|-------|------|------|------|------|------|-------|
|              | 1 5/8 | 1.5   | 1.25 | 1.00 | .75  | .50  | .25  | Pan   |
| Wt. Retained | 0     | 0     | .85  | 5.25 | 7.1  | 8.95 | 8.55 | 20.25 |
| % Passing    | 100.0 | 100.0 | 98.3 | 88.0 | 74.1 | 56.5 | 39.7 | -0-   |
| % Retained   | -0-   | -0-   | 1.7  | 10.3 | 13.9 | 17.6 | 16.8 | 39.7  |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 11-9-98

BY JFM

PROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 15

Total Sample Wt. 53.6

|                 | 1 5/8" | Pan   |
|-----------------|--------|-------|
| Weight Retained | - 0 -  | 53.6  |
| % Retained      | - 0 -  | 100.0 |
| % Passing       | 100.0  | - 0 - |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 11-12-98

BY JPM

PROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 16

Total Sample Wt. 56.0

|                 | 1 5/8" | Pen                      |
|-----------------|--------|--------------------------|
| Weight Retained | - 0 -  | 56.0<br><del>100.0</del> |
| % Retained      | - 0 -  | 100.0                    |
| % Passing       | 100.0  | - 0 -                    |

SUBJECT Crushed Limestone FilterPROJECT NO. 8152RM PAGECLIENT PathfinderDATE 11-18-98BY JFMPROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 17Total Sample Wt. 44.0

|                 | 1 5/8" | Pan   |
|-----------------|--------|-------|
| Weight Retained | - 0 -  | 44.0  |
| % Retained      | - 0 -  | 100.0 |
| % Passing       | 100.0  | - 0 - |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 11-20-98

BY JPM

PROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 18

Total Sample Wt. 39.0

|                 | 1 5/8" | Pen   |
|-----------------|--------|-------|
| Weight Retained | - 0 -  | 39.0  |
| % Retained      | - 0 -  | 100.0 |
| % Passing       | 100.0  | - 0 - |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 12-2-98 BY JPM

PROJECT Lucky McMine Reclamation

CHECKED BY

Sample # 19

Total Sample Wt. 52.0

|                 | 1 5/8" | Pen   |
|-----------------|--------|-------|
| Weight Retained | - 0 -  | 52.0  |
| % Retained      | - 0 -  | 100.0 |
| % Passing       | 100.0  | - 0 - |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 12-21-98

BY JPM

PROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 20

Total Sample Wt. 56.25

|                 | 1 5/8" | Pan   |
|-----------------|--------|-------|
| Weight Retained | -0-    | 56.25 |
| % Retained      | -0-    | 100.0 |
| % Passing       | 100.0  | -0-   |



SUBJECT Rock gradation samples - Filter PROJECT NO. 8152m PAGE

CLIENT Pathfinder DATE 2-27-98 BY

PROJECT Limestone Testing CHECKED BY

Pink #1 D<sub>50</sub> 2.17" sample wt. 250.16  
3.47" 3" 2 1/2" 2" 1.5" pan ✓  
wt. ret. 0 6.66 91.11 93.46 93.11 15.82  
% ret. 0 2.7 36.4 37.4 17.2 6.3  
% pass 100 97.3 63.9 22.5 6.3 -

Red #1 D<sub>50</sub> 1.63" sample wt. 169.40  
2 1/2" 2" 1 1/2" pan  
wt. ret. 0 17.87 85.31 66.22 ✓  
% ret. 0 10.5 50.4 39.1  
% pass 100 89.5 39.1

Blue #1 D<sub>50</sub> 1" sample wt. 56.18  
1 1/2" 1 1/4" 1" 3/4" pan  
wt. ret. 0 4.92 14.93 21.58 14.75 ✓  
% ret. 0 8.8 26.6 38.4 26.2  
% pass 100 91.2 64.6 26.2

Crushed Limestone filter (Nom. max. part. size = 1")

#1 Sample size = 27.58

1" pan ✓  
wt. ret. 0 27.58  
% pass 100%

D<sub>50</sub> 1" ROCK MULCH

1998

SUBJECT ROCK TESTING

PROJECT NO. 8752 RM PAGE

CLIENT Pathfinder mines

DATE 3-2-98

BY

PROJECT

CHECKED

BY

|       | Weight | % retained                     | % Passing              | TOTAL WT 55.15 |
|-------|--------|--------------------------------|------------------------|----------------|
| 1 1/2 | .55    | <del>.55</del> 1               | <del>99</del>          |                |
| 1 1/4 | 2.20   | <del>2.2</del> 4.5             | 96.01 95.0             |                |
| 1     | 10.5   | <del>10.5</del> 24.02          | <del>80.96</del> 75.97 |                |
| 3/4   | 16.5   | <del>16.5</del> 29.92<br>53.94 | <del>70.08</del> 46.06 |                |
| Pan   | 25.15  | <del>25.15</del> 45.6          | <del>25.15</del> 54.20 |                |

test # 1 R

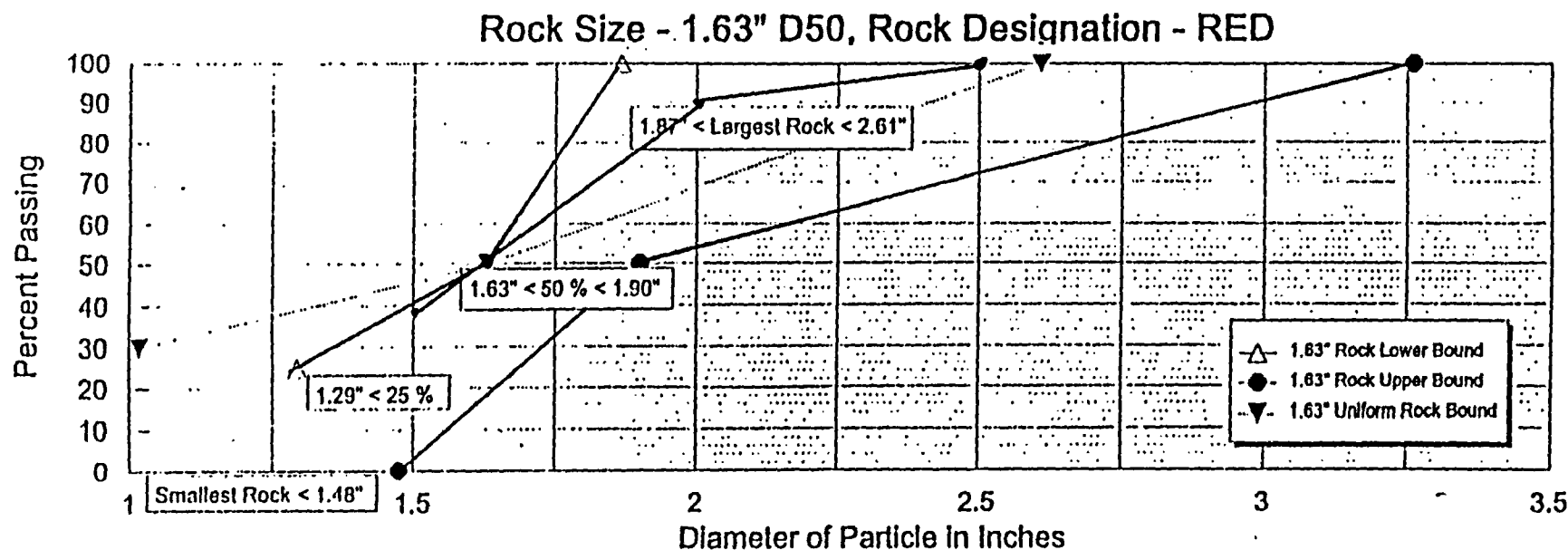
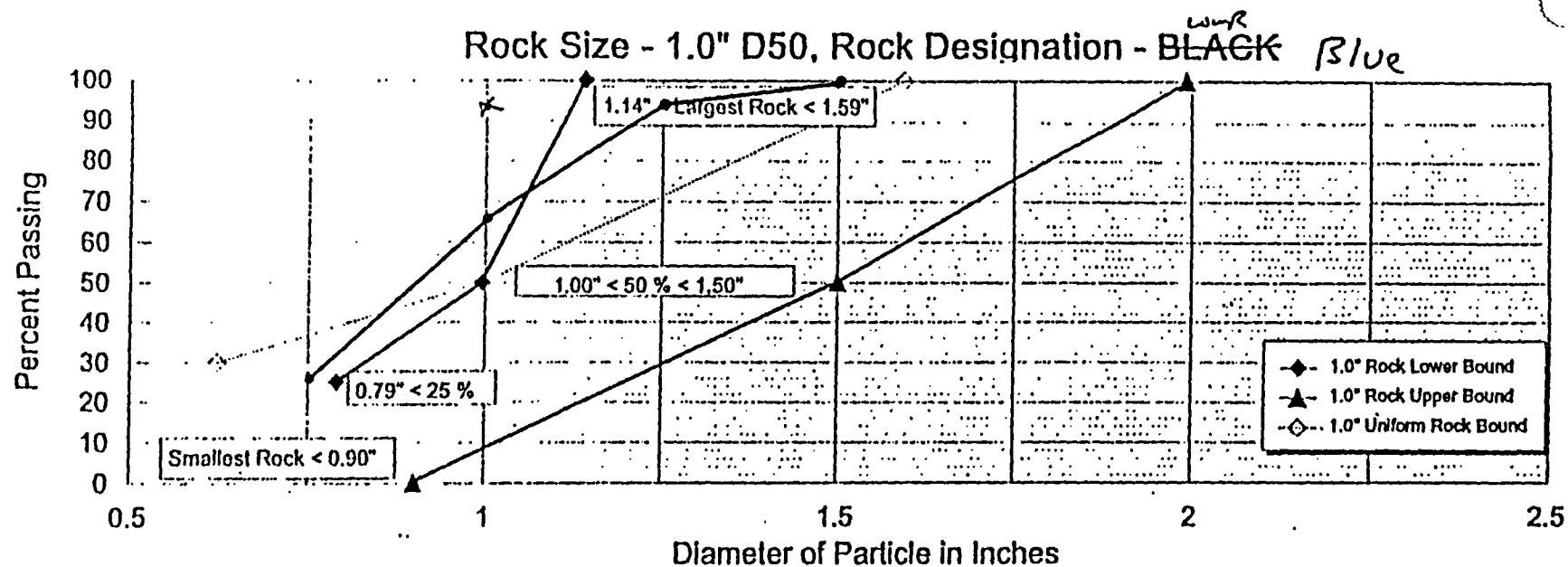
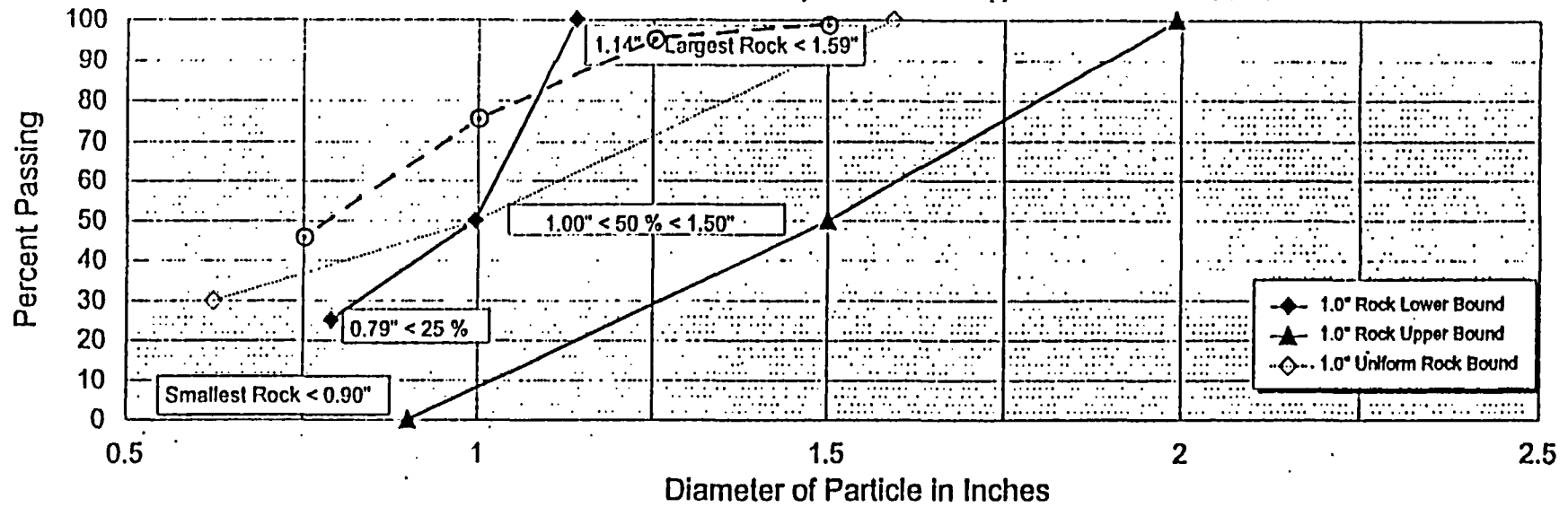


FIGURE 3

3-2-78  
sample # R(1)

### Rock Size - 1.0" D50, Rock Designation - BLACK



### Rock Size - 1.63" D50, Rock Designation - RED

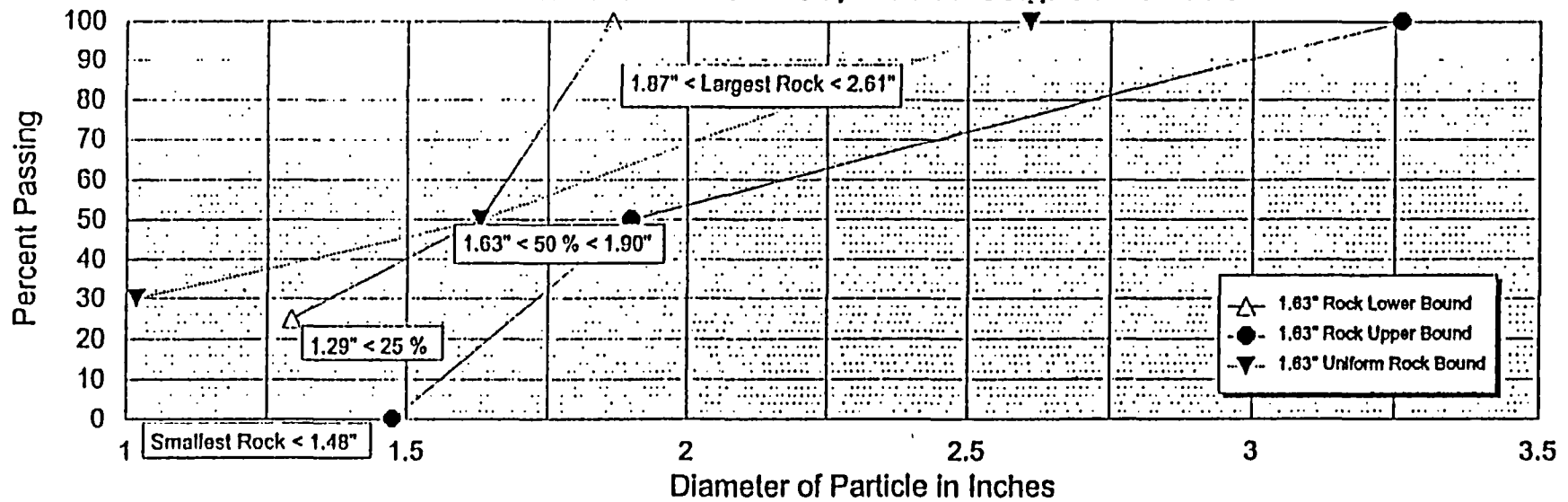


FIGURE 3

SUBJECT D 50 1" Refest #2

PROJECT NO. 815224- PAGE 1/1

CLIENT Pathfinder

DATE 3-3-78

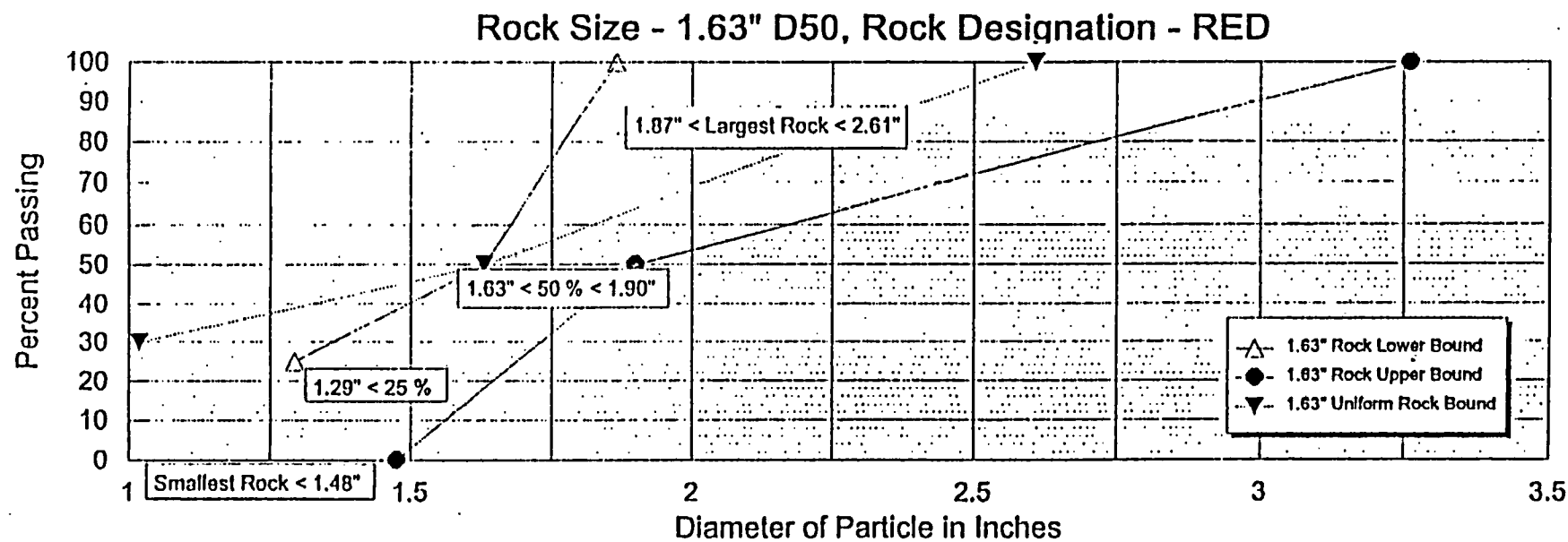
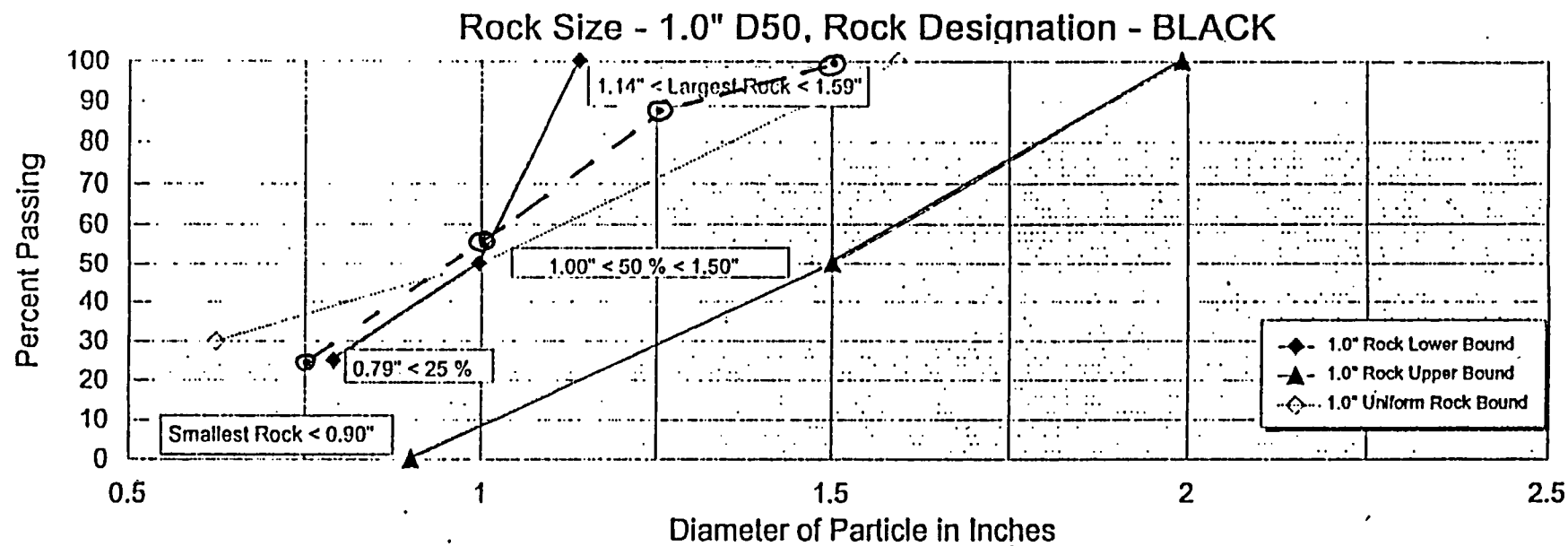
BY WMR

PROJECT Limestone Testing

CHECKED

BY

|          | 1 1/2" | 1 1/4" | 1"    | 3/4"  | pan   |       |
|----------|--------|--------|-------|-------|-------|-------|
| wt. ret. | Ø      | 5.55   | 17.51 | 15.44 | 12.16 | 50.64 |
| % ret.   | Ø      | 11.0   | 34.5  | 30.5  | 24.0  |       |
| % pass.  | 100    | 89.0   | 54.5  | 24.0  |       |       |



**FIGURE 3**

**SUBJECT**

PROJECT NO.

8152 Rm PAGE

**CLIENT**

DATE \_\_\_\_\_

BY

**PROJECT**

**CHECKED**

BY

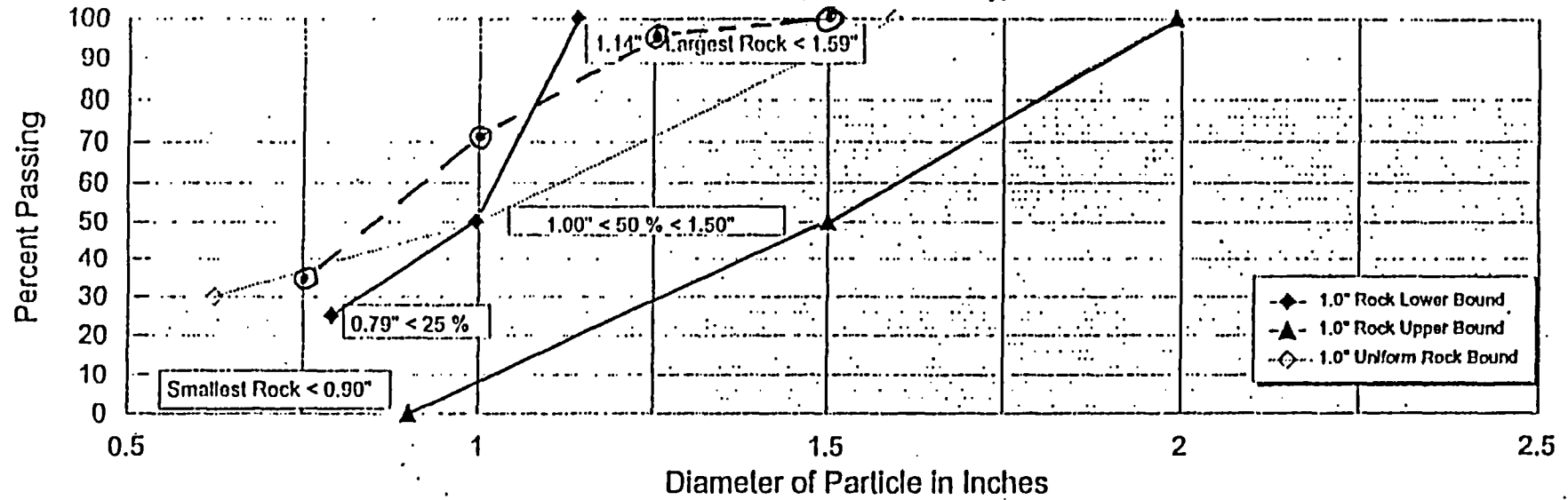
Sample #

Total Sample Wt.

wt.[illegible]



# Rock Size - 1.0" D50, Rock Designation - BLACK



**SUBJECT**

PROJECT NO. 8152 Rm PAGE

**CLIENT**

DATE \_\_\_\_\_

BY

## PROJECT

**CHECKED**

BY

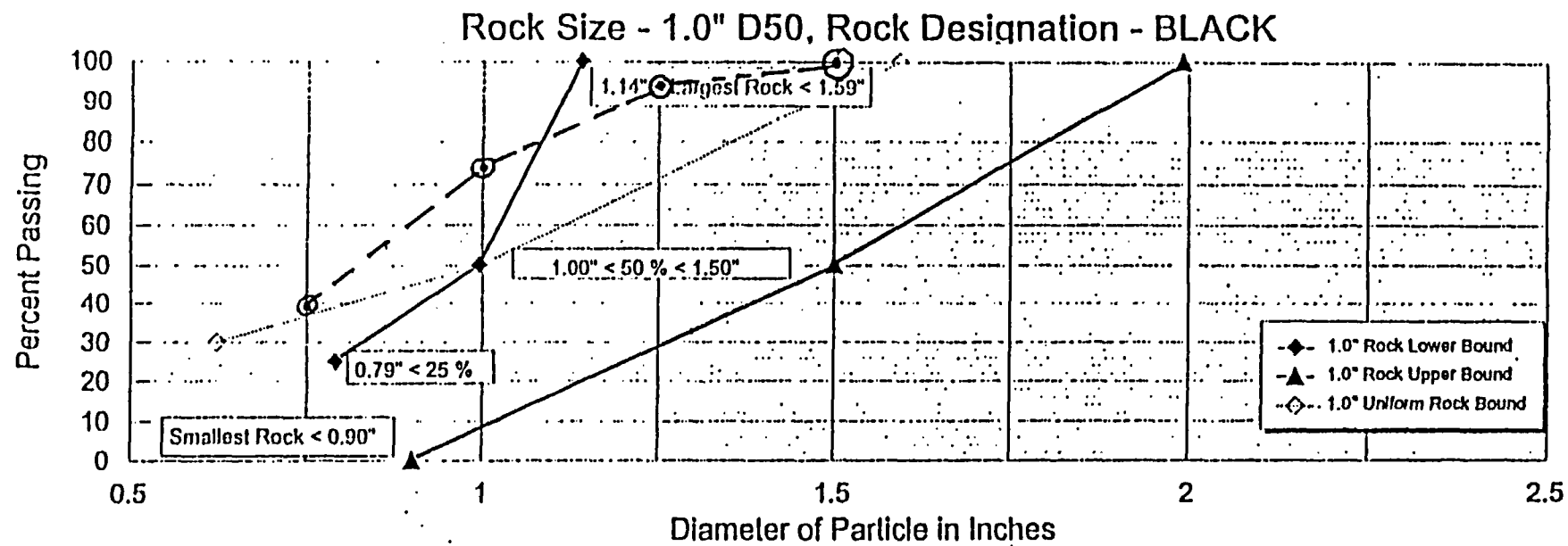
Sample #

Total Sample Wt.

wt. retained[illegible]

Sample # 1 R(4)

3-5-9



**SUBJECT**

D50 1" <sup>Link</sup>~~Black~~ Blue

PROJECT NO.

8152 Rev

PAGE

**CLIENT**

## Pathfinder

DATE \_\_\_\_\_

3-11-98

BY

**PROJECT**

## Limestone Rock Testing

**CHECKED**

BY

Sample # 1R(5)

Total Sample wt.

51.71 ✓

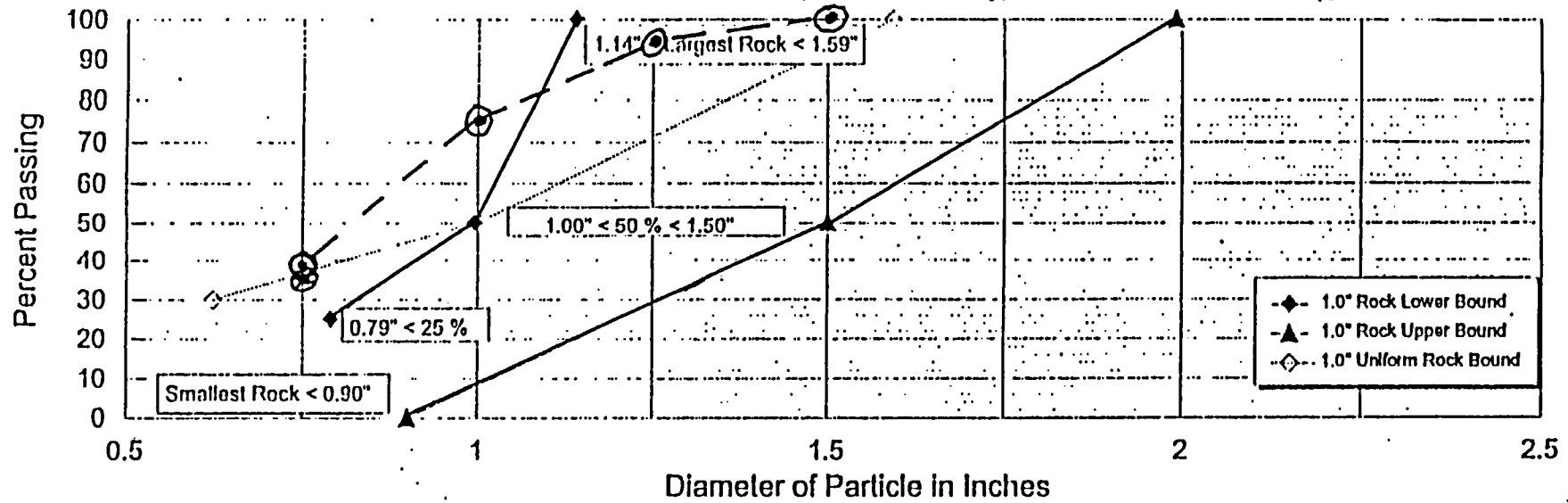
Wt. retained

[illegible]

3-11-98

Sample # 1R(5)

Rock Size - 1.0" D50, Rock Designation - ~~BLACK~~ <sup>W/B</sup> Blue



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1/1

**CLIENT**

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3-12-98

BY *Wink*

**PROJECT**

**CHECKED**

BY

Sample

Total Sample Wt.

47.80

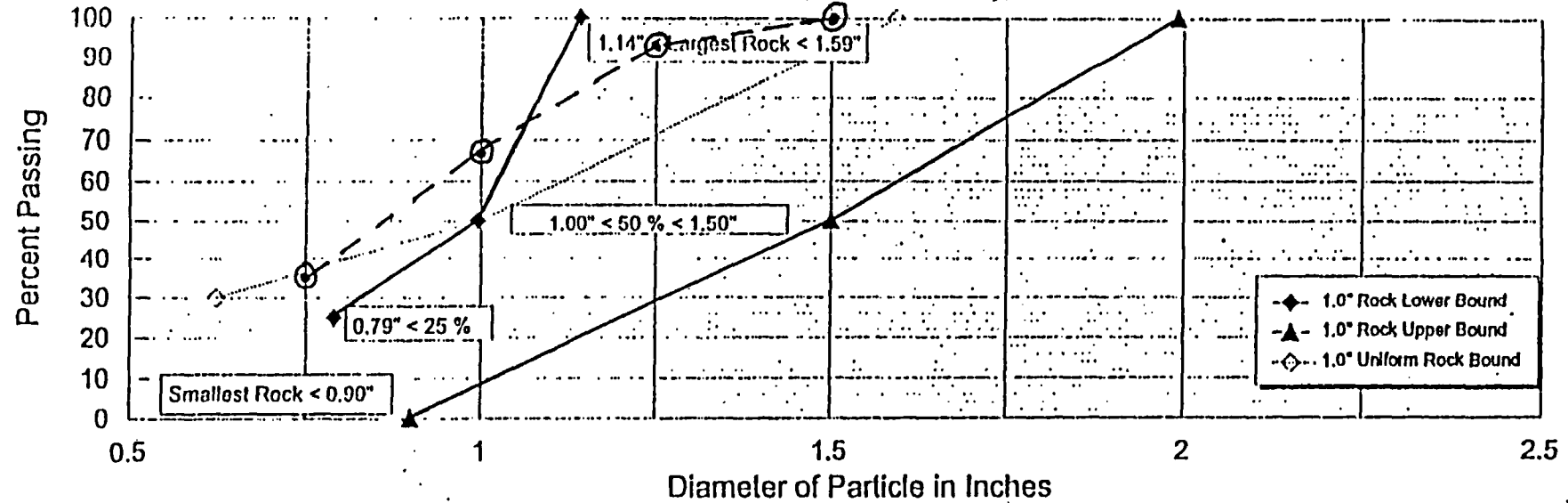
wt.

[illegible]

Sample # 6

3-12-98

# Rock Size - 1.0" D50, Rock Designation - BLACK



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DATE 3-13-98 BY \_\_\_\_\_

CHECKED BY

Total Sample wt. 50.67

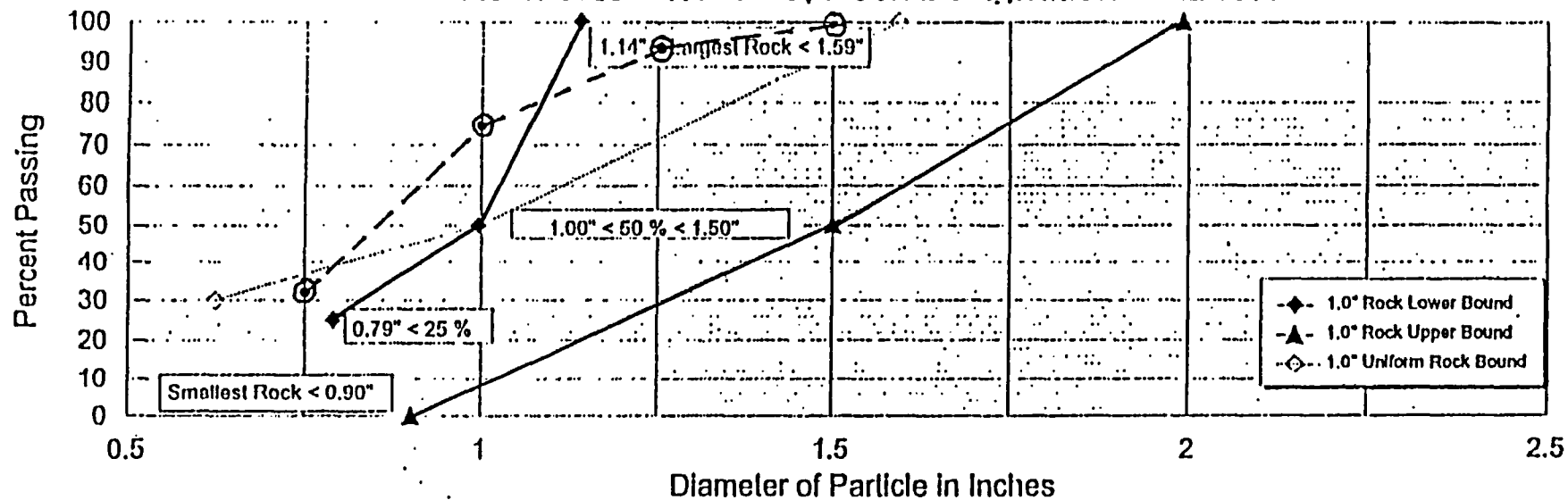
Wt. retained[illegible]



3-13-98

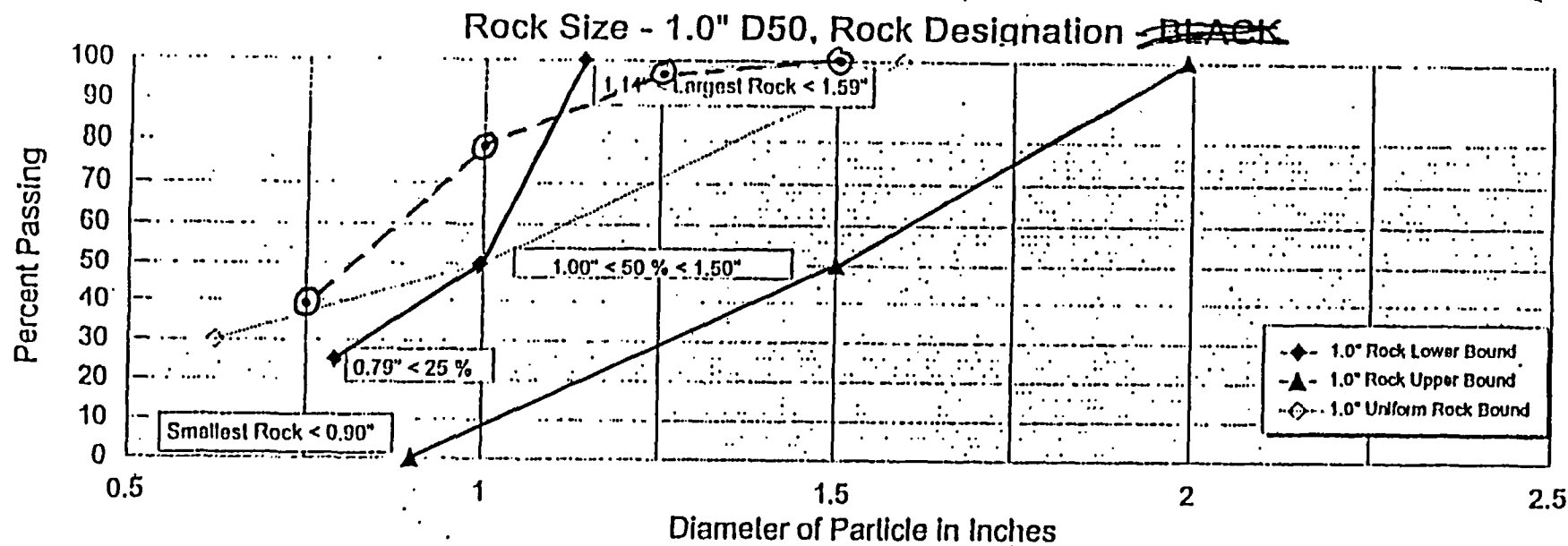
Sample # (7)

# Rock Size - 1.0" D50, Rock Designation - BLACK





3-16-98



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**CLIENT**

DATE \_\_\_\_\_

BY \_\_\_\_\_

**PROJECT**

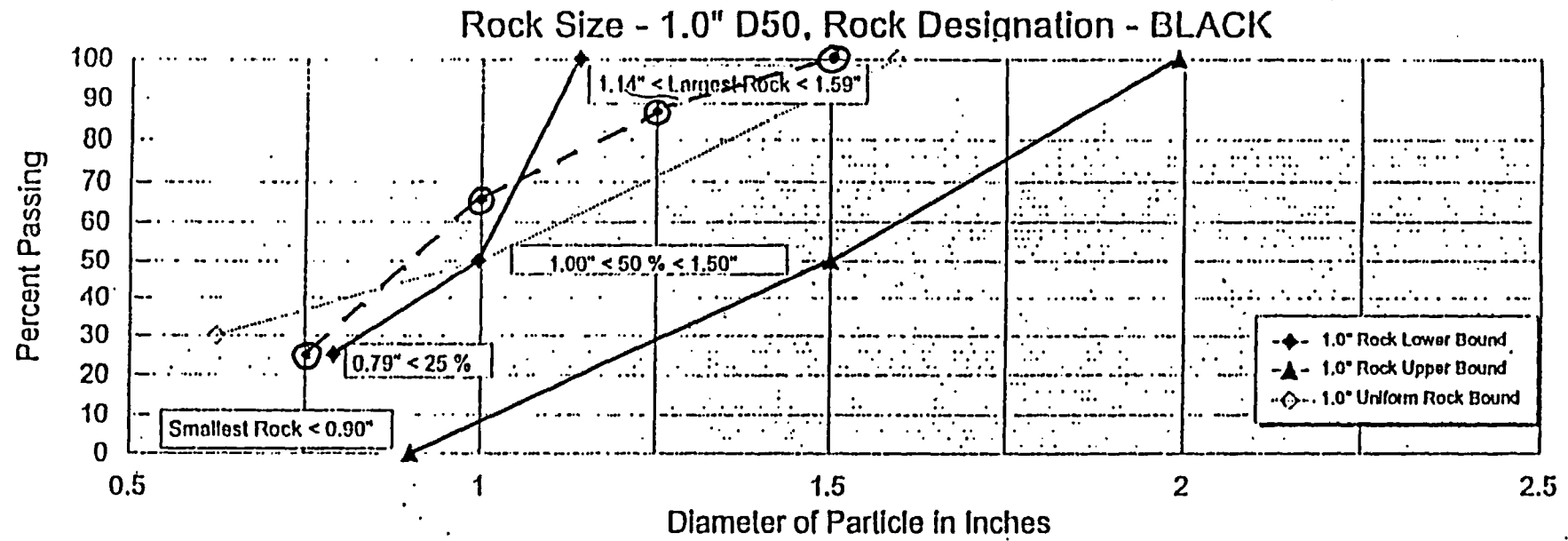
BY

Sample #

Total Sample Wt.

Wt. retained[illegible]

3-17-98



**SUBJECT**

D50 1" Black

PROJECT NO.

8152 Rm PAGE

PAGE

**CLIENT**

## Path finder

DATE \_\_\_\_\_

3-17-98 p.m.

BY

 $W \sim R$ 

**PROJECT**

## Limestone Rock Testing

**CHECKED**

BY

Sample #

IR (10)

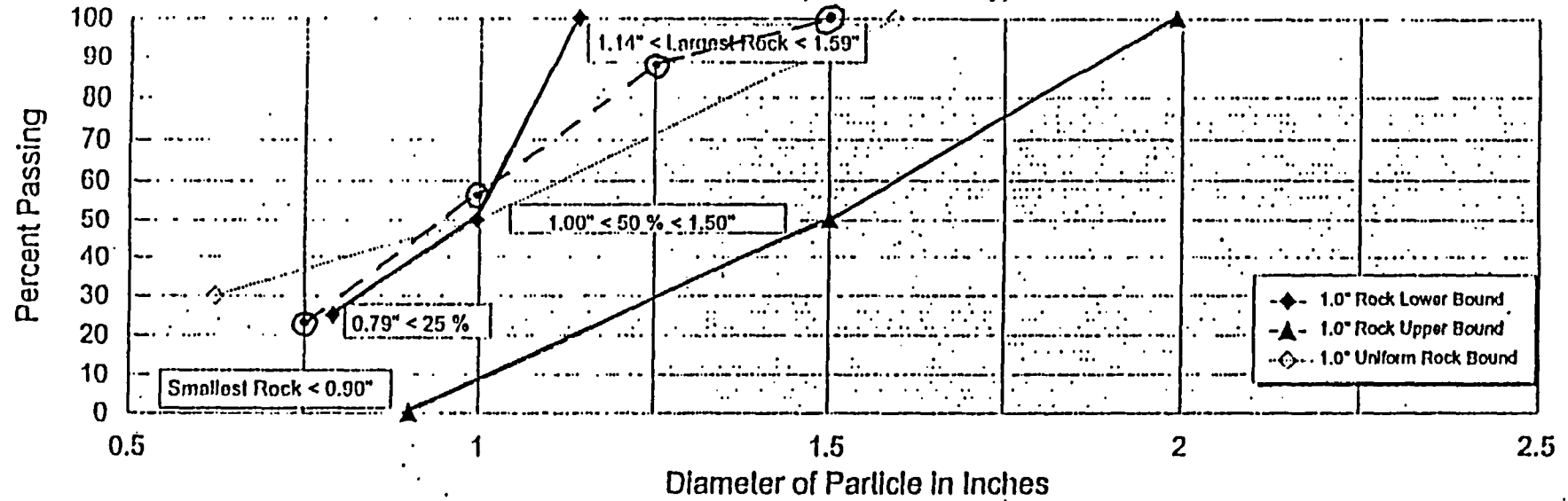
Total Sample wt.

56.82

wt. retain[illegible]

3-17-98 p.m.

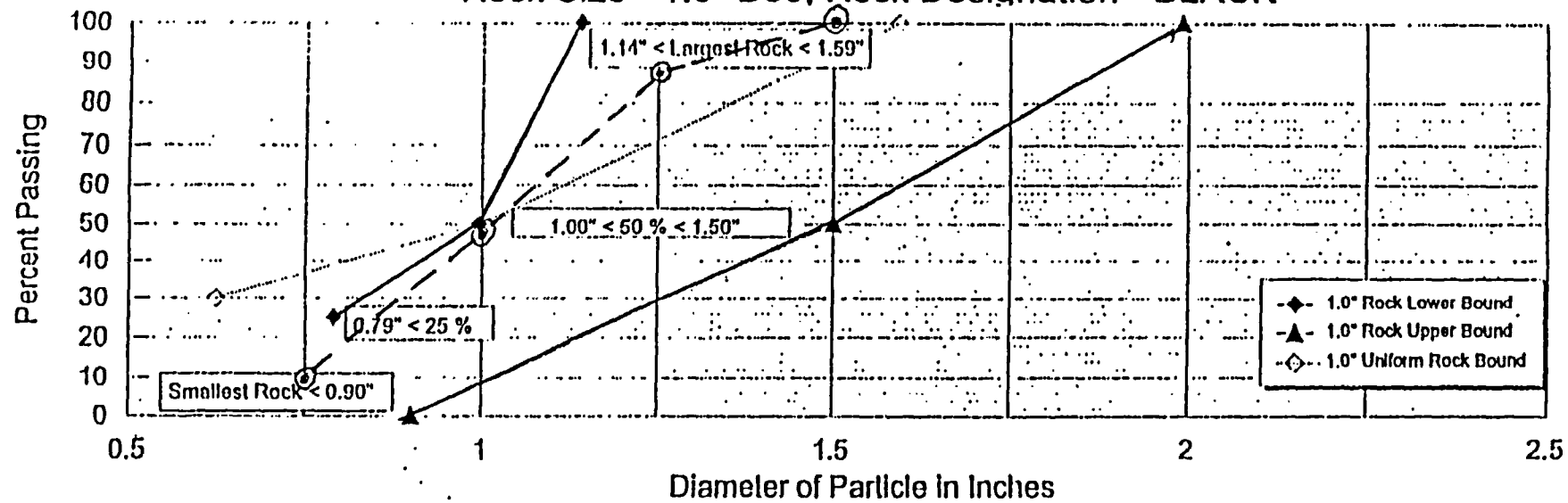
# Rock Size - 1.0" D50, Rock Designation - BLACK







# Rock Size - 1.0" D50, Rock Designation - BLACK



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14

**CLIENT**

DATE \_\_\_\_\_

BY Wink

**PROJECT**

BY

Sample #

Total Sample wt.

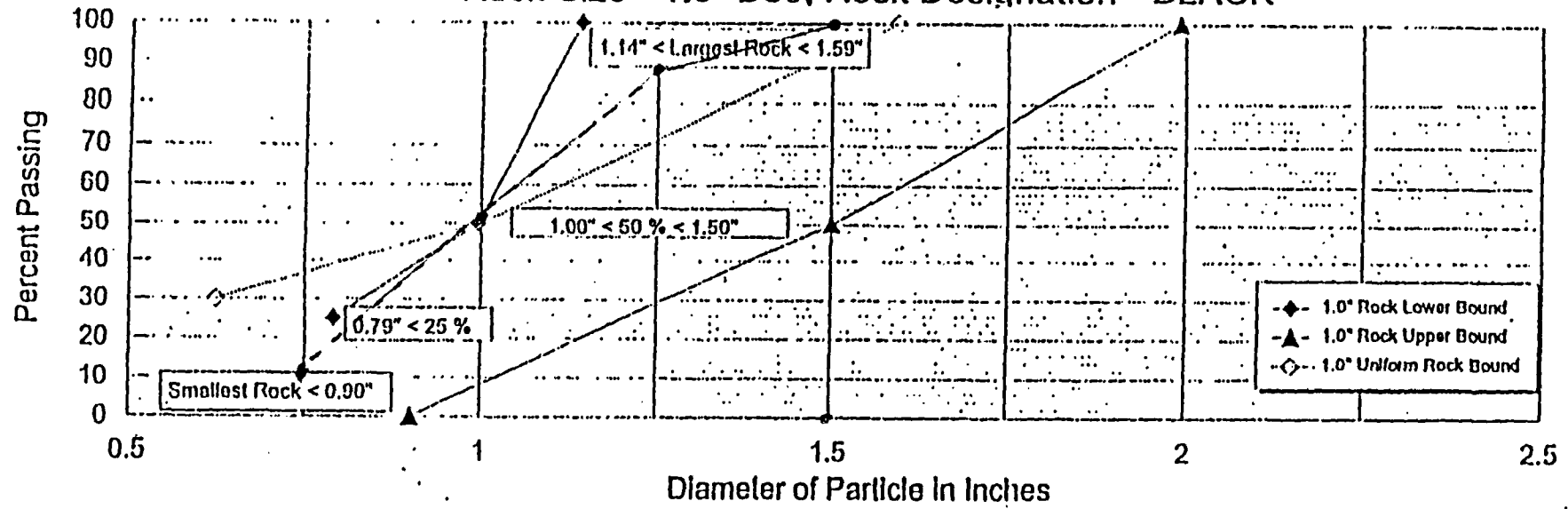
wt. retained

[illegible]





# Rock Size - 1.0" D50, Rock Designation - BLACK



**SUBJECT**

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**CLIENT**

DATE \_\_\_\_\_

BY

**PROJECT**

**CHECKED**

BY

Sample

Total Sample wt.

wt.

[illegible]

Sample #3  
6/26

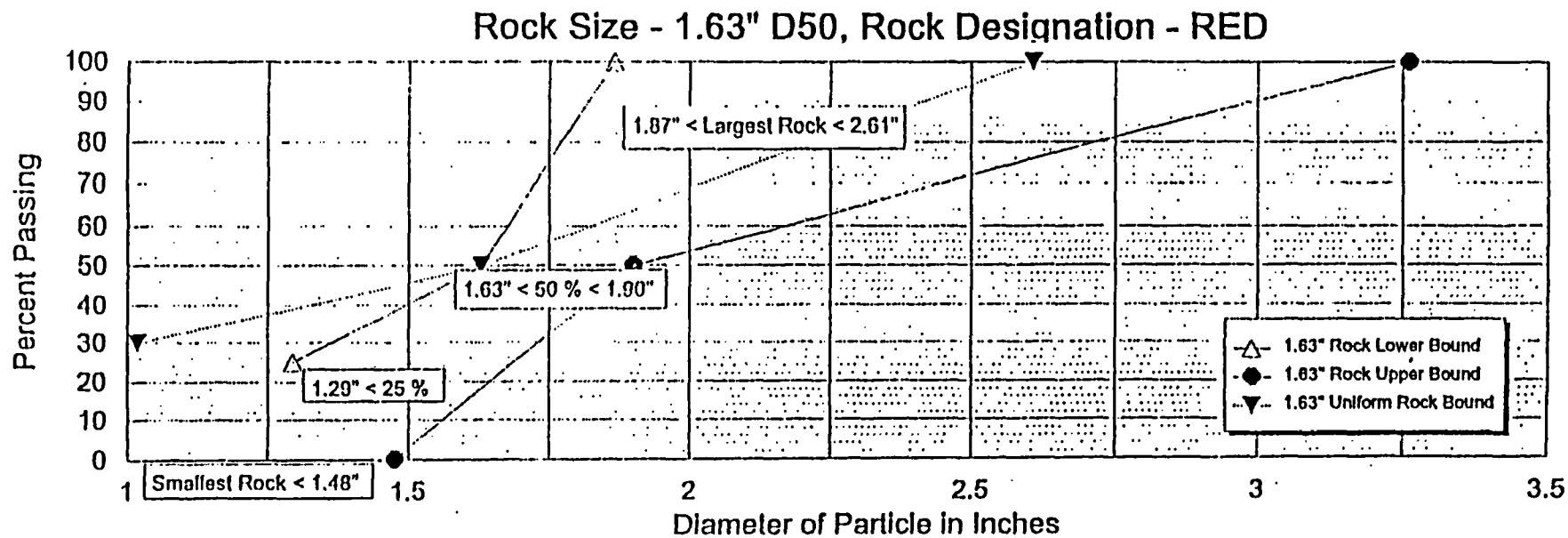
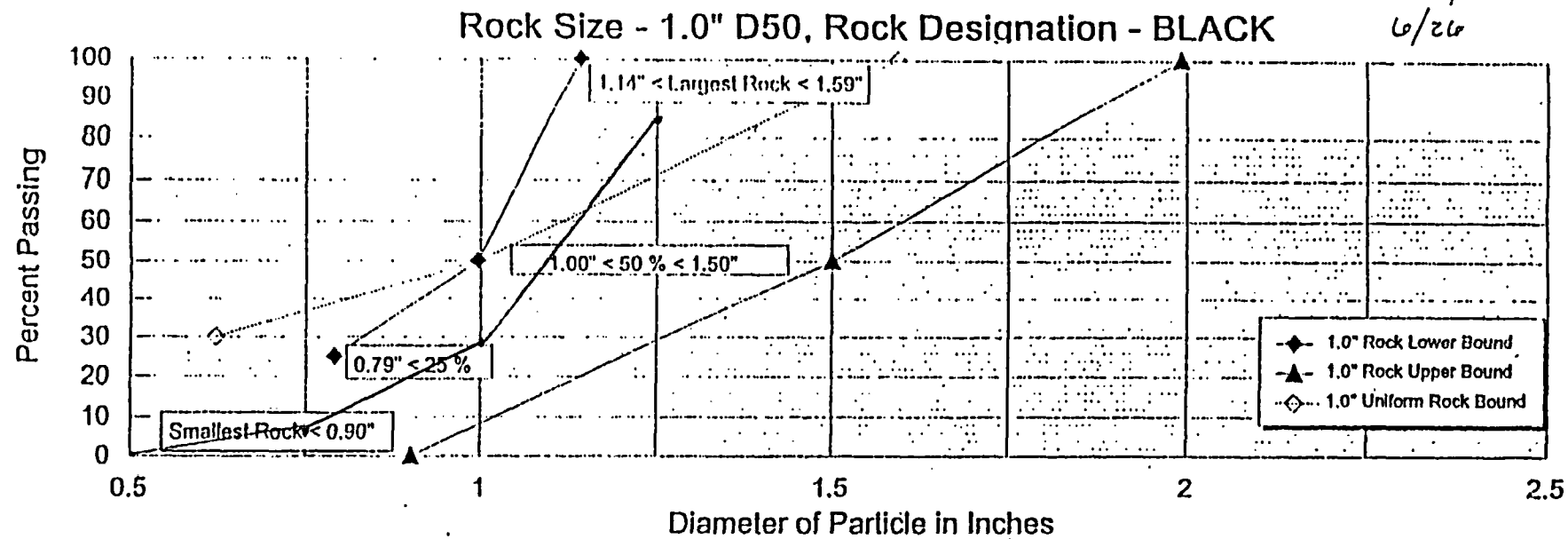


FIGURE 3

**SUBJECT**

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DATE 10-1-98

BY JFM

**PROJECT**

**CHECKED**

BY

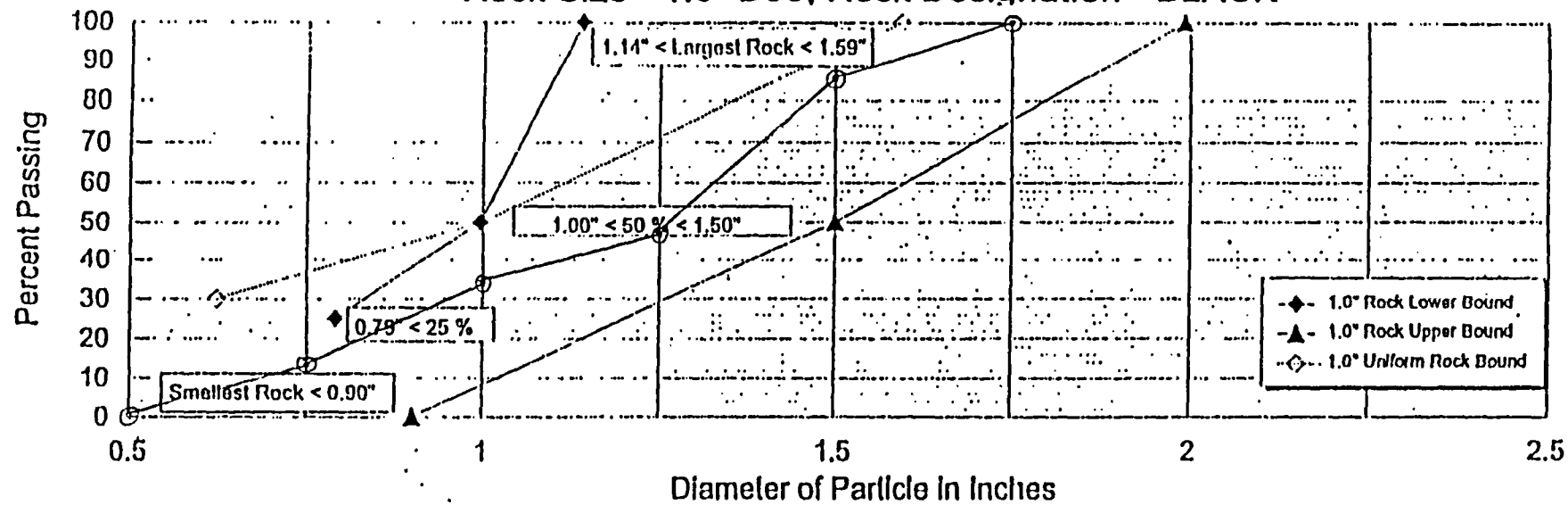
Sample # 5

Total Sample wt.

Wt. retained[illegible]



# Rock Size - 1.0" D50, Rock Designation - BLACK



D<sub>50</sub> 1.63" ROCK MULCH

1998

SUBJECT Rock gradation samplesPROJECT NO. 8152km PAGECLIENT PathfinderDATE 2-27-98 BYPROJECT Limestone Testing

CHECKED BY

Pink #1 D<sub>50</sub> 2.17" sample wt. 250.163.47" 3" 2 1/2" 2" 1.5" pan ✓wt. ret Ø 6.66 91.11 93.46 93.11 15.82% ret Ø 2.7 36.4 37.4 17.2 6.3% pass 100 97.3 63.9 23.5 6.3Red #1 D<sub>50</sub> 1.63" sample wt. 169.402 1/2" 2" 1 1/2" panwt. ret Ø 17.87 85.31 66.22 ✓% ret Ø 10.5 50.4 39.1% pass 100 89.5 39.1Blue #1 D<sub>50</sub> 1" sample wt. 56.181 1/2" 1 1/4" 1" 3/4" panwt. ret Ø 4.92 14.93 21.58 14.75 ✓% ret Ø 8.8 26.6 38.4 26.2% pass 100 91.2 64.6 26.2Crushed Limestone filter (Nom. max. part. size = 1")#1 Sample size = 27.581" pan ✓wt. ret Ø 27.58% pass 100%

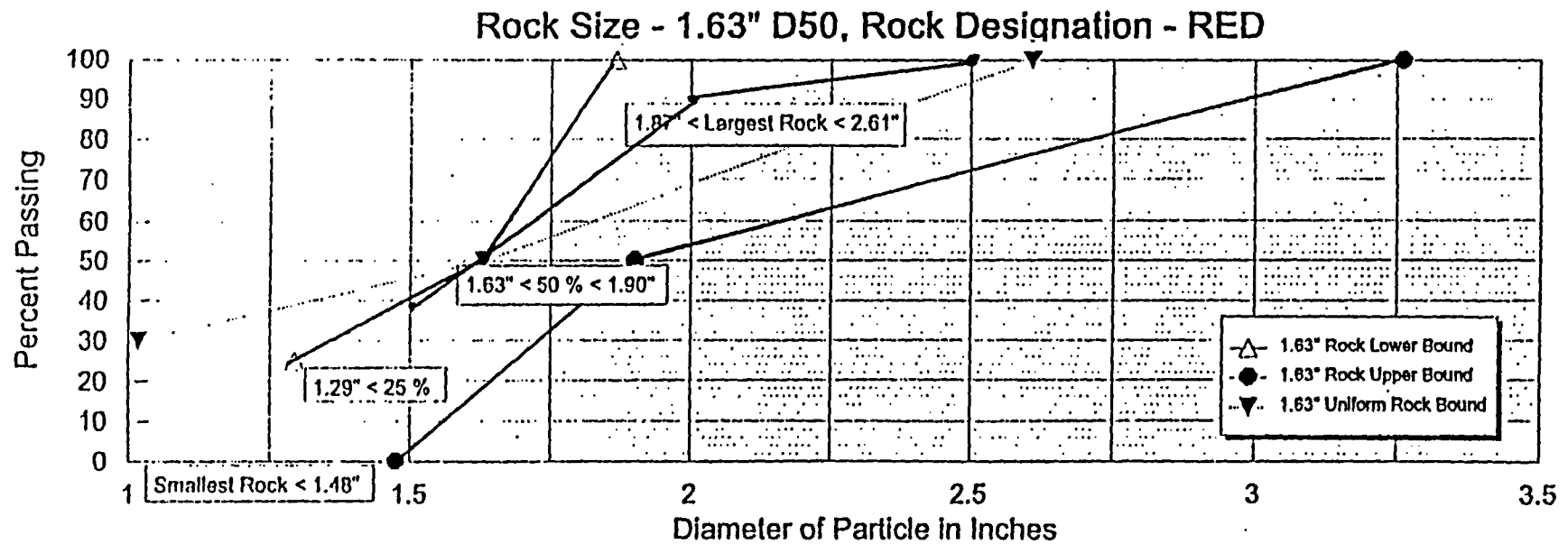
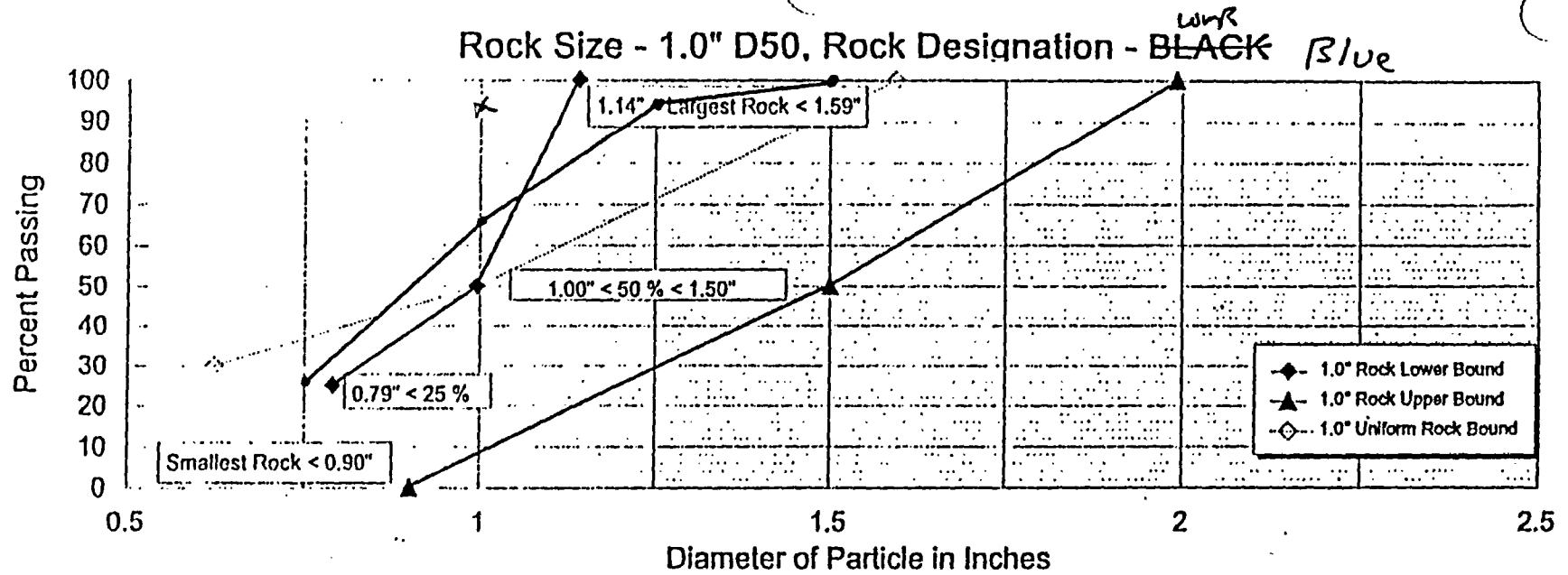


FIGURE 3



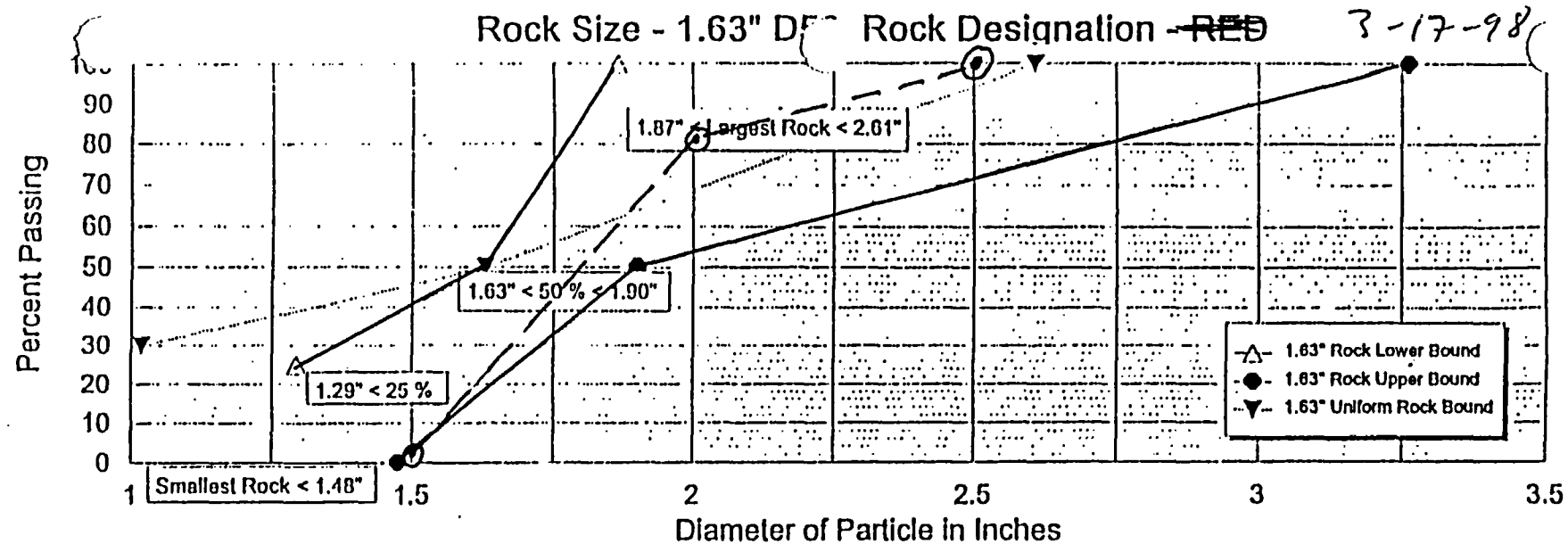
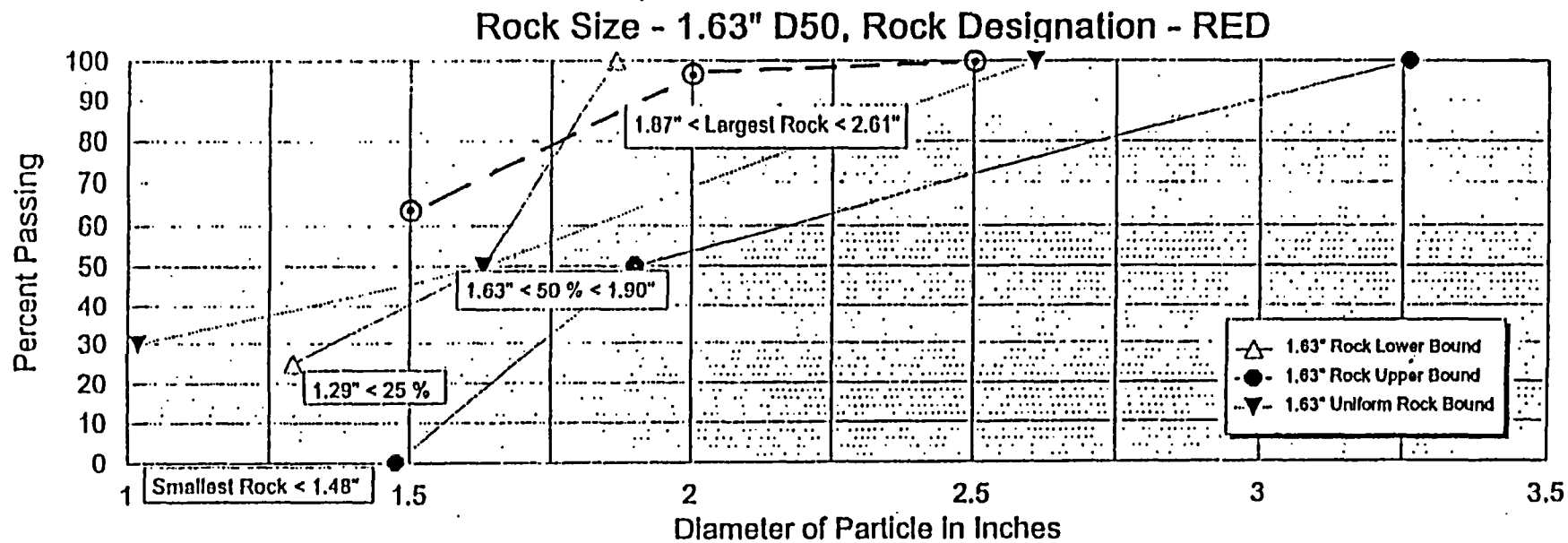
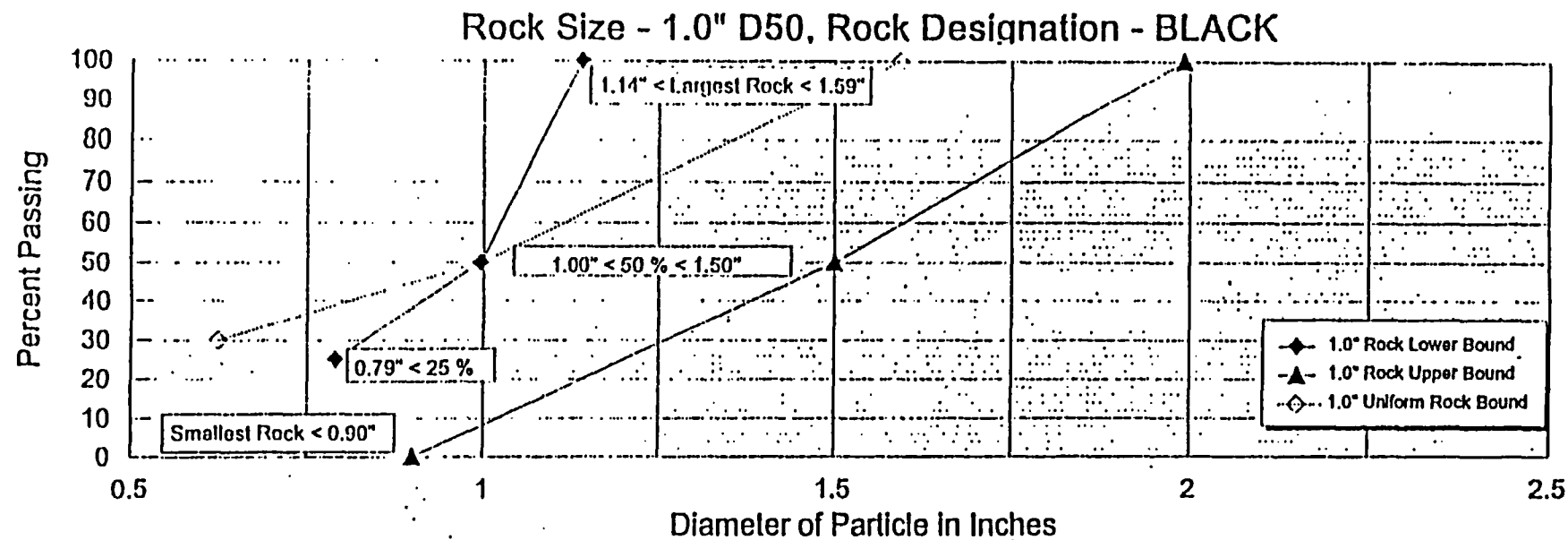


FIGURE 3





**FIGURE 3**







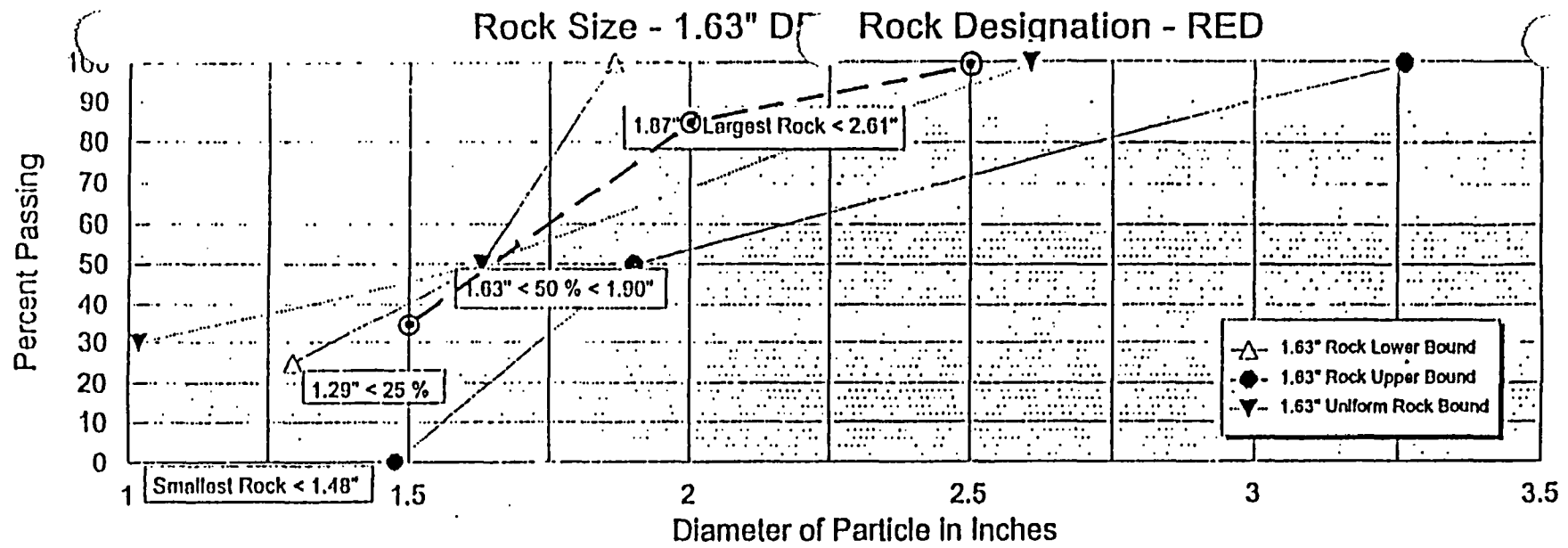


FIGURE 3

*3-R-2*  
*5-18-98*



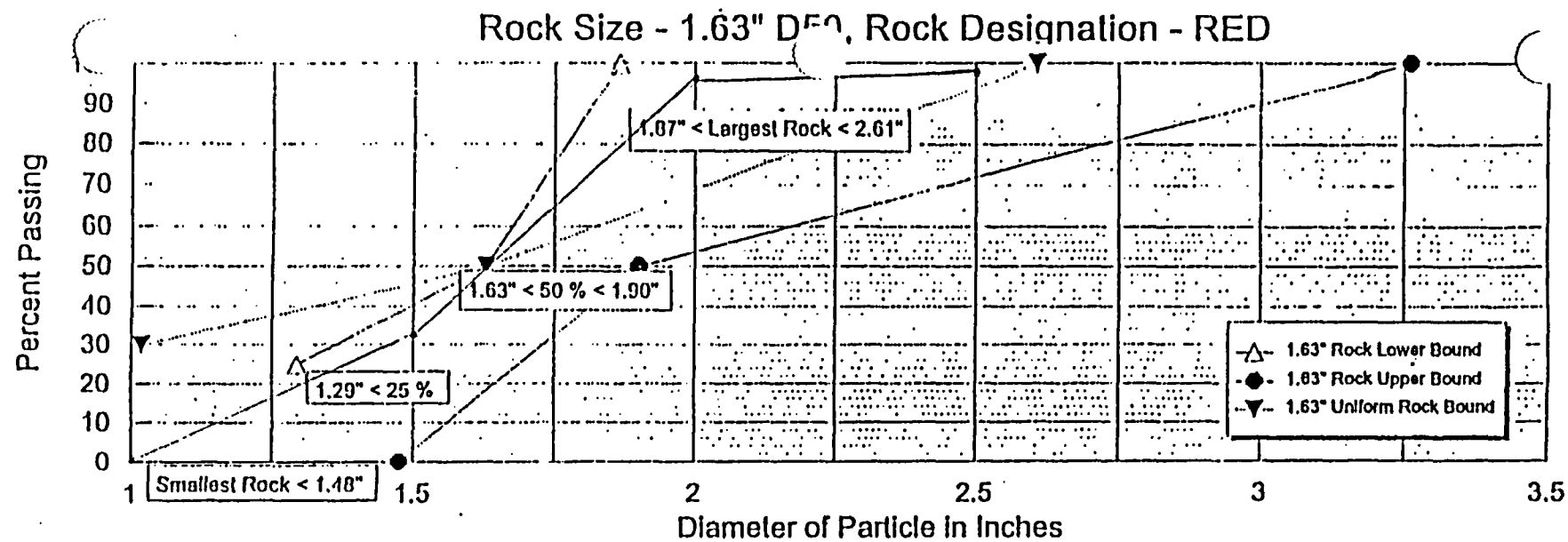


FIGURE 3



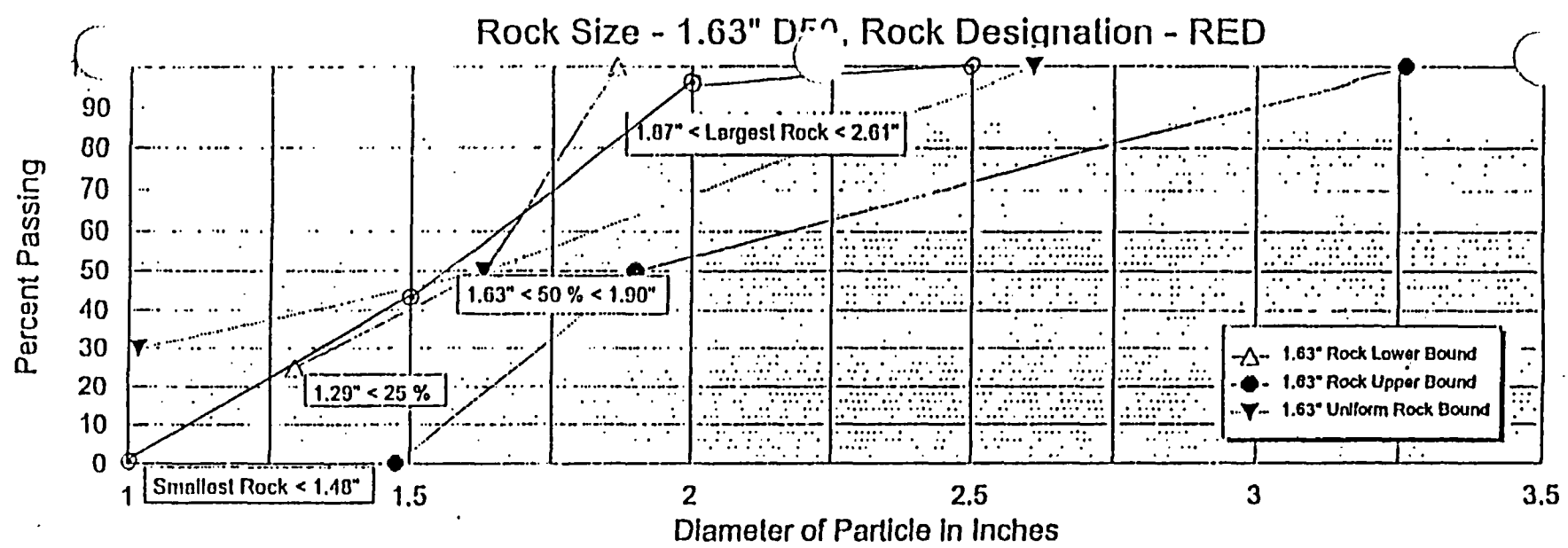


FIGURE 3

**SUBJECT**

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DATE 10-12-98

BY JPM

**PROJECT**

**CHECKED**

84

Sample # 5(R)

Total Sample Wt.

Wt. retained

| Screen size | 2 1/2" | 2"   | 1 1/2" | pan  |  |
|-------------|--------|------|--------|------|--|
| -0-         | 12.5   | 33.0 | 41.7   |      |  |
| Sleet total |        |      |        |      |  |
| TOTAL       | -      | 12.5 | 33.0   | 41.7 |  |
| % Retained  | -0-    | 14.3 | 37.8   | 47.8 |  |
| % Passing   | 100.0  | 85.6 | 47.8   | -0-  |  |



# Rock Size - 1.63" D50, Rock Designation - RED

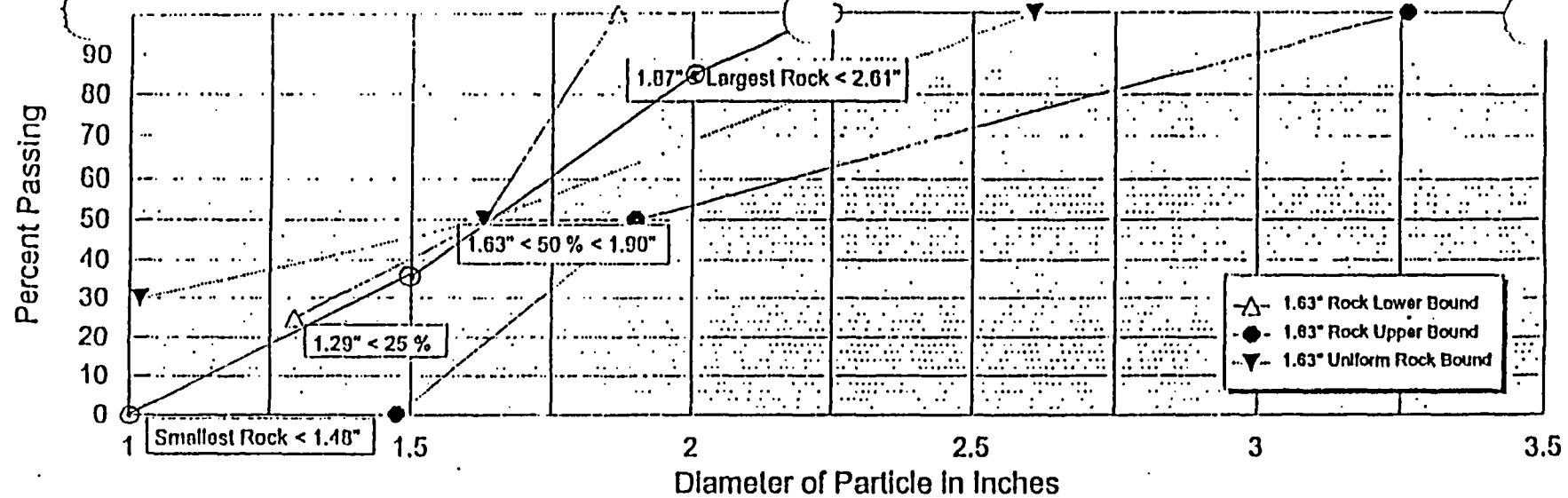


FIGURE 3

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**CLIENT**

DATE 11-9

BY JPM

**PROJECT**

**CHECKED**

BY

Sample # 6

Total Sample Wt. 89.15

Wt. retained[illegible]

# Rock Size - 1.63" D50, Rock Designation - RED

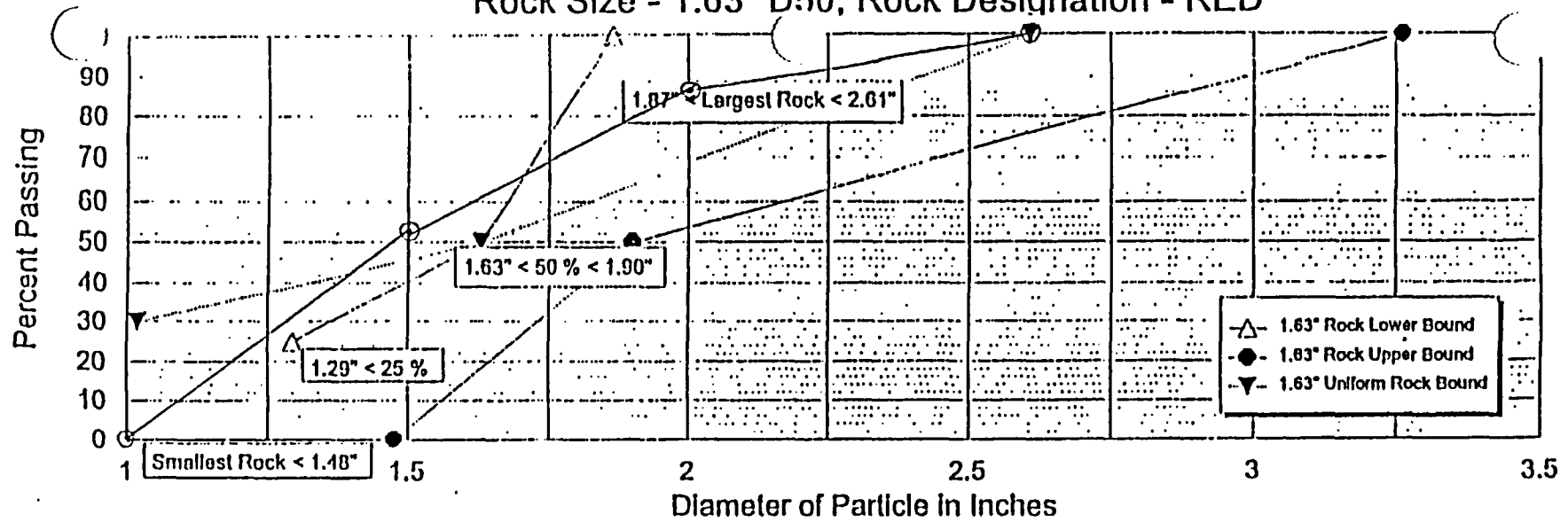


FIGURE 3



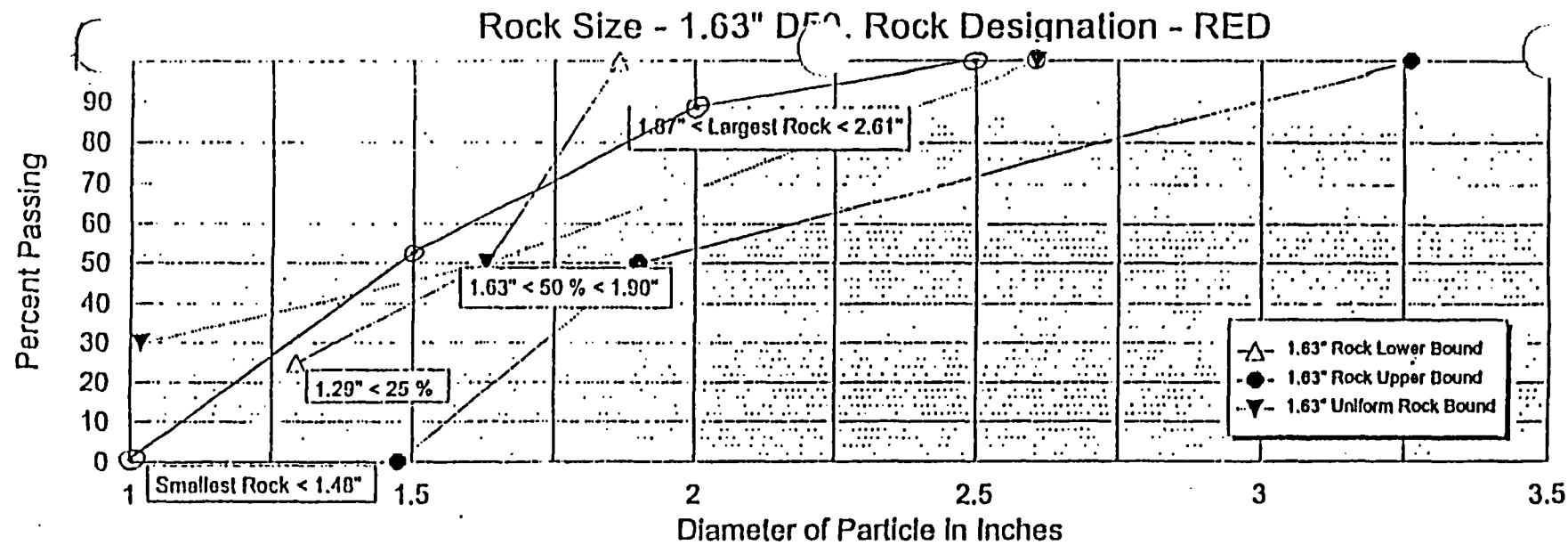


FIGURE 3

Kevin

2.17 Passed + I'll be out on Friday to retest 1.63.



# Rock Size - 1.63" D<sub>50</sub>, Rock Designation - RED

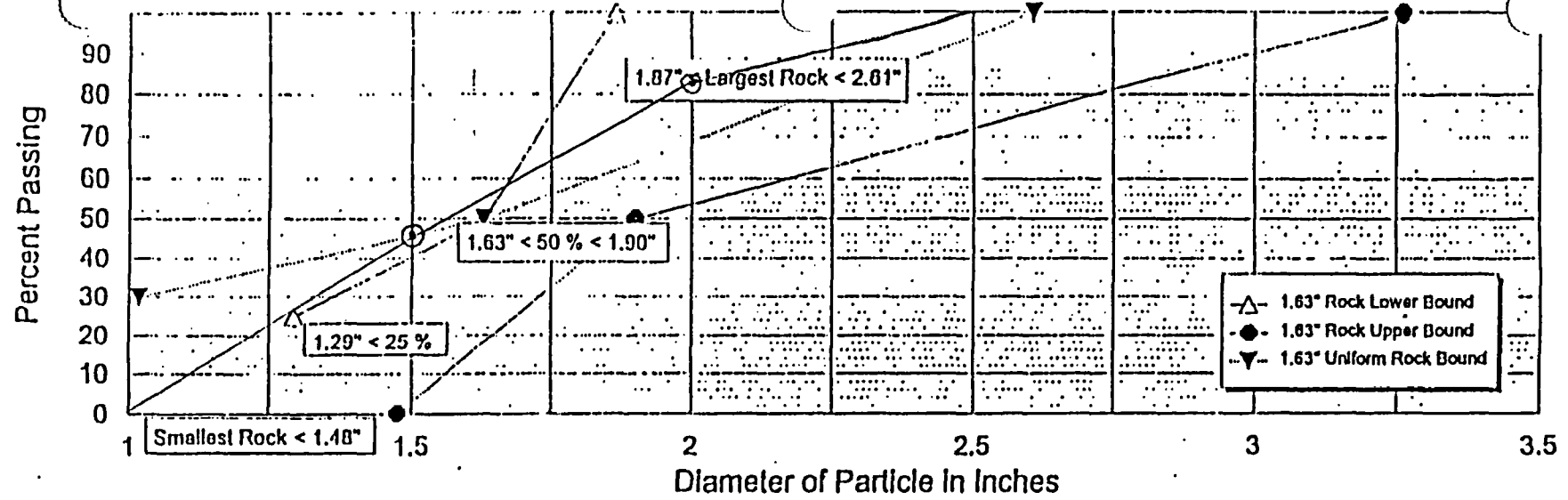


FIGURE 3

Kevin,  
I'll sample again later today  
-Justin





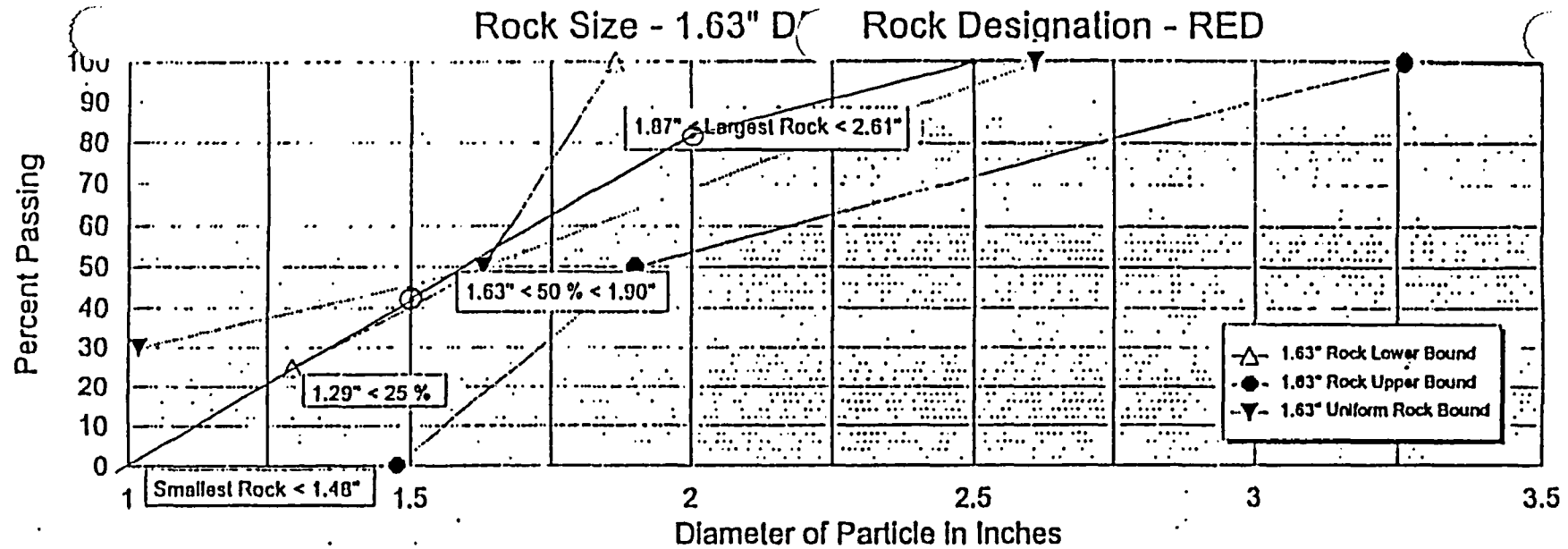


FIGURE 3

Kevin,  
I'll be out later today to resample.  
- Justin

**SUBJECT**

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PAGE

**CLIENT**

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BY JPM

PROJECT

**CHECKED**

BY

Sample # 6R(4)

Total Sample wt.

Wt. retained[illegible]

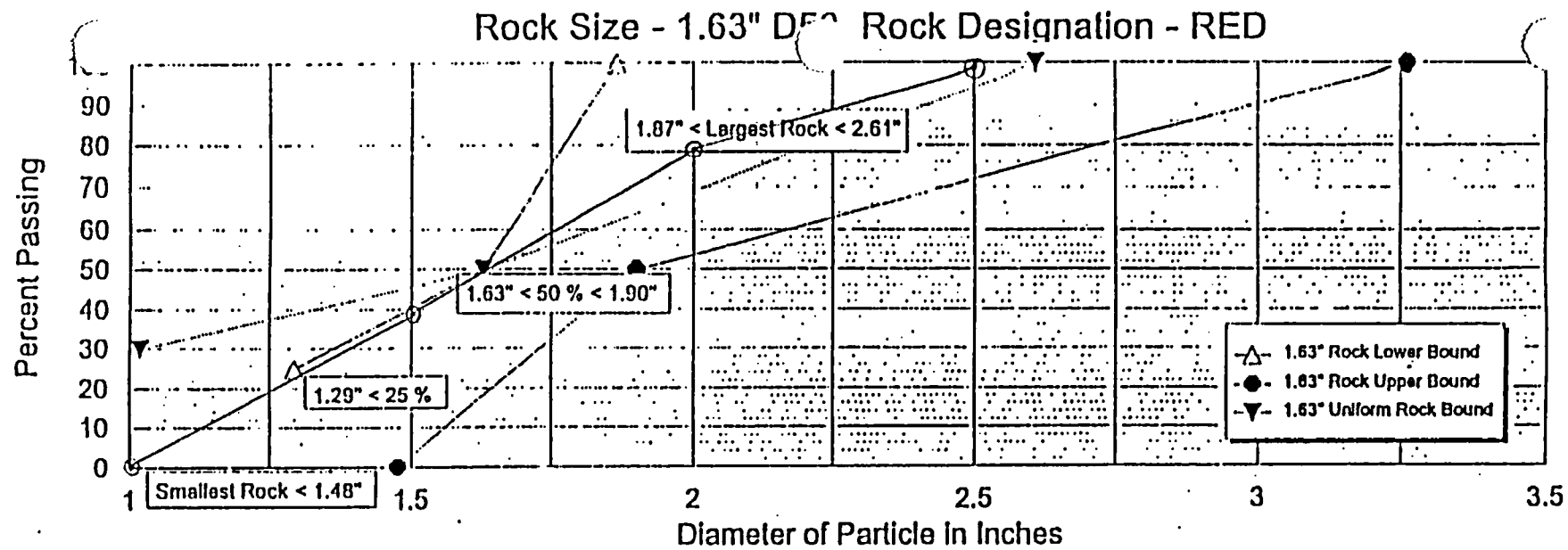


FIGURE 3

$D_{50} = 1.66$

**SUBJECT**

PROJECT NO.

8152 Rev PAGE

**CLIENT**

DATE 11-20-98

BY JFM

**PROJECT**

**CHECKED**

BY

Sample # 7

Total Sample wt. 1166.7

Wt. retained[illegible]

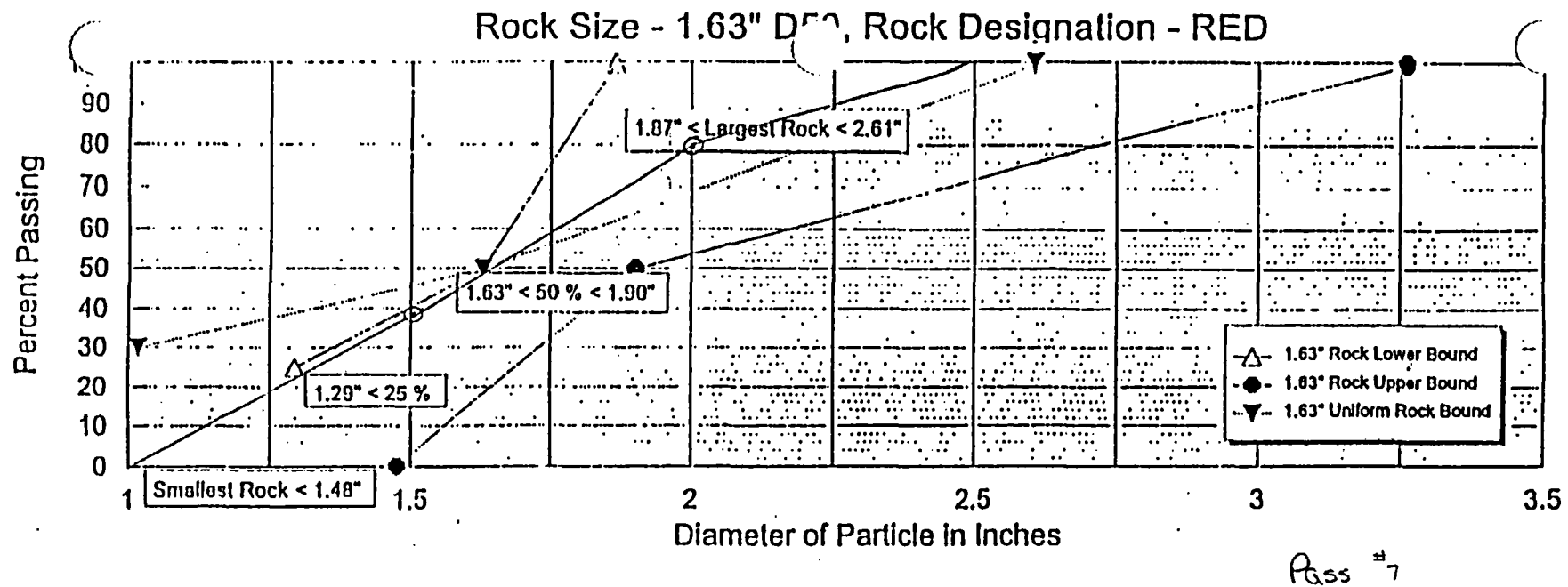


FIGURE 3



# Rock Size - 1.63" D<sub>50</sub>, Rock Designation - RED

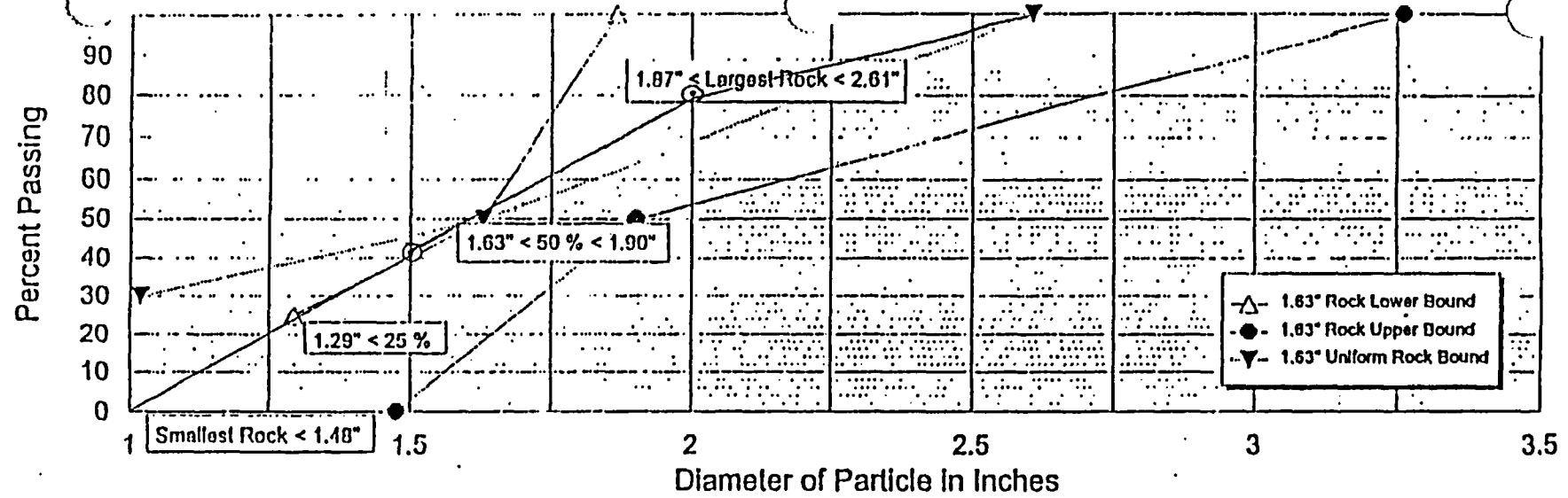


FIGURE 3

Kevin, it was a little bit out. I'll resample tomorrow.

**SUBJECT**

**PROJECT NO.**

8152 Ren PAGE

**CLIENT**

DATE \_\_\_\_\_

BY JFM

**PROJECT**

**CHECKED**

BY

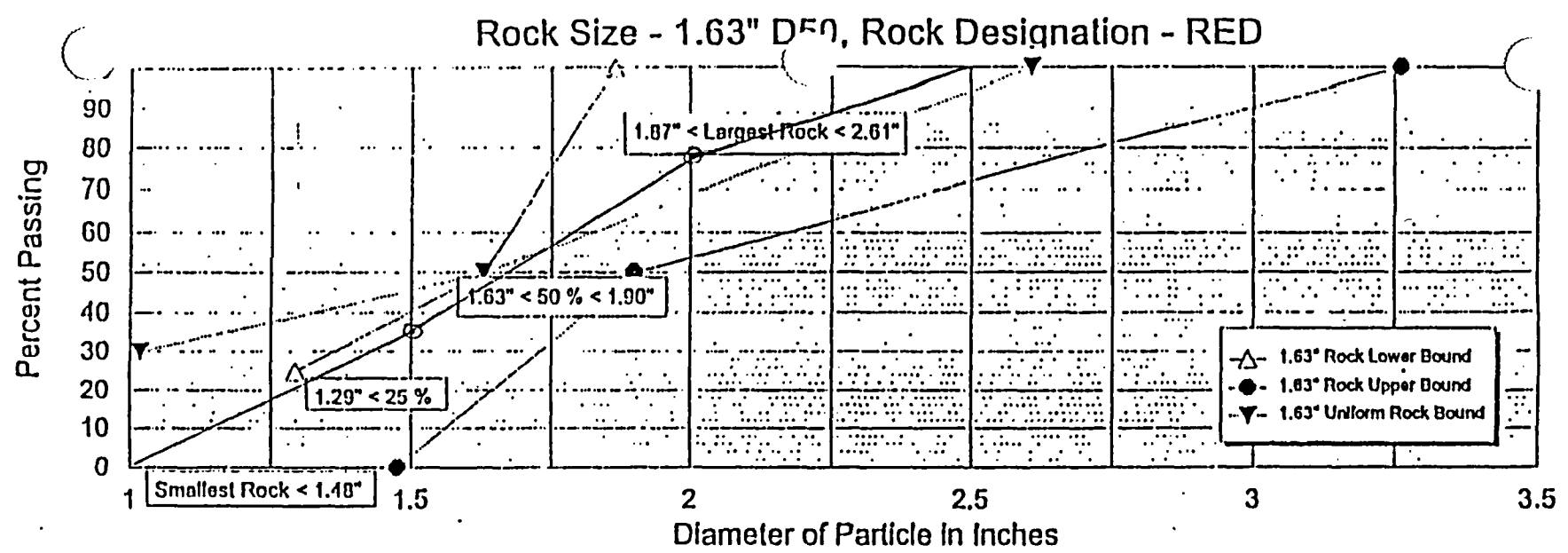
Sample # 8(R)

Total Sample Wt.

Wt. retained

| Screen<br>SIZE | 2 1/2 "  | 2 "   | 1 1/2 " | pan  |
|----------------|----------|-------|---------|------|
| -0-            | 33.95    | 62.5  | 52.2    |      |
| Sleet total    |          |       |         |      |
| TOTAL          | --0--    | 33.95 | 62.5    | 52.2 |
| % Retained     | ---0---  | 77.8  | 42.1    | 35.1 |
| % Passing      | ...100.0 | 22.2  | 57.9    | 64.9 |





**FIGURE 3**



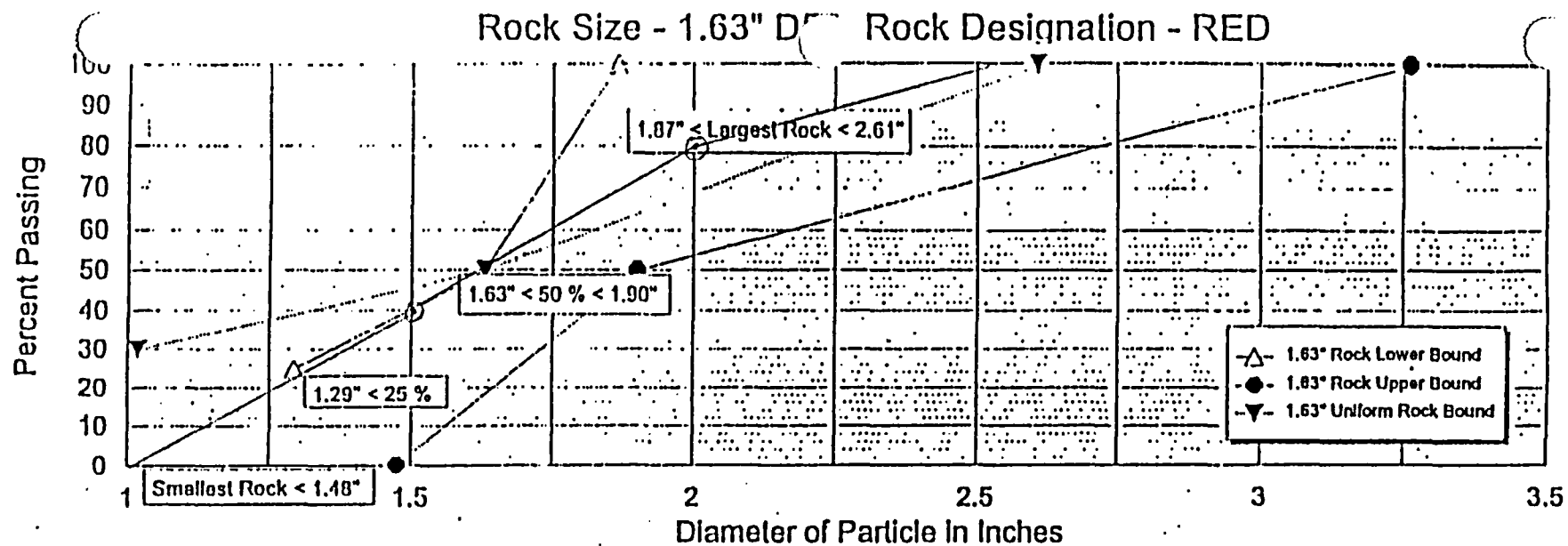


FIGURE 3

Passing

**SUBJECT**

**PROJECT NO.** \_\_\_\_\_

**PAGE**

**CLIENT**

**DATE** \_\_\_\_\_

BY \_\_\_\_\_

**PROJECT**

**CHECKED**

BY

Sample #

Total Sample Wt.

wt. retained

[illegible]

# Rock Size - 1.63" D<sub>50</sub>, Rock Designation - RED

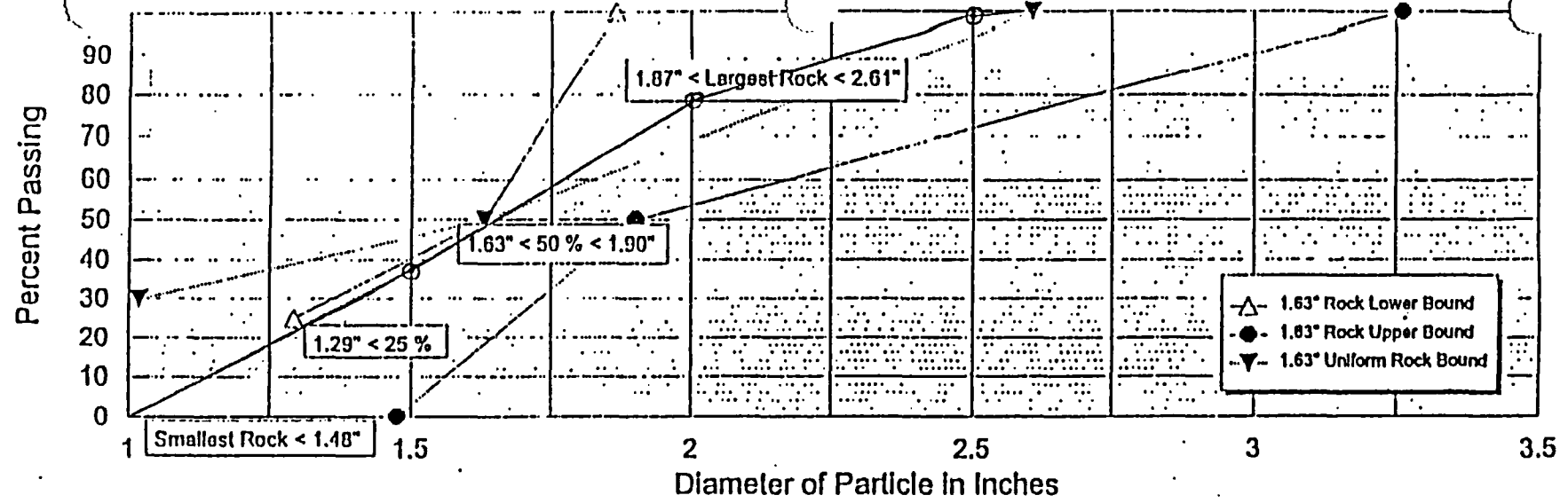


FIGURE 3

Passing

D<sub>50</sub> 2.17" ROCK MULCH

1998

SUBJECT Rock gradation samplesPROJECT NO. 81524 PAGECLIENT PathfinderDATE 2-27-98 BYPROJECT Limestone Testing

CHECKED BY

Pink #1 D<sub>50</sub> 2.17" sample wt. 250.163.47" 3" 2 1/2" 2" 1.5" pan ✓

wt. ret. Ø 6.66 91.11 93.46 93.11 15.82

% ret. Ø 2.7 36.4 37.4 17.2 6.3

% pass 100 97.3 60.9 22.5 6.3

Red #1 D<sub>50</sub> 1.63" sample wt. 169.402 1/2" 2" 1 1/2" pan

wt. ret. Ø 17.87 85.31 66.22 ✓

% ret. Ø 10.5 50.4 39.1

% pass 100 89.5 39.1

Blue #1 D<sub>50</sub> 1" sample wt. 56.181 1/2" 1 1/4" 1" 3/4" pan ✓

wt. ret. Ø 4.92 14.93 21.58 14.75

% ret. Ø 8.8 26.6 38.4 26.2

% pass 100 91.2 64.6 26.2

Crushed Limestone filter (Nom. max. part. size = 1")#1 Sample size = 27.581" pan ✓

wt. ret. Ø 27.58

% pass 100%

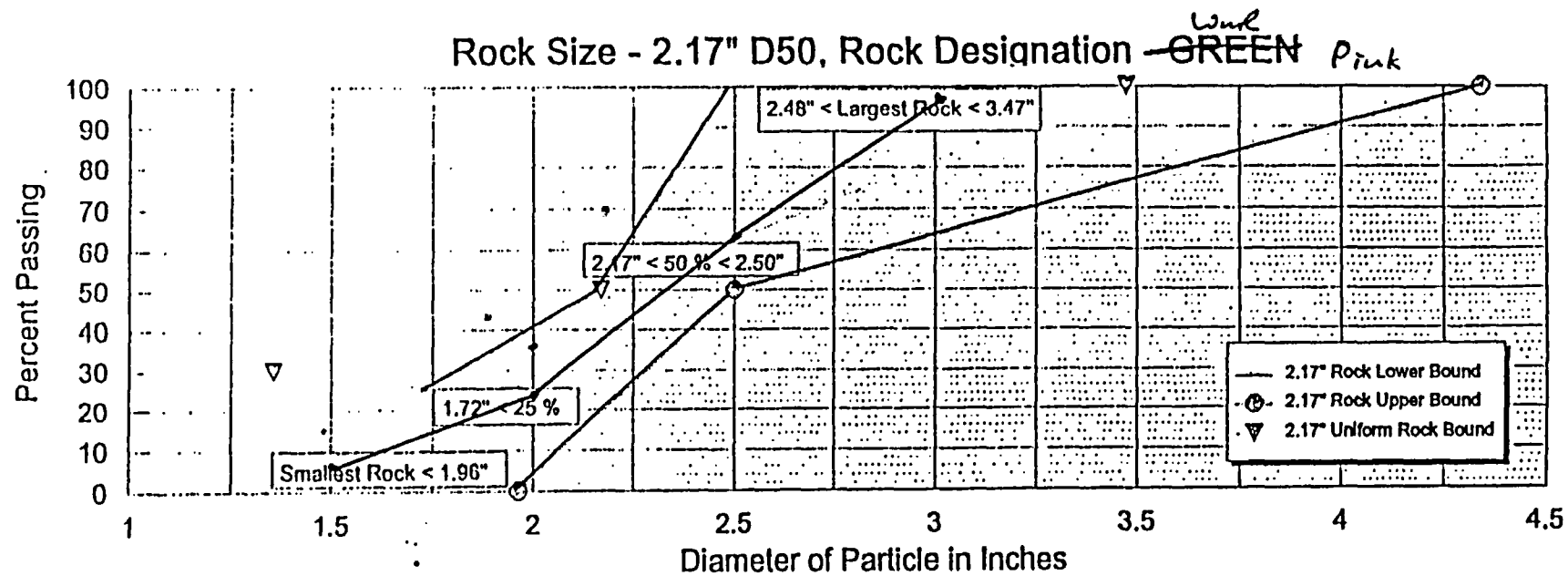


FIGURE 3 (Continued)



SUBJECT D<sub>50</sub> 2.17" Green

PROJECT NO. 8152 RM PAGE

CLIENT Pathfinder

DATE

BY

PROJECT Limestone Testing

CHECKED

BY

Sample # 2Total sample wt. 311.60 lbf

Wt. Retained

| Screen size → | 3.47" | 3"  | 2 1/2" | 2"    | 1 1/2" | pan   |
|---------------|-------|-----|--------|-------|--------|-------|
| 61.85         | -0-   | -0- | 52.50  | 42.9  | 51.80  | 22.85 |
| 62.20         |       |     | 20.80  | 57.05 | 26.65  |       |
| 61.35         |       |     |        | 36.55 |        |       |
| 63.45         |       |     |        |       |        |       |
| 62.75         |       |     |        |       |        |       |

5-15-98

311.60 lbf

VCH -

The results of gradation on the 2.17" D<sub>50</sub> material will be done this morning. Could you plot the results on the attached graph and fax to Jim Couch this morning?

Thanks  
Elen

|  |     |     |       |       |       |       |
|--|-----|-----|-------|-------|-------|-------|
| Total                                    | 0   | 0   | 73.30 | 136.6 | 78.45 | 22.85 |
| % Retained                               | 0   | 0   | 23.52 | 43.84 | 25.18 | 7.33  |
| % Passing                                | 100 | 100 | 76.5  | 32.6  | 7.5   | (0.1) |
| how do we get a percent passing the pan? |     |     |       |       |       |       |

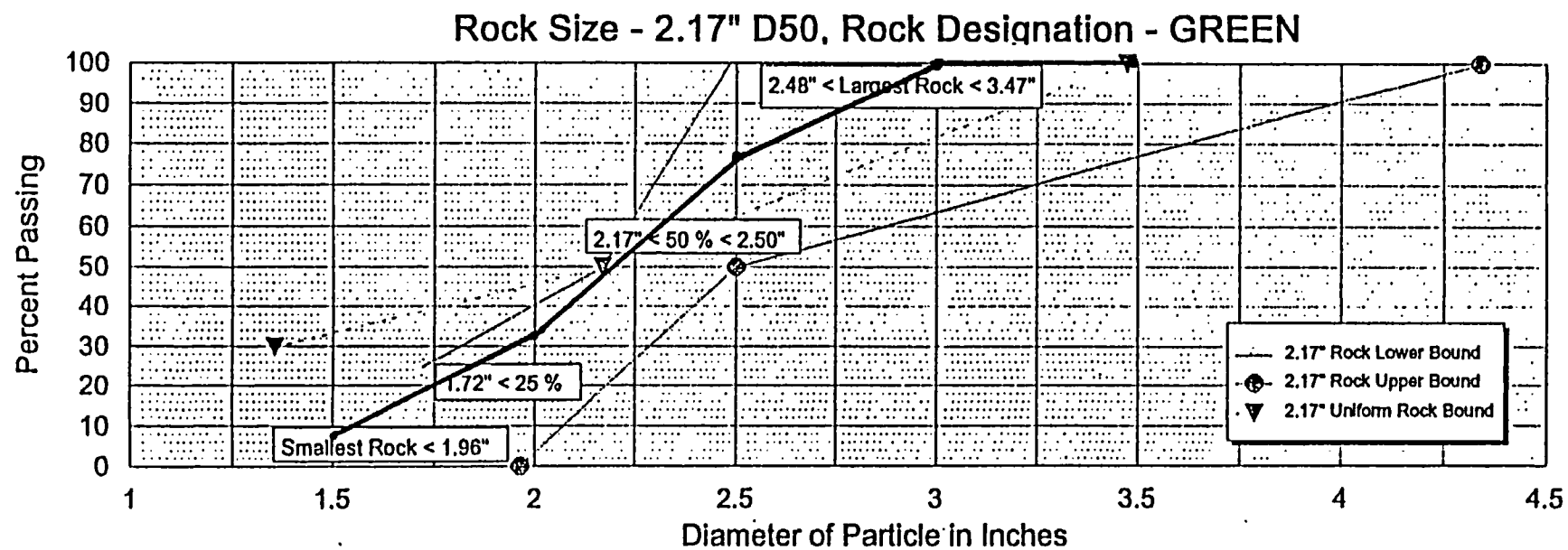


FIGURE 3 (Continued)

SUBJECT Dgo 2.17" GreenPROJECT NO. 8152 RM PAGECLIENT PathfinderDATE 8-31-98BY JFMPROJECT Limestone Testing

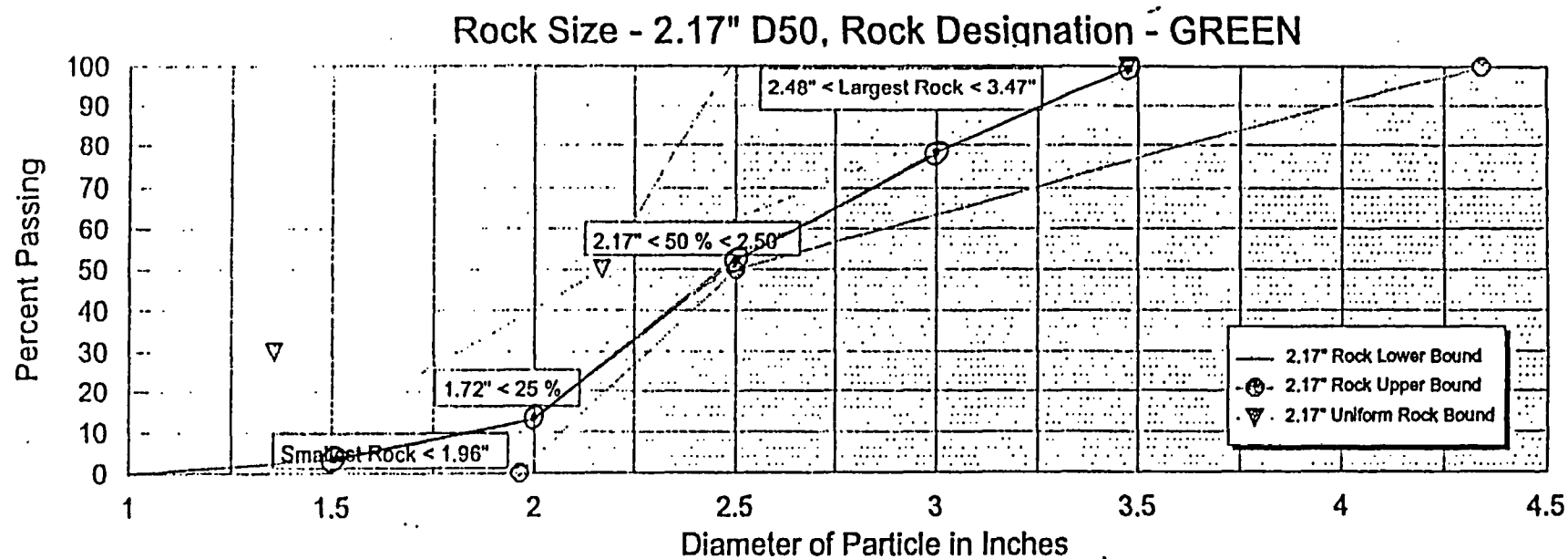
CHECKED

BY

Sample # 3Total sample wt. 132.91

Wt. Retained

| Screen size → | 3.47" | 3"    | 2 1/2" | 2"    | 1 1/2" | pan  |
|---------------|-------|-------|--------|-------|--------|------|
| -0-           | 27.19 | 37.65 | 49.27  | 12.92 | 5.88   |      |
| Total         | -0-   | 27.19 | 37.65  | 49.27 | 12.92  | 5.88 |
| % Retained    | -0-   | 20.5  | 28.3   | 37.1  | 9.7    | 4.4  |
| % Passing     | 100%  | 79.5  | 51.2   | 14.1  | 4.4    | -0-  |



**FIGURE 3 (Continued)**

SUBJECT D<sub>50</sub> 2.17" GreenPROJECT NO. 8152 R4 PAGECLIENT PathfinderDATE 10-9-98BY JPMPROJECT Limestone Testing

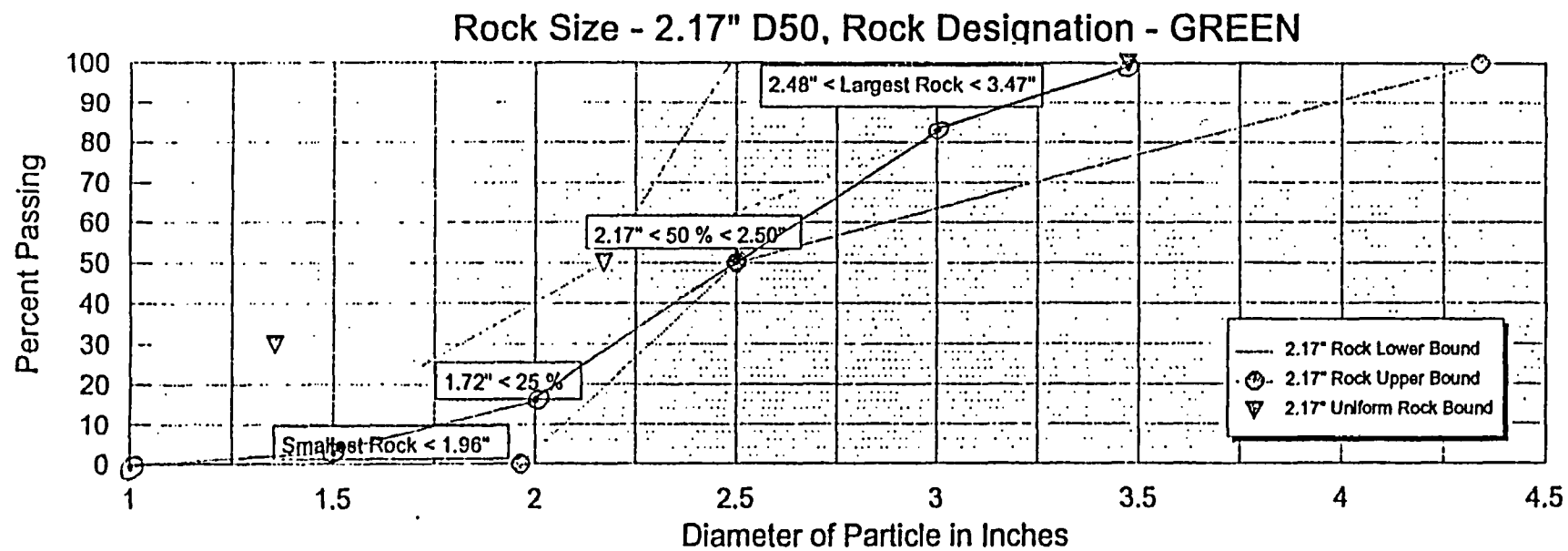
CHECKED

BY

Sample # 4Total sample wt. 245.6

Wt. Retained

| Screen size → | 3.47" | 3"   | 2 1/2" | 2"   | 1 1/2" | pan |
|---------------|-------|------|--------|------|--------|-----|
|               | 0     | 41.5 | 82.3   | 77.1 | 36.5   | 2.2 |
| Total         | 0.0   | 41.5 | 82.3   | 77.1 | 36.5   | 2.2 |
| % Retained    | 0.0   | 16.9 | 33.5   | 31.4 | 14.9   | 3.3 |
| % Passing     | 100.0 | 83.1 | 49.6   | 18.2 | 3.3    | 0.0 |



**FIGURE 3 (Continued)**



# Rock Size - 2.17" D50, Rock Designation - GREEN

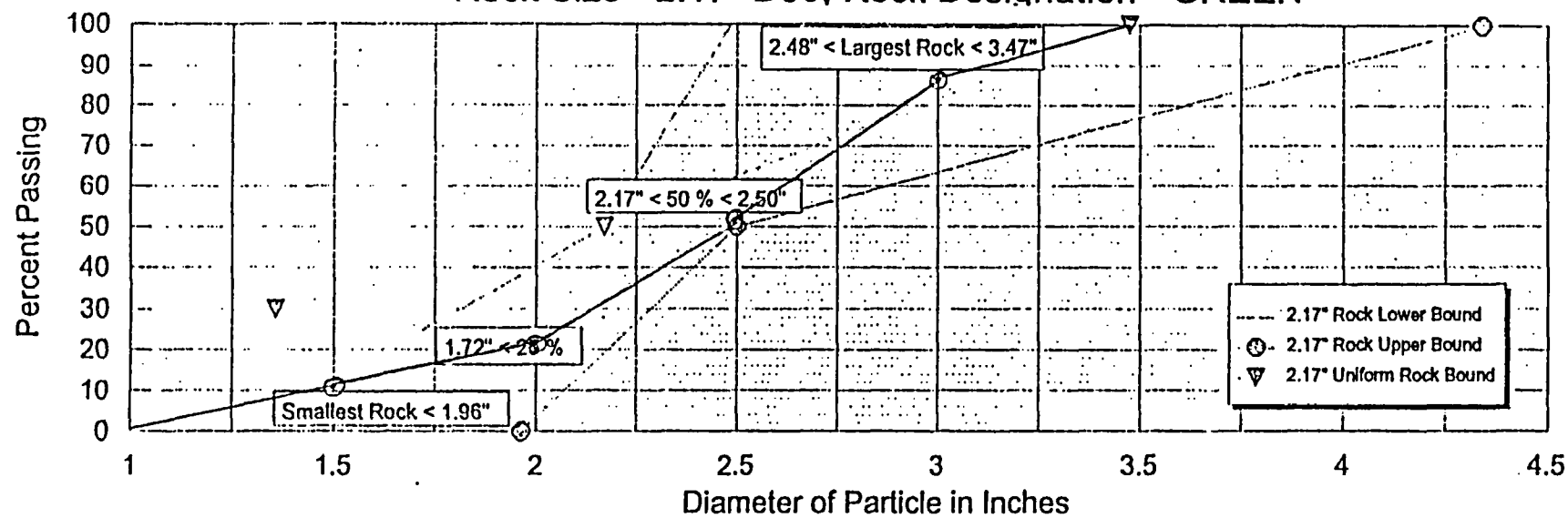
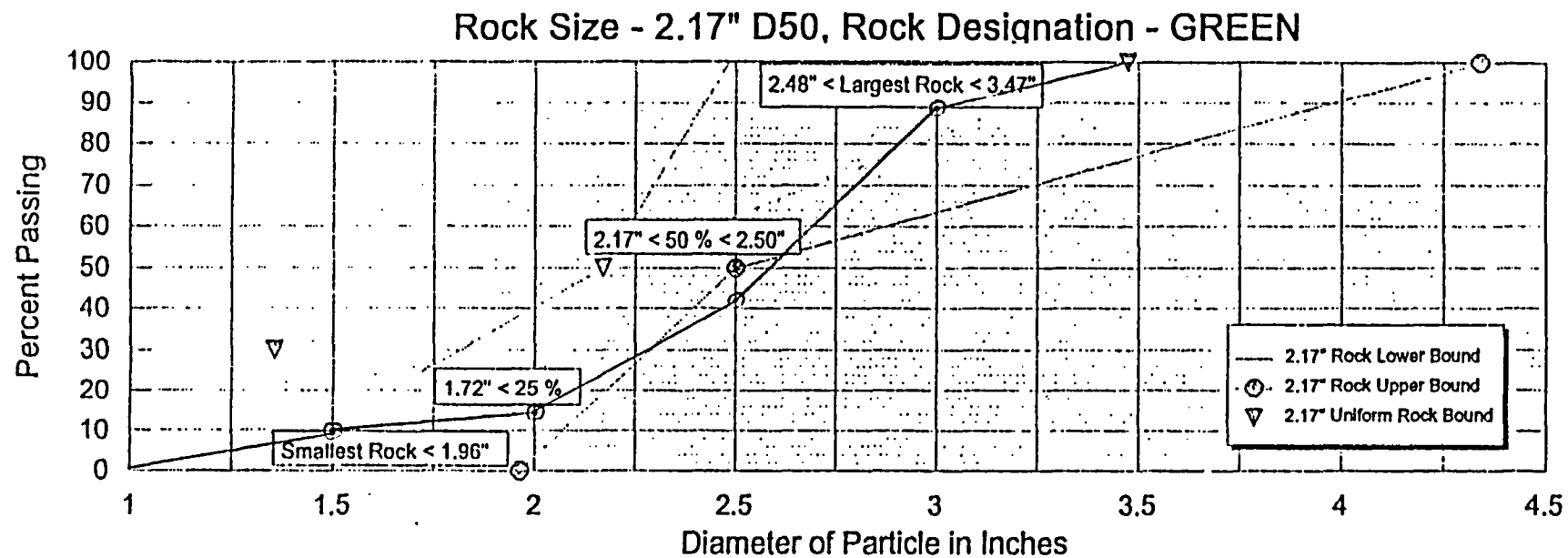


FIGURE 3 (Continued)







Kevin;

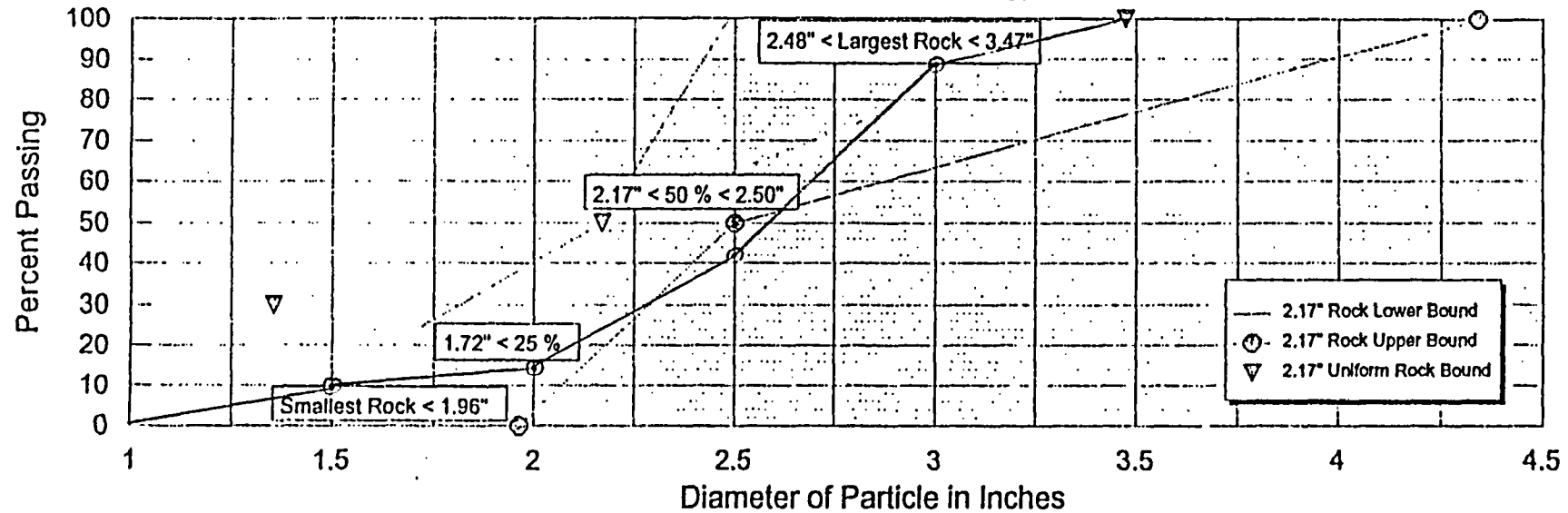
I'll be out to resample both 2.17 + 1.63 on Wednesday.

2.17 might pass without changing screens but it'll be close.

The frozen mud gave a higher percent passing on the low end (10.8% uns mud)

**FIGURE 3 (Continued)**

# Rock Size - 2.17" D50, Rock Designation - GREEN



Kevin;

I'll be out to resample both 2.17 + 1.63 on Wednesday.

2.17 might pass without changing screens but it'll be close.

The frozen mud gave a higher percent passing on the low end (10.8% uns mud)

FIGURE 3 (Continued)

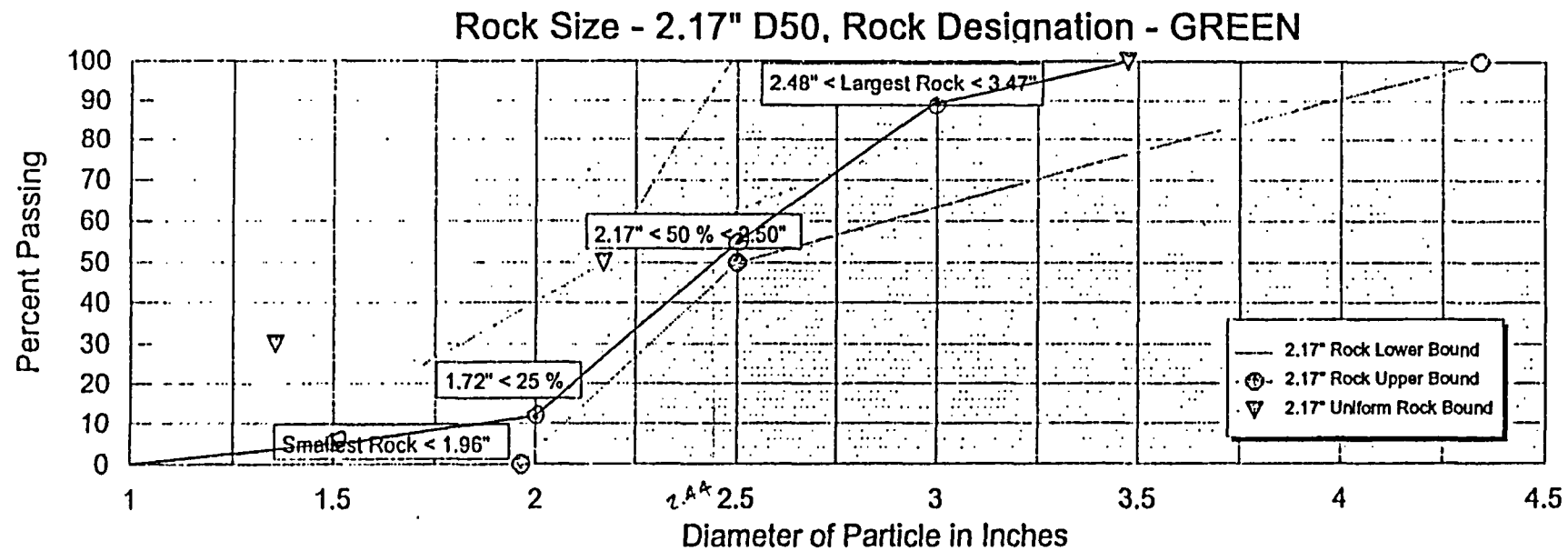


FIGURE 3 (Continued)

D<sub>50</sub> 4" SMALL RIP RAP

1998

SUBJECT D50 4" BLUE

PROJECT NO. 8152 RM PAGE

CLIENT Pathfinder

DATE 3-2-78

BY C. M. R.

PROJECT Limestone Rock Testing

CHECKED

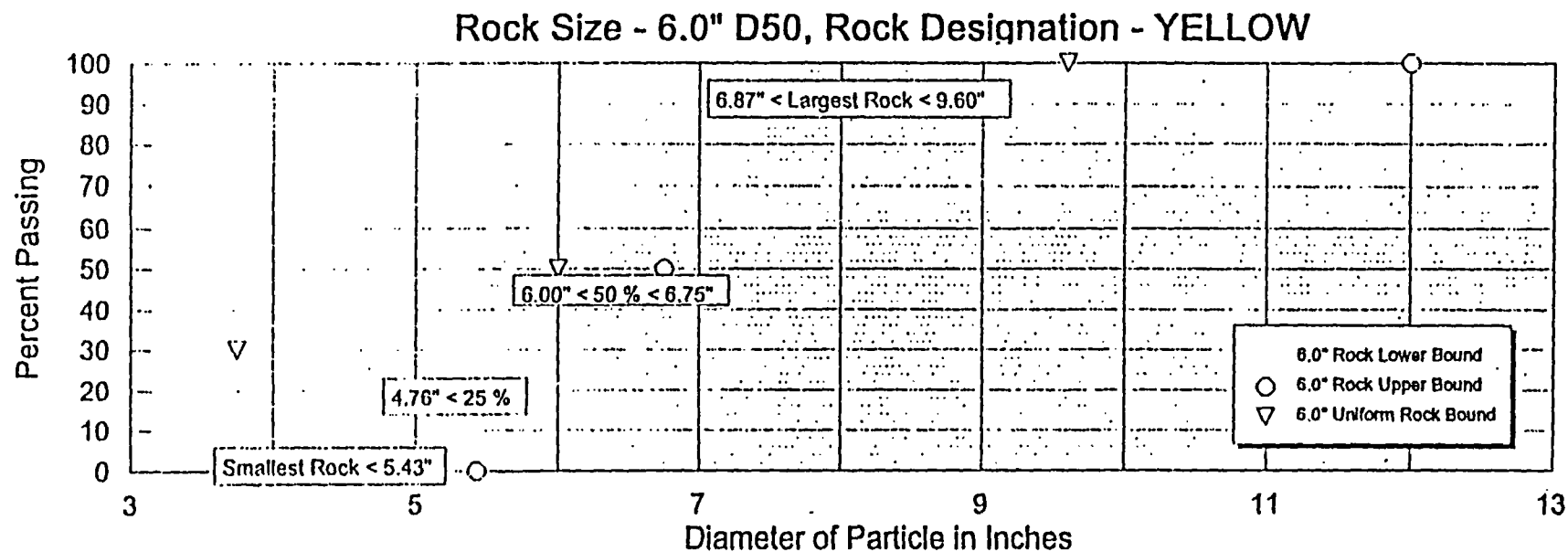
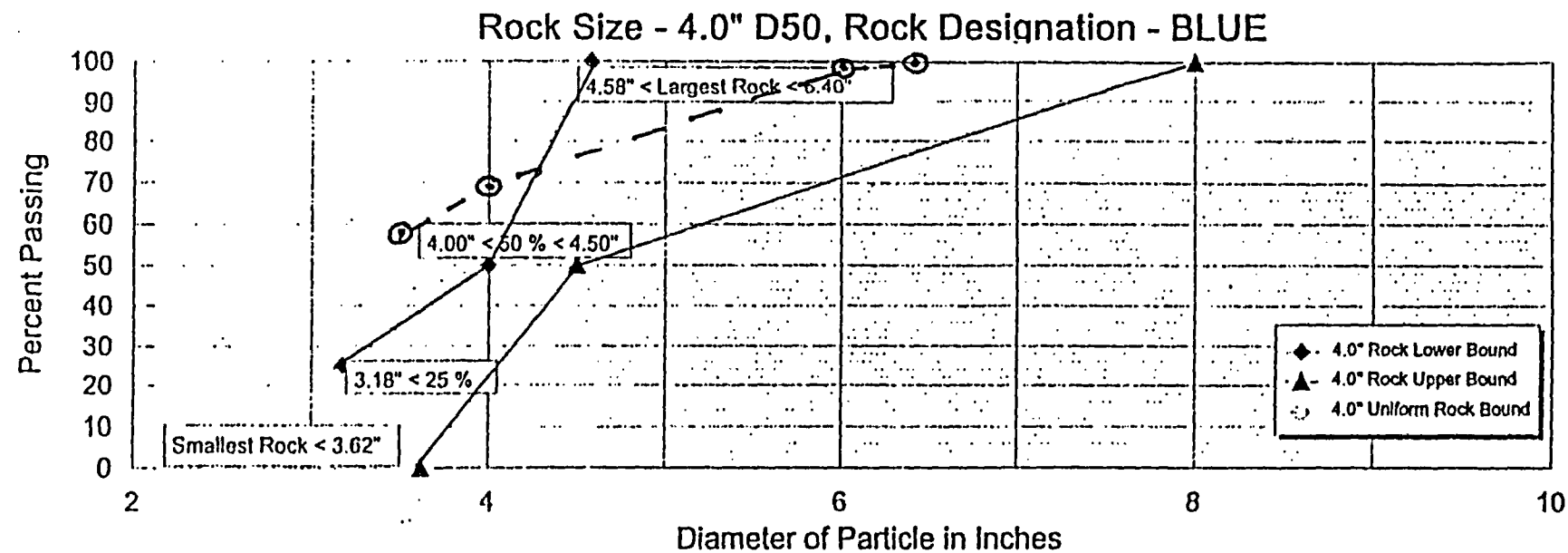
BY

Sample # 1

Total Sample Wt. 2,703 lbs

Wt. retained

| Screen Size | 6.4" | 6"   | 4"    | 3.5"  | Pan    |
|-------------|------|------|-------|-------|--------|
|             | Ø    | 10   | 179   | 48    | 114    |
|             |      |      | 103   | 41    | 103    |
|             |      |      | 102   | 37    | 114    |
|             |      |      | 92    | 44    | 107    |
|             |      |      | 105   | 54    | 175    |
|             |      |      | 101   | 58    | 102    |
|             |      |      | 123   | 13    | 164    |
|             |      |      |       |       | 116    |
|             |      |      |       |       | 114    |
|             |      |      |       |       | 112    |
|             |      |      |       |       | 103    |
|             |      |      |       |       | 104    |
|             |      |      |       |       | 107    |
|             |      |      |       |       | 53     |
| Sieve total | —    | —    | —     | —     | —      |
| TOTAL       | Ø    | 10   | 810 ✓ | 295 ✓ | 1588 ✓ |
| % Retained  | Ø    | 0.3  | 30.0  | 10.9  | 58.8   |
| % Passing   | 100  | 99.7 | 69.7  | 58.8  |        |

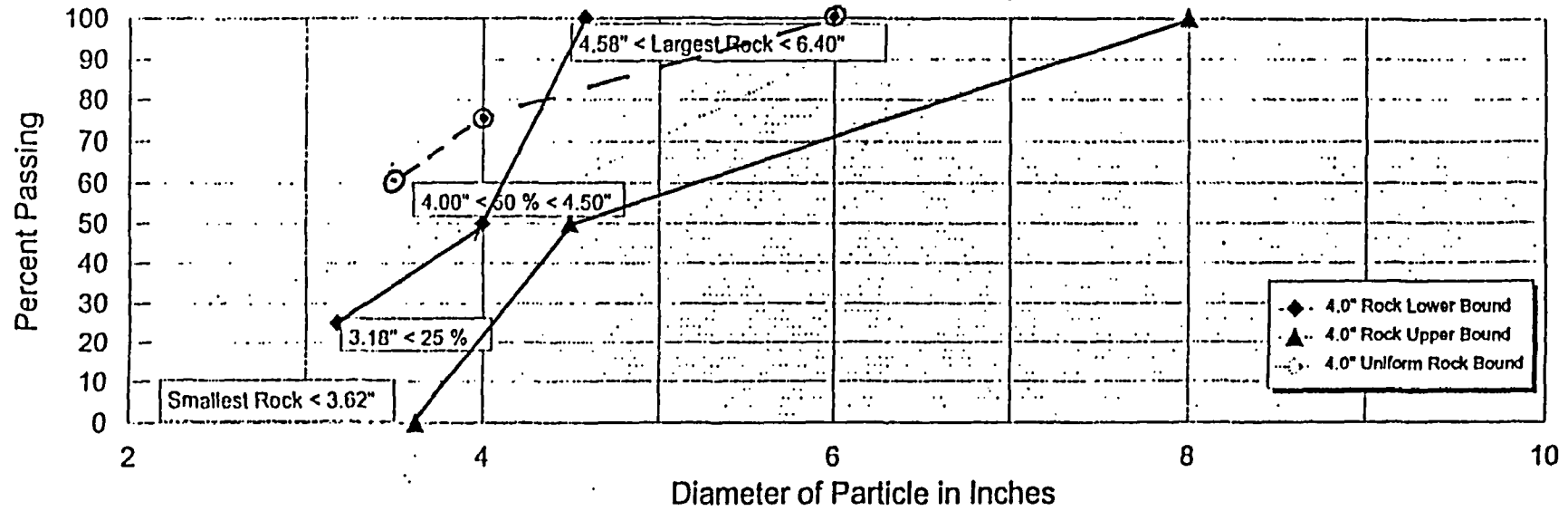


**FIGURE 2**





# Rock Size - 4.0" D50, Rock Designation - BLUE



**SUBJECT**

PROJECT NO. \_\_\_\_\_

BY

**CLIENT**

DATE \_\_\_\_\_

**PROJECT**

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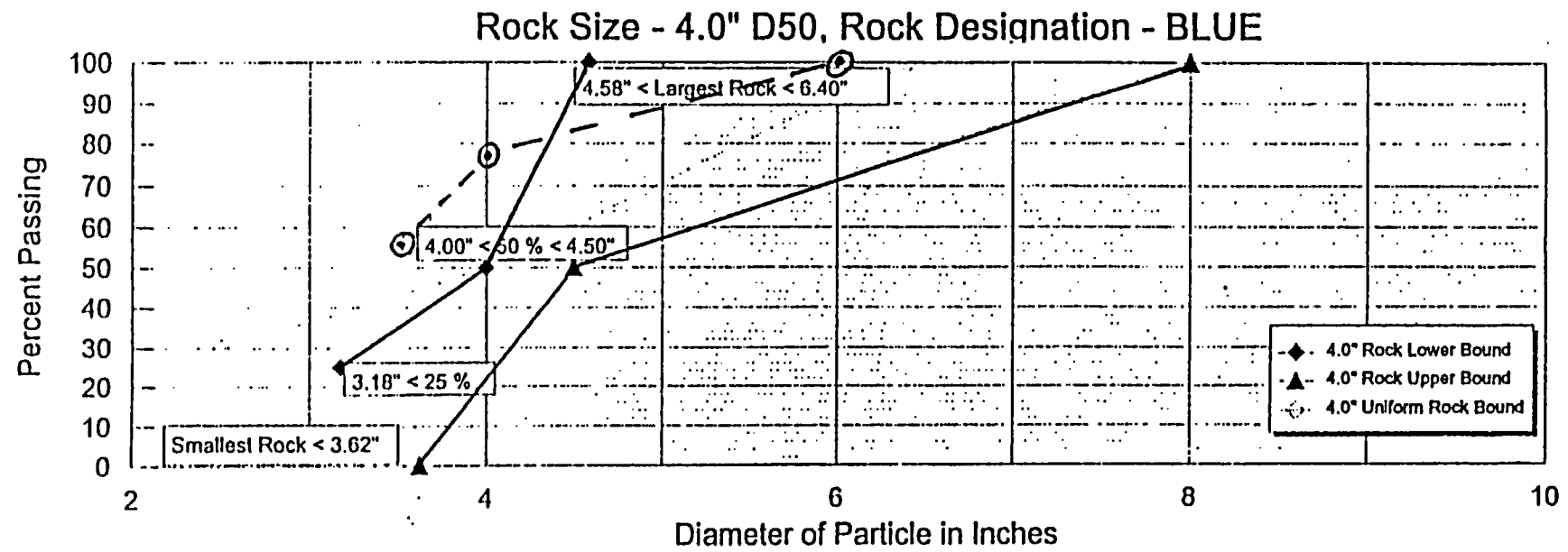
Sample #

Total Sample Wt.

Wt. retained

| Screen<br>SIZE | 6.4"         | 6"           | 4"    | 3.5"  | -3.5"         |
|----------------|--------------|--------------|-------|-------|---------------|
|                | <del>Ø</del> | <del>Ø</del> | 103   | 49    | 51            |
|                |              |              | 112   | 56    | <del>58</del> |
|                |              |              |       | 69    | 107           |
|                |              |              |       | 43    | 45            |
|                |              |              |       |       | 59            |
|                |              |              |       |       | 48            |
|                |              |              |       |       | 56            |
|                |              |              |       |       | 57            |
|                |              |              |       |       | <del>48</del> |
|                |              |              |       |       | 81            |
| Sleet total    |              |              |       |       |               |
| TOTAL          | <del>Ø</del> | <del>Ø</del> | 215   | 217   | 556           |
| % Retained     |              | <del>Ø</del> | 21.8% | 21.9% | 56.3%         |
| % Passing      |              | 100          | 78.2% | 51.1% |               |

Sample # 1R(2) 3-5-52



**SUBJECT**

D50 4"

BLUE

PROJECT NO.

8152 Run

PAGE

**CLIENT**

## Path Finder

DATE \_\_\_\_\_

3-13-98

BY Wark

PROJECT

## Limestone Rock Testing

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Sample # 12(3)

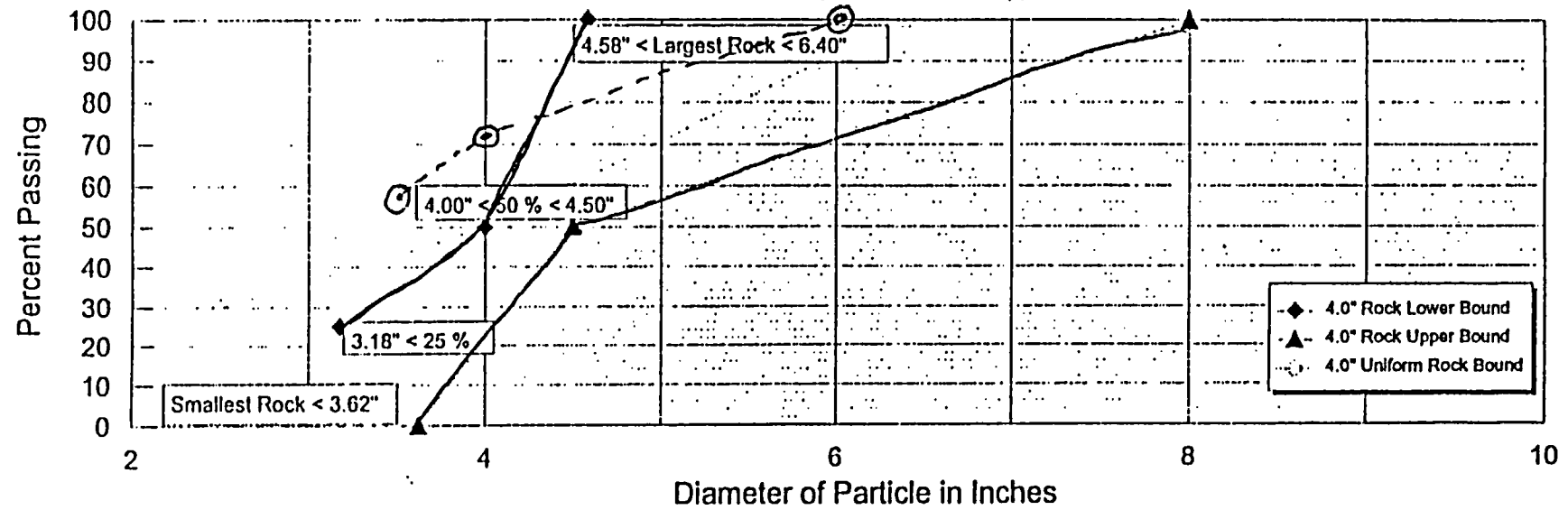
Total Sample wt.

948-

Wt. retained[illegible]

3-13-98 Sample #

Rock Size - 4.0" D50, Rock Designation - BLUE



**SUBJECT**

**PROJECT NO.** \_\_\_\_\_

## CLIENT

DATE \_\_\_\_\_

**PROJECT**

**CHECKED**

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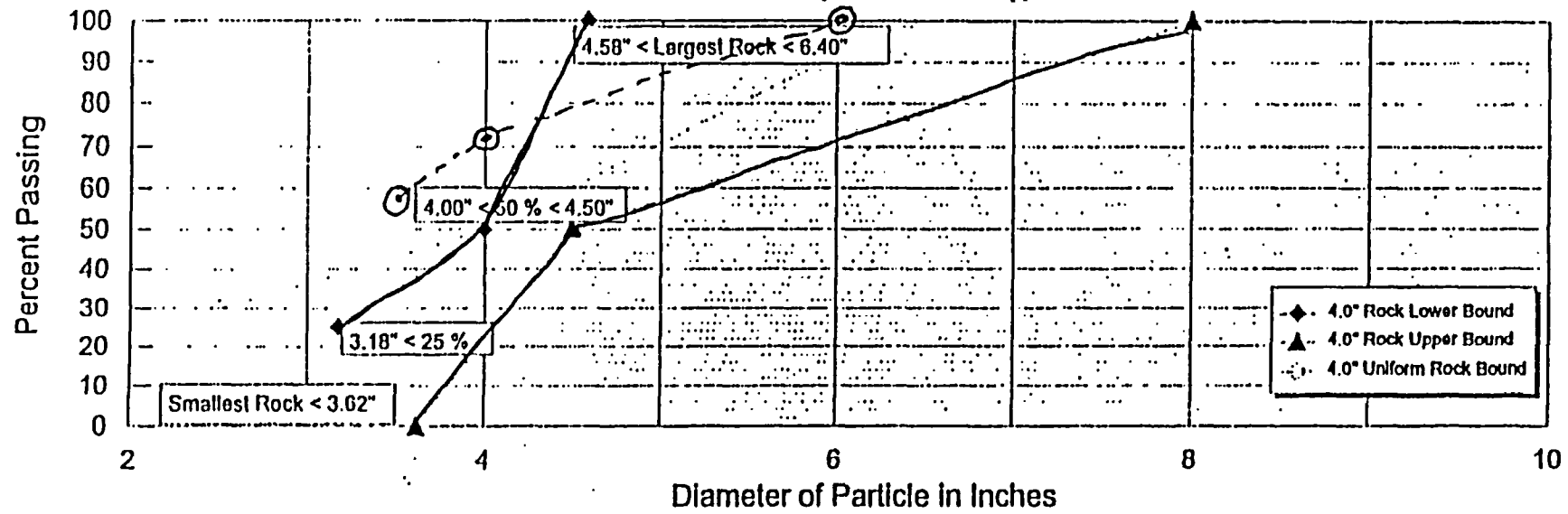
Sample # 1K(4)

Total Sample wt.

Wt. retained[illegible]

3-15-98 Sample # 1R(4)

Rock Size - 4.0" D50, Rock Designation - BLUE



SUBJECT D50 4 ISSUE

PROJECT NO. 8152 Rm PAGE

CLIENT Pathfinder

DATE 3-16-98 BY \_\_\_\_\_

PROJECT Limestone Rock Testing

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Sample # 1R(5)

Total Sample wt. 985

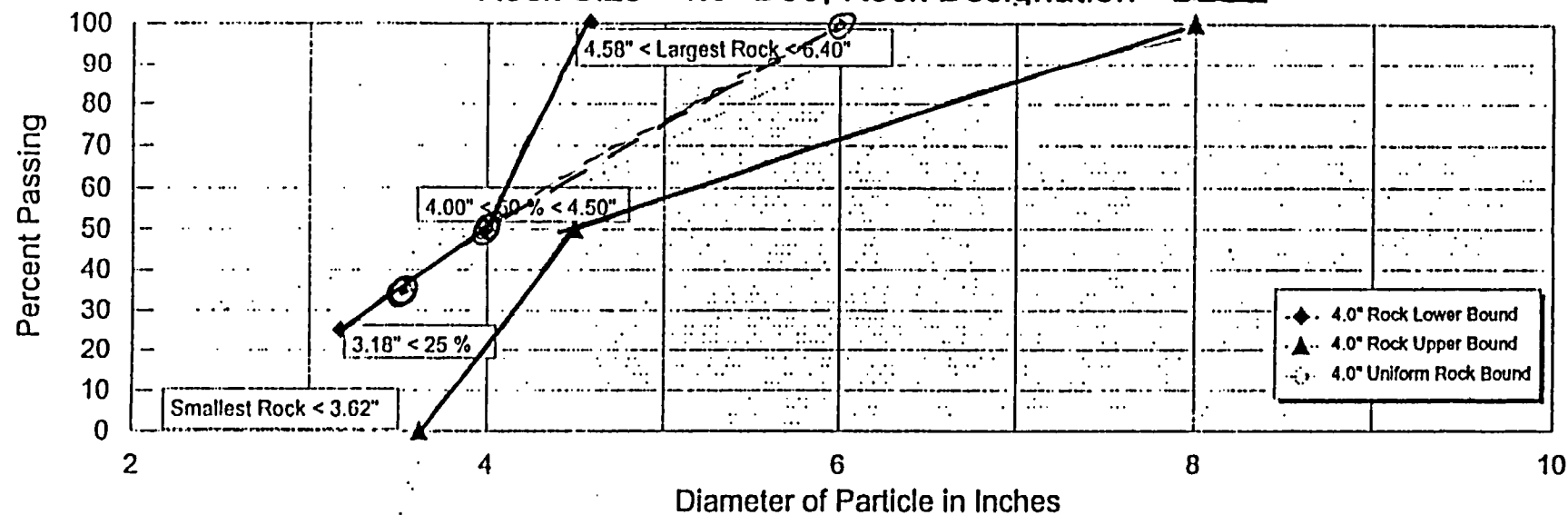
Wt. retained

[illegible]



3-16-98

Rock Size - 4.0" D50, Rock Designation ~~4.0" D50~~



SUBJECT D50 4" BLUE

PROJECT NO. 8152 RM PAGE

CLIENT Pathfinder

DATE 4-10-98

BY Gerald Miller

PROJECT Limestone Rock Testing

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BY

Sample # 2Total Sample Wt. 2520.4Wt. retained

| Screen size | 6.4"         | 6"           | 4"     | 3.5"  |       |
|-------------|--------------|--------------|--------|-------|-------|
|             |              |              | 68.5   | 61.9  | 61.4  |
|             |              |              | 66.2   | 63.9  | 57.5  |
|             |              |              | 62.2   | 46.7  | 60.2  |
|             |              |              | 58.2   | 64.4  | 60.2  |
|             |              |              | 65.4   | 55.5  | 63.0  |
|             |              |              | 51.2   | 70.5  | 59.1  |
|             |              |              | 47.9   | 66.8  | 63.9  |
|             |              |              | 58.5   | 58.8  | 68.3  |
|             |              |              | 67.6   | 66.8  | 63.9  |
|             |              |              | 62.7   | 59.3  |       |
|             |              |              | 68.3   |       |       |
|             |              |              | 56.4   |       |       |
|             |              |              | 54.2   |       |       |
|             |              |              | 57.1   |       |       |
|             |              |              | 60.8   |       |       |
|             |              |              | 46.9   |       |       |
|             |              |              | 58.4   |       |       |
|             |              |              | 61.8   |       |       |
|             |              |              | 59.3   |       |       |
|             |              |              | 57.1   |       |       |
|             |              |              | 53.5   |       |       |
|             |              |              | 52.6   |       |       |
|             |              |              | 53.3   |       |       |
|             |              |              | 63.4   |       |       |
| Sleet total |              |              |        |       |       |
| TOTAL       | <del>0</del> | <del>1</del> | 1408.5 | 614.6 | 497.3 |
| % Retained  |              |              | 55.9   | 24.4  | 19.7  |
| % Passing   |              | 100%         | 44.1   | 75.7  |       |

2520.4

SUBJECT D50 4" BLUE

PROJECT NO. 8152 RM PAGE

CLIENT Pathfinder

DATE

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PROJECT Limestone Rock Testing

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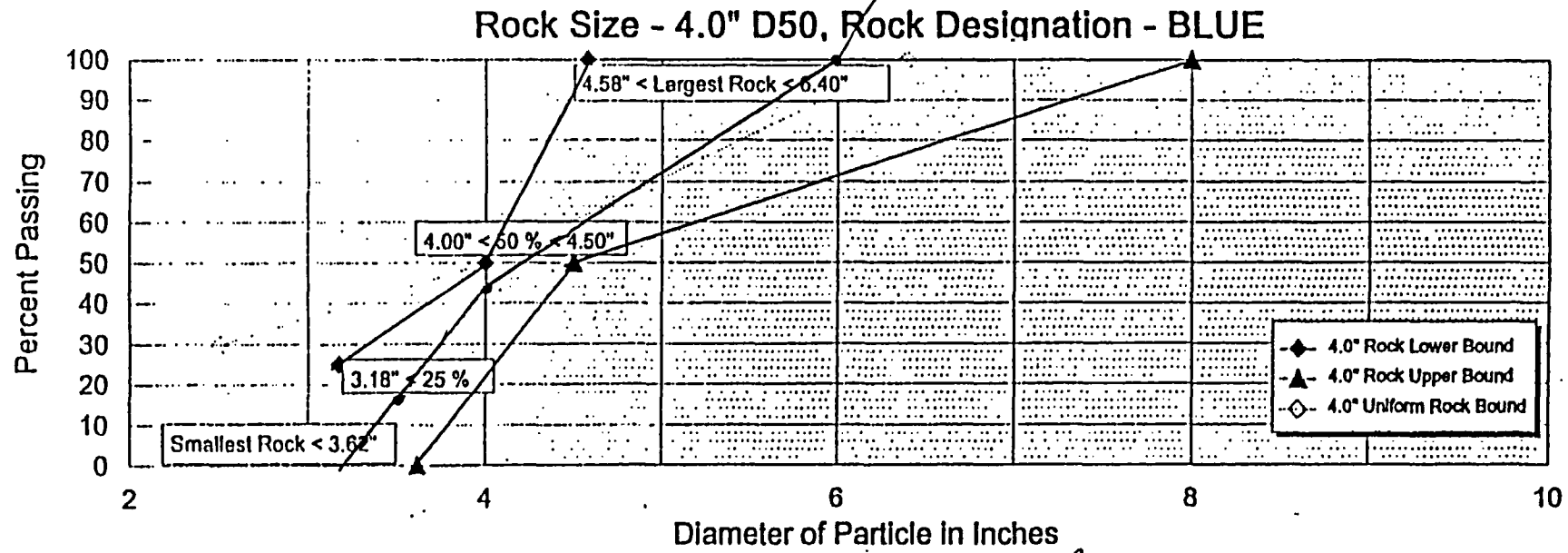
Sample # \_\_\_\_\_

Total Sample Wt. \_\_\_\_\_

Wt. retained

| Screen<br>SIZE | 6.4" | 6" | 4"            | 3.5"          | <del>3.5"</del>       |
|----------------|------|----|---------------|---------------|-----------------------|
|                |      |    | ✓ 10.6 - 2.1  | ✓ 64.3 - 2.4  | 58                    |
|                |      |    | ✓ 68.4 - 2.2  | ✓ 66.2 - 2.3  | <del>63.5</del> - 2.1 |
|                |      |    | ✓ 64.5 - 2.3  | ✓ 48.95 - 2.3 | 59.2 - 1.7            |
|                |      |    | ✓ 59.9 - 1.7  | ✓ 66.5 - 2.1  | 65.0 - 4.8            |
|                |      |    | ✓ 67.4 - 2.0  | ✓ 60.2 - 4.75 | 65.1 - 2.1            |
|                |      |    | ✓ 53.1 - 1.9  | ✓ 72.7 - 2.2  | 62.3 - 3.2            |
|                |      |    | ✓ 52.6 - 4.75 | ✓ 69.0 - 2.2  | 65.7 - 1.8            |
|                |      |    | ✓ 60.5 - 2.0  | ✓ 60.9 - 2.1  | 70.2 - 1.9            |
|                |      |    | ✓ 69.7 - 2.1  | ✓ 69.0 - 2.2  | <del>65.6</del> - 1.7 |
|                |      |    | ✓ 65.0 - 2.3  | 61.3 - 2.0    |                       |
|                |      |    | ✓ 70.3 - 2.0  |               |                       |
|                |      |    | ✓ 58.6 - 2.2  |               |                       |
|                |      |    | ✓ 56.2 - 2.0  |               |                       |
|                |      |    | ✓ 45.4 - 2.3  |               |                       |
|                |      |    | ✓ 42.5 - 1.7  |               |                       |
|                |      |    | ✓ 48.8 - 1.9  |               |                       |
|                |      |    | ✓ 60.7 - 2.3  |               |                       |
|                |      |    | ✓ 63.9 - 2.1  |               |                       |
|                |      |    | ✓ 61.5 - 2.2  |               |                       |
|                |      |    | ✓ 59.2 - 2.1  |               |                       |
|                |      |    | ✓ 55.6 - 2.1  |               |                       |
|                |      |    | ✓ 54.7 - 2.1  |               |                       |
|                |      |    | ✓ 49.9 - 1.6  |               |                       |
|                |      |    | ✓ 51.0 - 2.0  |               |                       |
| Slect total    |      |    |               |               |                       |
| TOTAL          |      |    |               |               |                       |
| % Retained     |      |    |               |               |                       |
| % Passing      |      |    |               |               |                       |

4-10-98



SUBJECT D50 4 ISSUE

PROJECT NO. 8152 Rm PAGE

CLIENT Pathfinder

DATE 6-11

BY

PROJECT Limestone Rock Testing

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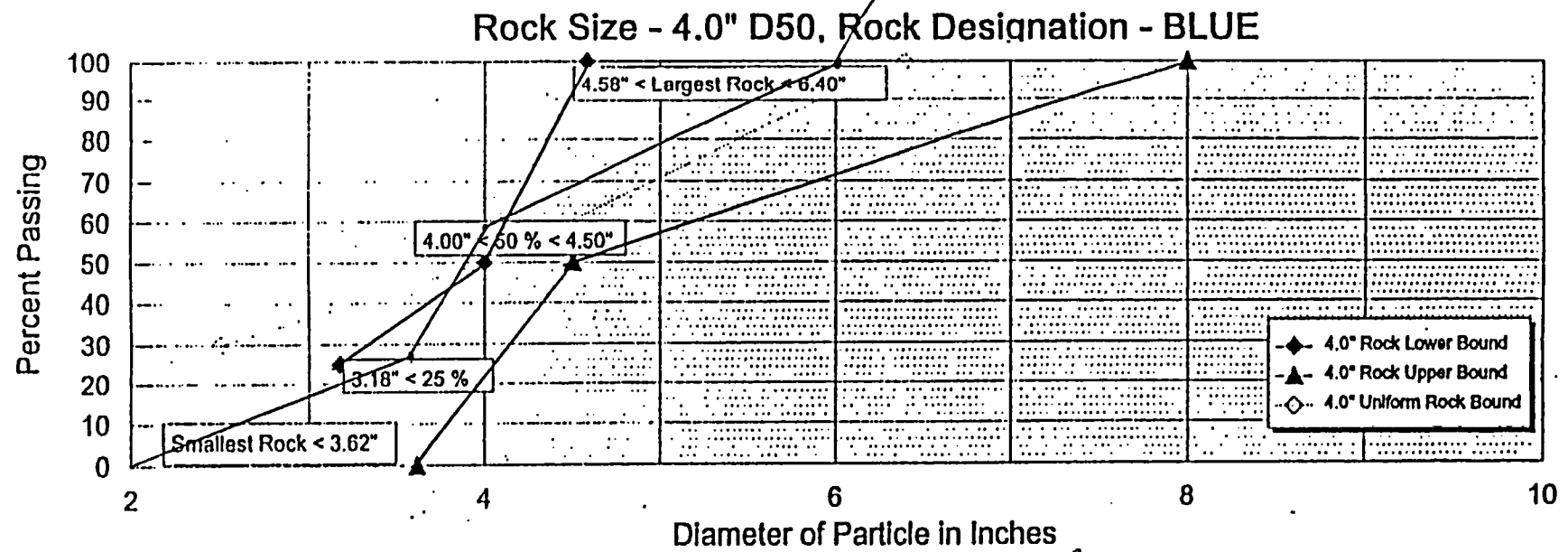
Sample # 3

Total Sample Wt. 308

Wt. retained

262 lbs sample size

[illegible]



D<sub>50</sub> 6" SMALL RIP RAP

1998





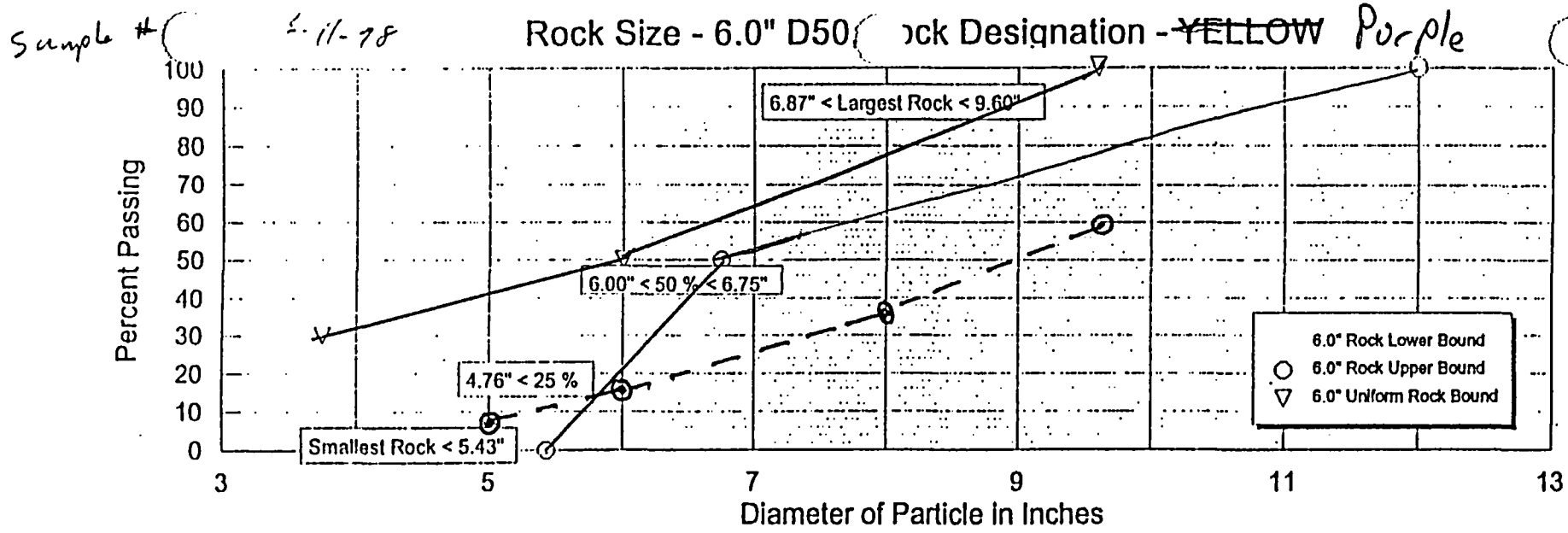


FIGURE 2



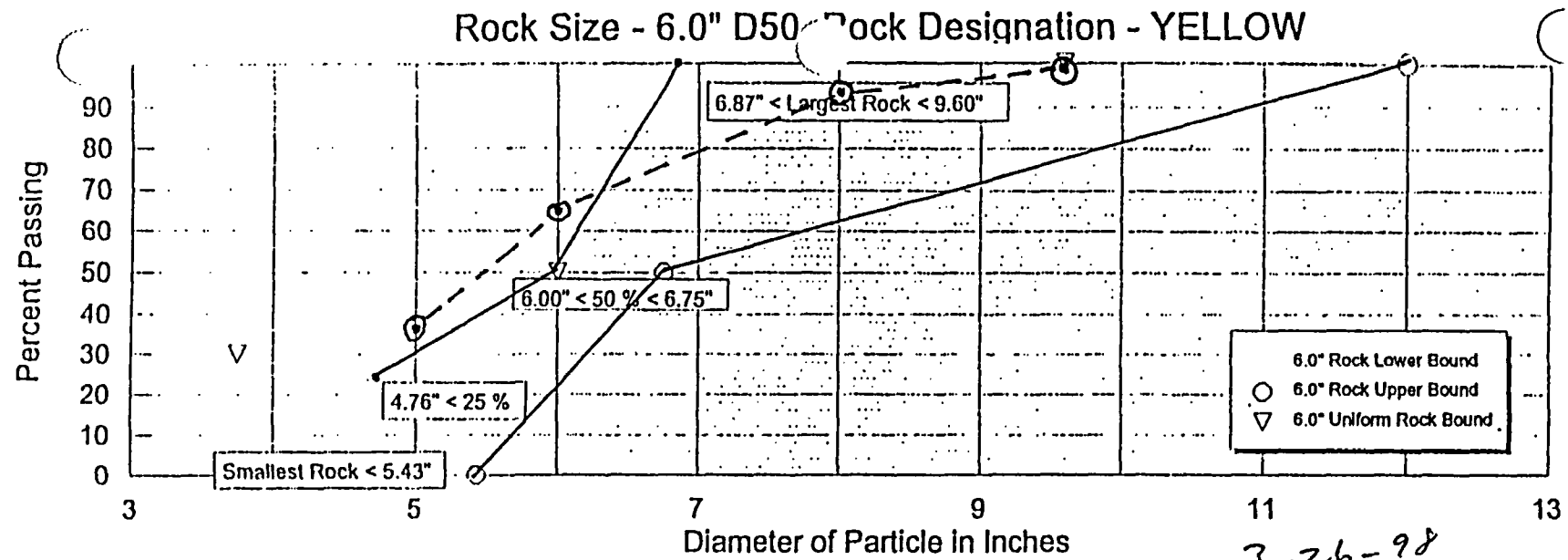


FIGURE 2

3-26-98

Sample #1 R(1)

**SUBJECT**

PROJECT NO.

**CLIENT**

DATE \_\_\_\_\_

**PROJECT**

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Sample # 1R(z)

Total Sample wt. 2,385

Wt. retained

[illegible]

# Rock Size - 6.0" D50, Rock Designation - YELLOW

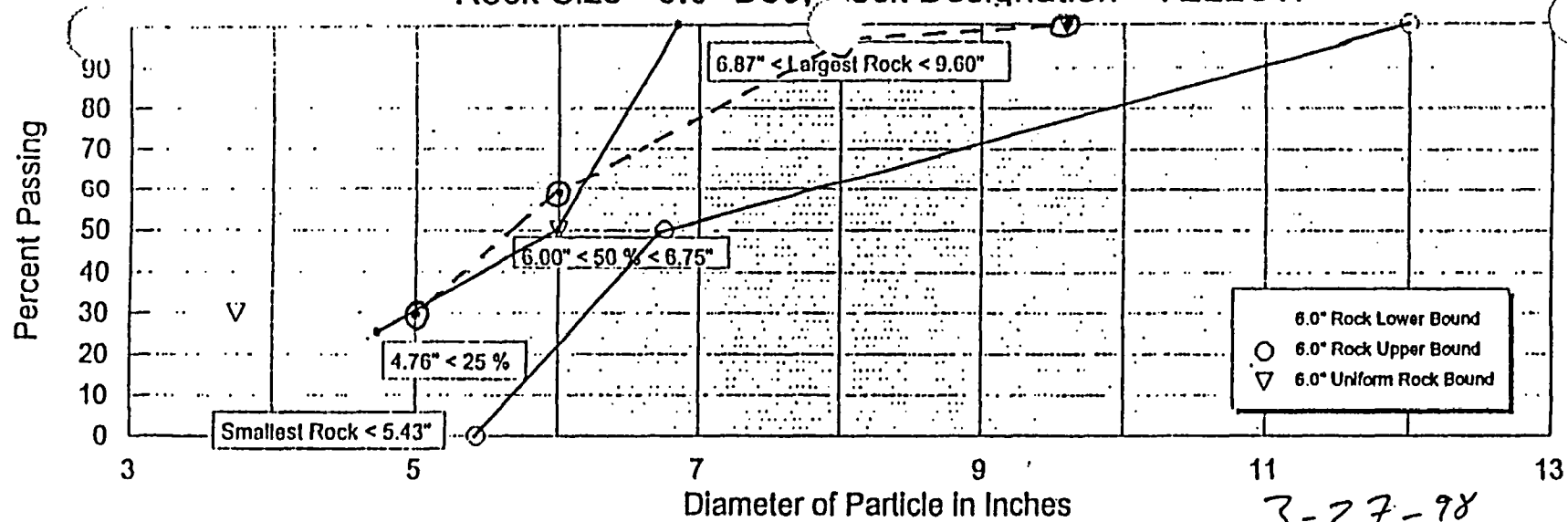


FIGURE 2

3-27-98

Sample #1 R(2)



# Rock Size - 6.0" D50, Rock Designation - YELLOW

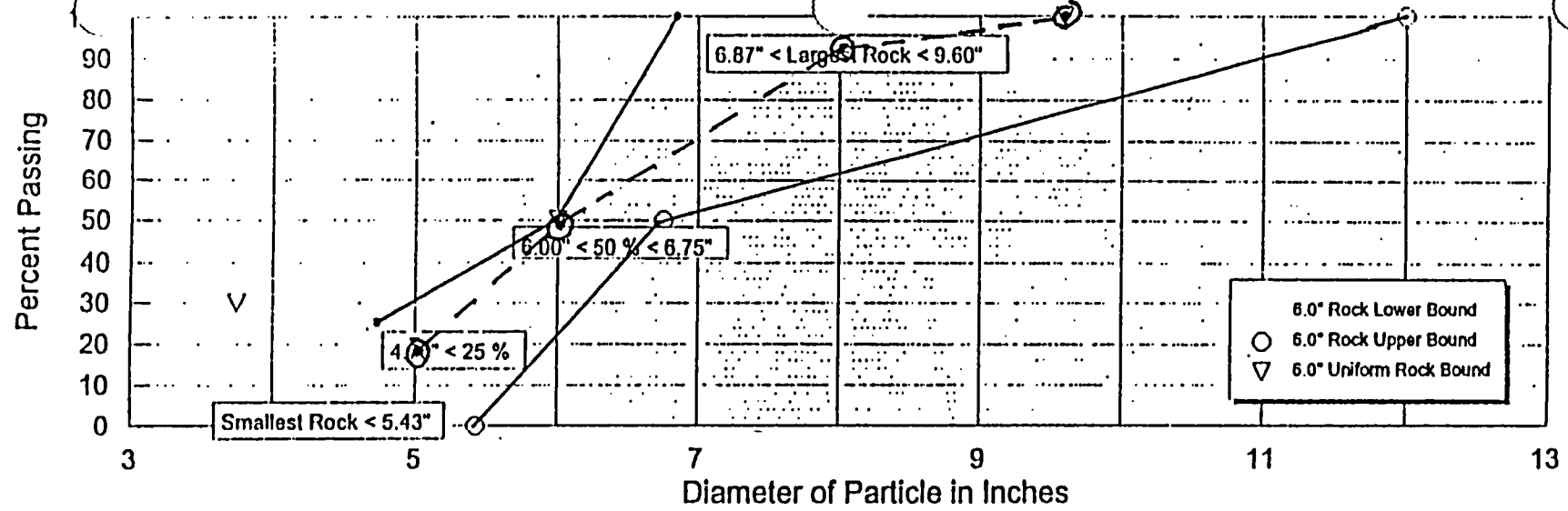


FIGURE 2

4-1-98  
sample # 1(RS)





# Rock Size - 6.0" D50 Rock Designation - YELLOW

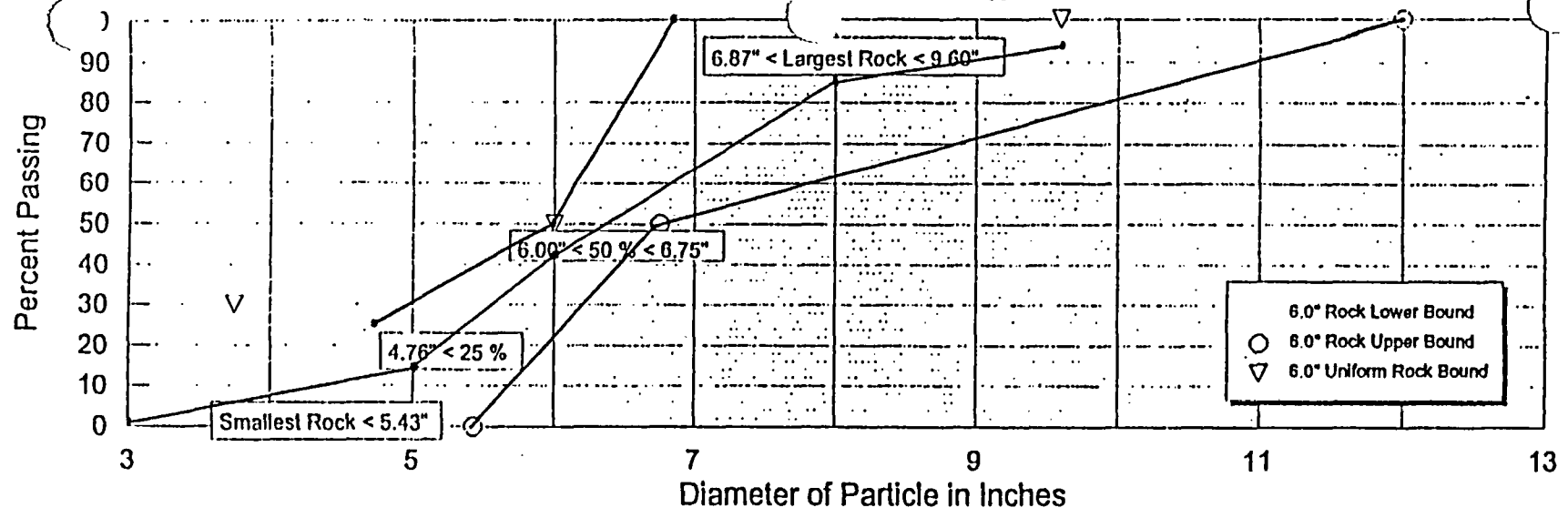


FIGURE 2

**SUBJECT**

**PROJECT NO.**

**CLIENT**

DATE \_\_\_\_\_

BY

**PROJECT**

**CHECKED**

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Sample #

Total Sample wt.

Wt. retained[illegible]

# Rock Size - 6.0" D50, Rock Designation - YELLOW

7-28-98

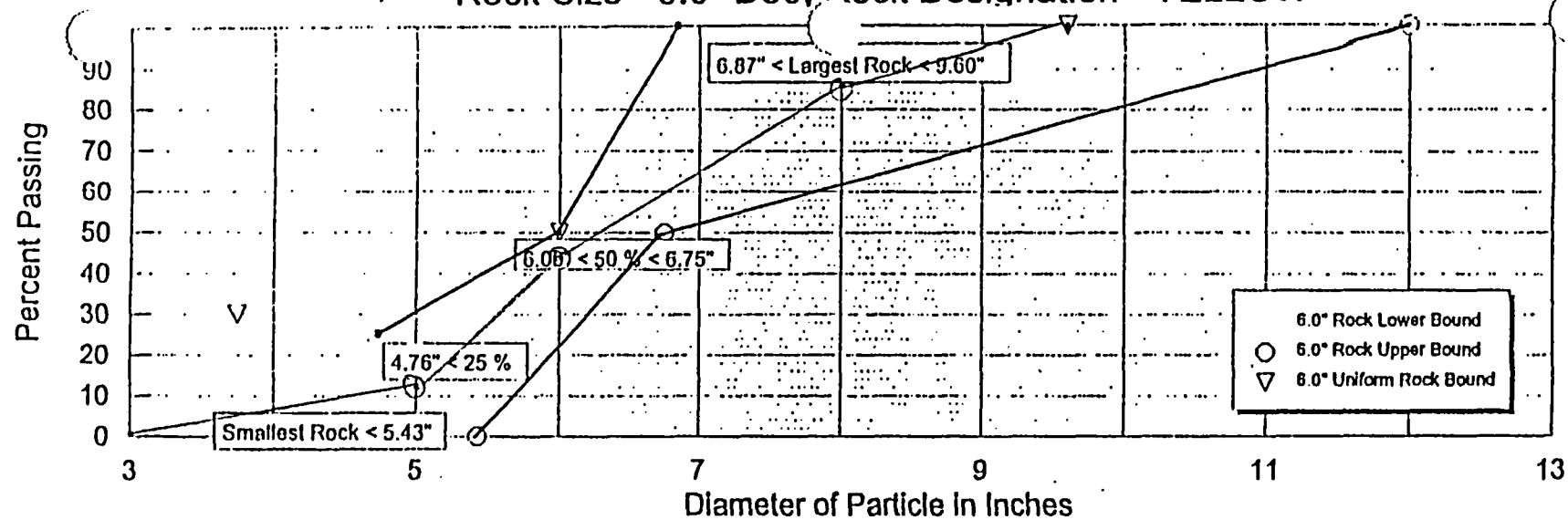


FIGURE 2



# Rock Size - 6.0" D50, Rock Designation - YELLOW

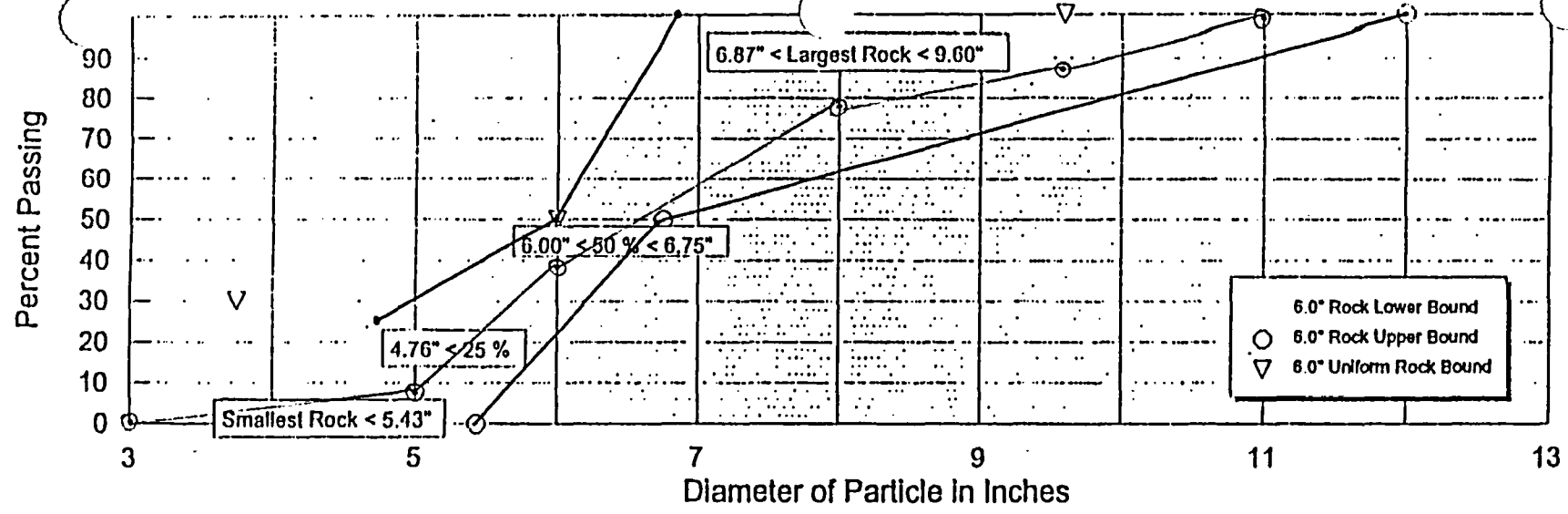


FIGURE 2

D<sub>50</sub> 9.6" RIP RAP

1998

SUBJECT D<sub>50</sub> 9.6" ~~ORANGE~~ Yellow

PROJECT NO. 8152 RM PAGE

CLIENT Pathfinder

DATE 3-12-98 BY

PROJECT Limestone Rock Testing

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Sample # 1

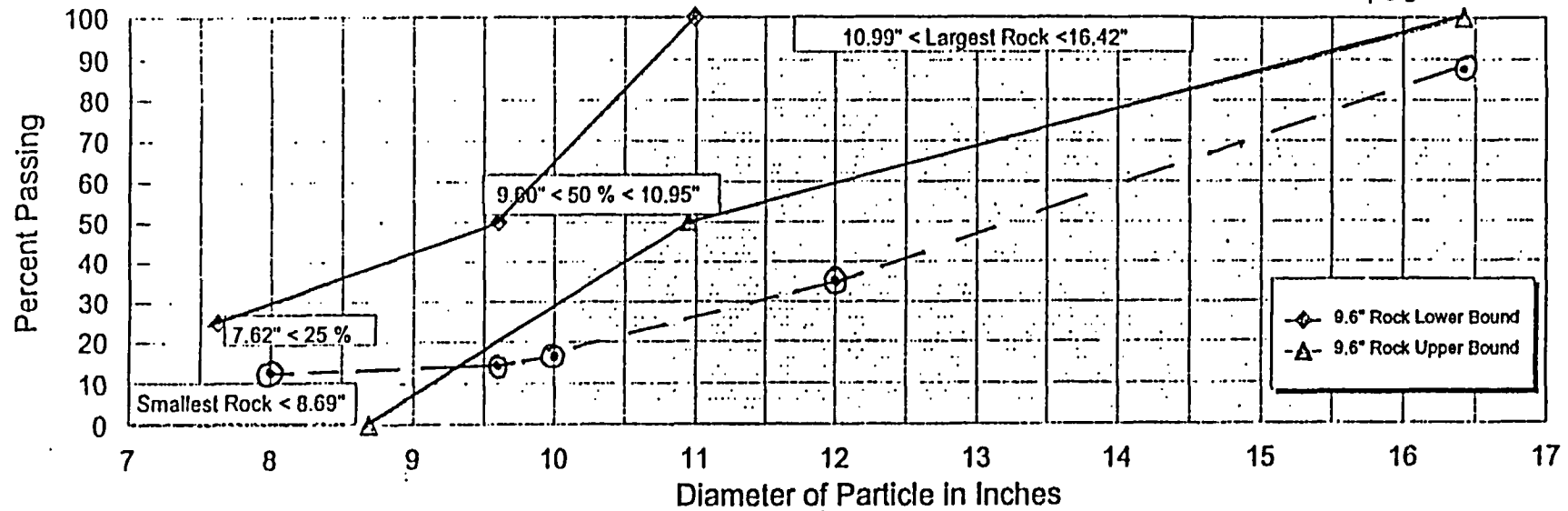
Total Sample Wt. 12,602

Wt. retained  $w_b = 46$   
 $cut = 91$

| Screen size | 16.42" | 12"   | 10"  | 9.6" | 8"   | - 8  |
|-------------|--------|-------|------|------|------|------|
|             | 444    | 122   | 229  | 161  | 207  | 237  |
|             | 294    | 137   | 210  | 274  |      | 293  |
|             | 495    | 167   | 247  | 104  |      | 248  |
|             | 269    | 265   | 344  |      |      | 534  |
|             |        | 224   | 300  |      |      | 377  |
|             |        | 260   | 417  |      |      | 110  |
|             |        | 164   | 149  |      |      |      |
|             |        | 157   | 104  |      |      |      |
|             |        | 164   |      |      |      |      |
|             |        | 116   |      |      |      |      |
|             |        | 237   |      |      |      |      |
|             |        | 178   |      |      |      |      |
|             |        | 170   |      |      |      |      |
|             |        | 139   |      |      |      |      |
|             |        | 137   |      |      |      |      |
|             |        | 194   |      |      |      |      |
|             |        | 263   |      |      |      |      |
|             |        | 150   |      |      |      |      |
|             |        | 232   | 127  |      |      |      |
|             |        | 216   | 236  |      |      |      |
|             |        | 185   | 295  |      |      |      |
|             |        | 168   | 194  |      |      |      |
|             |        | 214   | 159  |      |      |      |
|             |        | 312   | 211  |      |      |      |
|             |        | 313   | 228  |      |      |      |
|             |        | 184   | 241  |      |      |      |
| Sleet total |        |       |      |      |      |      |
| TOTAL       | 1502   | 6,755 | 2000 | 539  | 207  | 1599 |
| % Retained  | 11.9   | 53.6  | 15.9 | 4.3  | 1.6  | 12.7 |
| % Passing   | 88.1   | 34.5  | 18.6 | 14.3 | 12.7 |      |

Sample #1 3-12-98

Rock Size - 9.6" D50, Rock Designation - <sup>upper</sup>ORANGE Yellow





SUBJECT D<sub>50</sub> 9.6" ORANGE

PROJECT NO. 8152 Rm PAGE

CLIENT Pathfinder

DATE 3-16-98

BY

PROJECT Limestone Rock Testing

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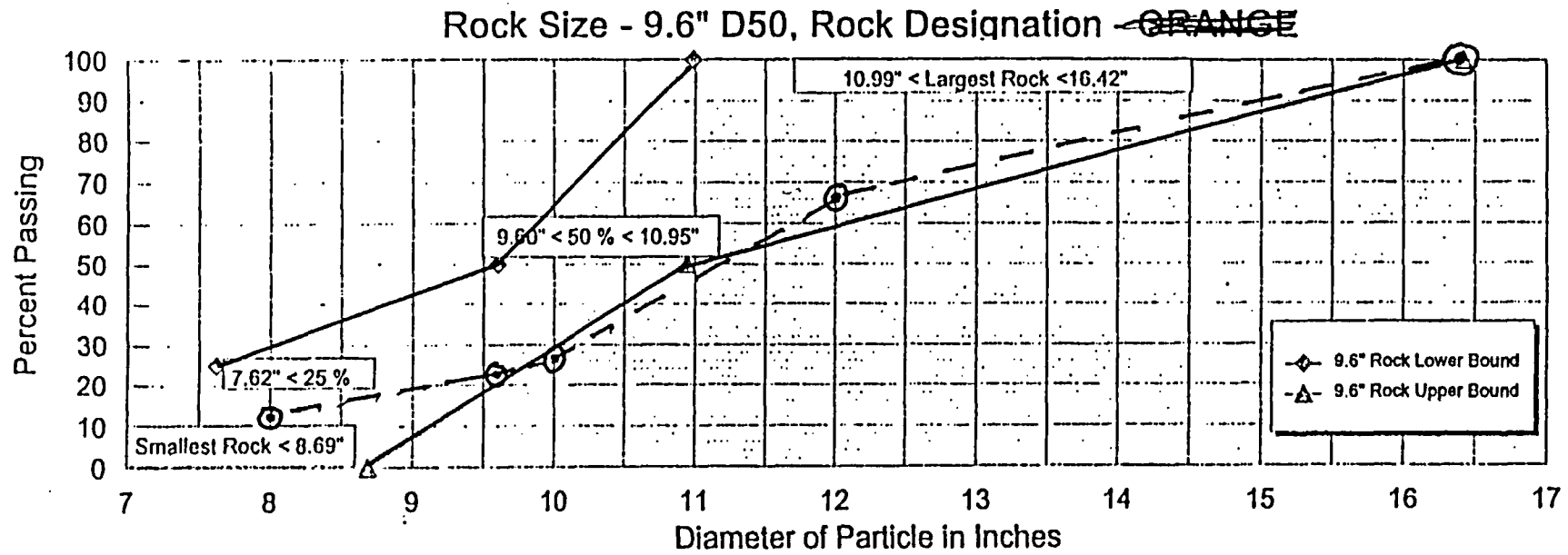
Sample # 1A(1)

Total Sample Wt. 8,878

Wt. retained

| Screen Size | 16.42" | 12"   | 10"   | 9.6" | 8"   | - 8"           |
|-------------|--------|-------|-------|------|------|----------------|
|             | 0      | 96    | 238   | 294  | 271  | 225            |
|             |        | 105   | 134   | 268  | 109  | <del>225</del> |
|             |        | 131   | 145   |      | 298  | 240            |
|             |        | 154   | 115   |      | 210  | 311            |
|             |        | 250   | 302   |      |      | 256            |
|             |        | 154   | 95    |      |      |                |
|             |        | 149   | 205   |      |      |                |
|             |        | 255   | 146   |      |      |                |
|             |        | 254   | 193   |      |      |                |
|             |        | 179   | 334   |      |      |                |
|             |        | 106   | 292   |      |      |                |
|             |        | 184   | 276   |      |      |                |
|             |        | 204   | 300   |      |      |                |
|             |        | 132   | 182   |      |      |                |
|             |        | 137   | 324   |      |      |                |
|             |        | 210   | 210   |      |      |                |
|             |        | 191   |       |      |      |                |
| Sleet total |        |       |       |      |      |                |
| TOTAL       | ---    | 2,945 | 3,491 | 562  | 848  | 1032           |
| % Retained  | ---    | 33.2  | 39.3  | 6.3  | 9.6  | 11.2           |
| % Passing   | (100)  | 66.8  | 27.5  | 21.2 | 11.6 |                |

3-16-98



D<sub>50</sub> 12" RIP RAP

1998

SUBJECT D50 12" Brown

PROJECT NO. 8152 RM PAGE 1/2

CLIENT Pathfinder

DATE 3-25-98 BY Wmr

PROJECT Limestone Rock Testing

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BY

Sample # 1

Total Sample Wt. 25,080

Wt. retained

| Screen size | 20.52" | 15"    | 12"   | 10"   | -10"  |
|-------------|--------|--------|-------|-------|-------|
|             | 480    | 268    | 205   | 274   | 261   |
|             |        | 227    | 219   | 219   | 273   |
|             |        | 287    | 159   | 266   | 188   |
|             |        | 224    | 190   | 115   | 294   |
|             |        | 189    | 164   | 174   | 230   |
|             |        | 184    | 236   | 234   | 175   |
|             |        | 198    | 264   |       | 234   |
|             |        | 178    | 296   | 147   | 220   |
|             |        | 223    | 217   | 132   | 190   |
|             |        | 177    | 165   | 80    | 120   |
|             |        | 254    | 264   | 22    |       |
|             |        | 128    | 122   |       |       |
|             |        | 320    | 247   |       |       |
|             |        | 263    | 263   |       |       |
|             |        | 230    | 239   |       |       |
|             |        | 280    | 136   |       |       |
|             |        | 165    | 274   |       |       |
|             |        | 277    | 280   |       |       |
|             |        | 132    | 202   |       |       |
|             |        | 101    | 225   |       |       |
|             |        | 217    | 134   |       |       |
|             |        | 355    | 308   |       |       |
|             |        | 158    | 88    |       |       |
|             |        | 221    | 218   |       |       |
|             |        | 167    | 172   |       |       |
|             |        | 262    | 117   |       |       |
|             |        | 217    | 195   |       |       |
|             |        | 322    | 207   |       |       |
|             |        | 290    | 264   |       |       |
| Sleet total | 480    | 6,464  | 6,070 | 1,663 | 2,185 |
| TOTAL       | 480    | 11,369 | 9,383 | 1,663 | 2,185 |
| % Retained  | 1.9    | 45.3   | 37.4  | 6.6   | 8.7   |
| % Passing   | 98.1   | 52.8   | 62.4  | 93.4  | 91.3  |

SUBJECT D50 12" Brown

PROJECT NO. 8152 RM PAGE 2/2

CLIENT Pathfinder

DATE 3-25-98 BY WWR

PROJECT Limestone Rock Testing

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BY

Sample # 1

Total Sample wt. \_\_\_\_\_

Wt. retained

| Screen size | 20.52" | 15"   | 12"   | 10" | -10" |
|-------------|--------|-------|-------|-----|------|
|             | Ø      | 185   | 170   | Ø   | Ø    |
|             |        | 195   | 255   |     |      |
|             |        | 372   | 272   |     |      |
|             |        | 200   | 165   |     |      |
|             |        | 260   | 180   |     |      |
|             |        | 236   | 145   |     |      |
|             |        | 225   | 122   |     |      |
|             |        | 175   | 123   |     |      |
|             |        | 230   | 192   |     |      |
|             |        | 320   | 130   |     |      |
|             |        | 230   | 222   |     |      |
|             |        | 210   | 197   |     |      |
|             |        | 220   | 74    |     |      |
|             |        | 175   | 110   |     |      |
|             |        | 222   | 220   |     |      |
|             |        | 220   | 147   |     |      |
|             |        | 300   | 215   |     |      |
|             |        | 152   | 100   |     |      |
|             |        | 244   | 165   |     |      |
|             |        | 222   | 109   |     |      |
|             |        | 312   |       |     |      |
| Sleet total | Ø      | 4,905 | 3,213 | Ø   | Ø    |
| TOTAL       |        |       |       |     |      |
| % Retained  |        |       |       |     |      |
| % Passing   |        |       |       |     |      |

# Rock Size - 12" D50 Rock Designation - BROWN

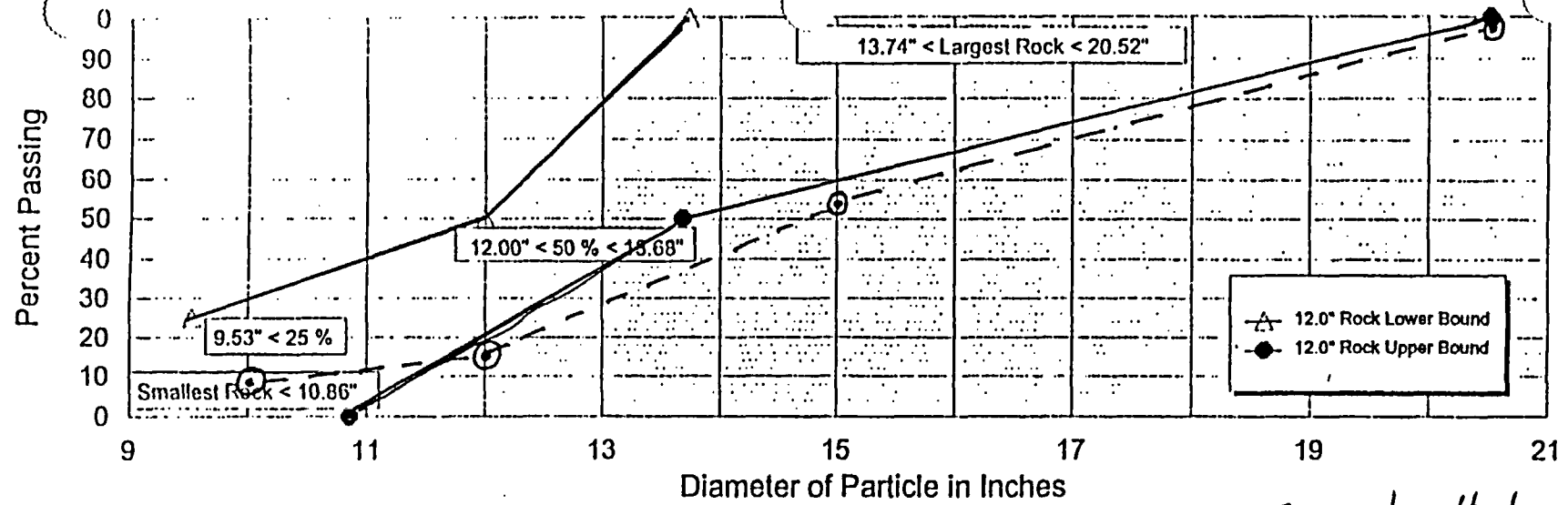


FIGURE 1

Sample #1  
3-25-98

SUBJECT D50 12" Brown

PROJECT NO. 8152 Rm PAGE

CLIENT Pathfinder

DATE 3-25-08 BY

PROJECT Limestone Rock Testing

CHECKED BY

Sample # \_\_\_\_\_

Total Sample Wt. \_\_\_\_\_

Wt. retained

| Screen<br>SIZE | 20.52" | 15" | 12" | 10" | -10 |
|----------------|--------|-----|-----|-----|-----|
|                | *480   | 268 | 205 | 274 | 261 |
|                |        | 227 | 219 | 219 | 273 |
|                |        | 287 | 159 | 266 | 188 |
|                |        | 224 | 190 | 175 | 294 |
|                |        | 189 | 164 | 174 | 230 |
|                |        | 184 | 236 | 234 | 175 |
|                |        | 198 | 264 |     |     |
|                |        | 178 | 296 |     |     |
|                |        | 223 | 217 |     |     |
|                |        | 177 | 165 |     |     |
|                |        |     | 264 |     |     |
|                |        |     | 122 |     |     |
|                |        |     | 247 |     |     |
|                |        |     | 263 |     |     |
|                |        |     | 239 |     |     |
|                |        |     | 136 |     |     |
|                |        |     | 274 |     |     |
|                |        |     | 280 |     |     |
|                |        |     | 202 |     |     |
|                |        |     | 225 |     |     |
| Sleet total    |        |     |     |     |     |
| TOTAL          |        |     |     |     |     |
| % Retained     |        |     |     |     |     |
| % Passing      |        |     |     |     |     |

SUBJECT D50 12" Brown

PROJECT NO. 8152 Rm PAGE

CLIENT Pathfinder

DATE 3-25-98 BY

PROJECT Limestone Rock Testing

CHECKED

BY

Sample # \_\_\_\_\_

Total Sample Wt. \_\_\_\_\_

Wt. retained

| Screen size | 20.52" | 15" | 12" | 10" | -10" |
|-------------|--------|-----|-----|-----|------|
|             |        | 254 | 134 | 147 | 234  |
|             |        | 128 | 308 | 132 | 220  |
|             |        | 320 | 88  | 80  | 190  |
|             |        | 263 | 218 | 22  | 120  |
|             |        | 230 | 132 |     |      |
|             |        | 280 | 172 |     |      |
|             |        | 165 | 117 |     |      |
|             |        | 227 | 195 |     |      |
|             |        | 132 | 207 |     |      |
|             |        | 101 | 264 |     |      |
|             |        | 217 | 170 |     |      |
|             |        | 355 | 255 |     |      |
|             |        | 158 | 272 |     |      |
|             |        | 221 | 165 |     |      |
|             |        | 167 | 180 |     |      |
|             |        | 262 | 145 |     |      |
|             |        | 217 | 122 |     |      |
|             |        | 322 | 124 |     |      |
|             |        | 290 | 19  |     |      |
|             |        | 145 | 130 |     |      |
|             |        | 195 | 222 |     |      |
|             |        |     | 147 |     |      |
| Sleet total |        |     |     |     |      |
| TOTAL       |        |     |     |     |      |
| % Retained  |        |     |     |     |      |
| % Passing   |        |     |     |     |      |



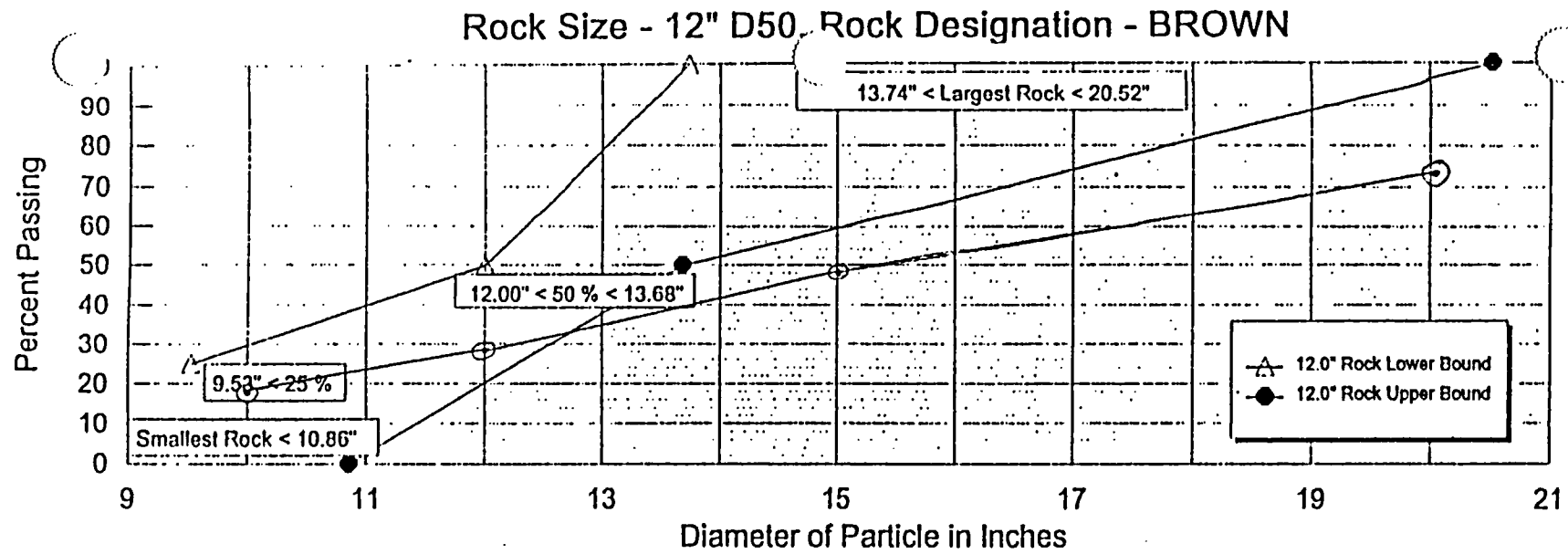
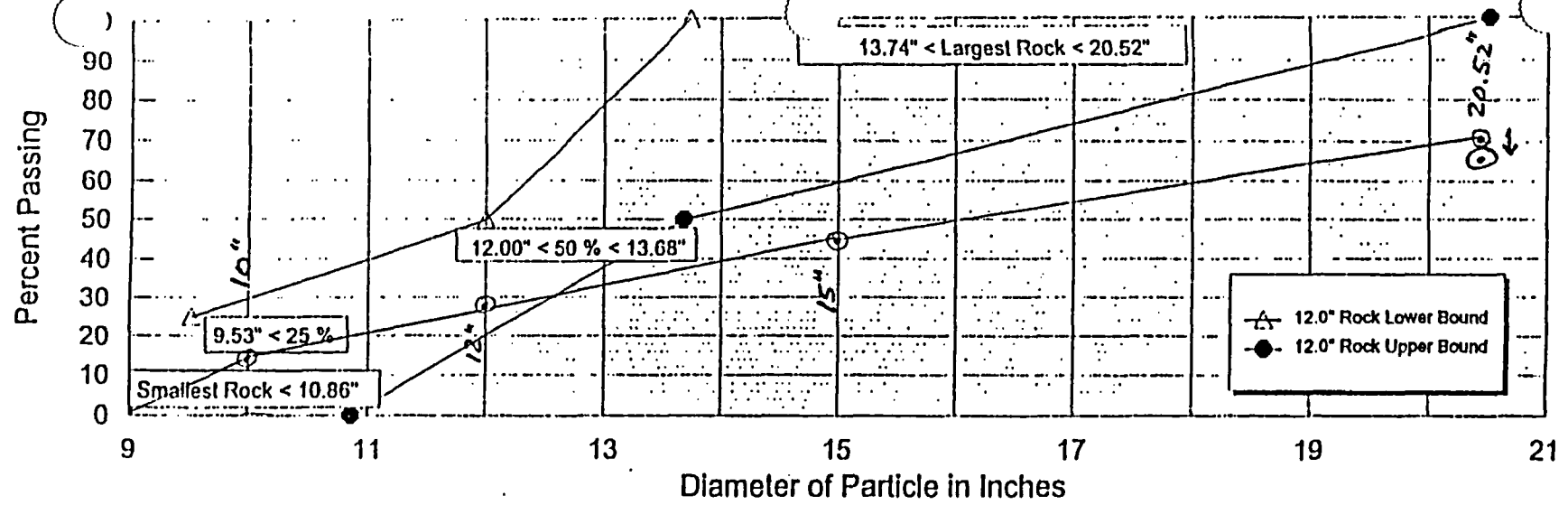


FIGURE 1



Rock Size 12" D50 Rock Designation BROWN



| <u>Size</u> | <u>% Finer</u> |
|-------------|----------------|
| 20.52       | 65             |
| 15          | 44             |
| 12          | 28             |
| 10          | 15             |

FIGURE 1

**LIMESTONE ROCK PRODUCTS  
QUALITY CONTROL  
GRADATION RESULTS**

**1998**

### Rock Products Quality Control Gradation Results

|   |  |                      |
|---|--|----------------------|
| Non-Conformance Description: Dso 1" d.d not meet specs. | Tested By: <u>Willis</u>                 | Date: <u>2-27-98</u> |
| Corrective Action: Adjustments made to crusher          | IME Project Manager: <u>Tom R. Smith</u> | Date: <u>3-16-98</u> |
| for re-sample & retest                                  | PMC Construction Manager:                | Date:                |

## Rock Products Quality Control Gradation Results

[illegible]

|   |                                       |                     |
|---|---------------------------------------|---------------------|
| Non-Conformance Description: D <sub>1</sub> 1" and D <sub>2</sub> 4" did not meet spec. | Tested By: <u>William G</u>           | Date: <u>3-2-98</u> |
| Corrective Action: <u>Adjustments made to crusher,</u>                                  | IME Project Manager: <u>Sam Rabin</u> | Date: <u>4-1-98</u> |
| <u>resample and retest</u>  | PMC Construction Manager:             | Date:               |



### Rock Products Quality Control Gradation Results

[illegible]

|  |   |              |
|--|---|--------------|
| Non-Conformance Description: Dns 1" and 4" did not meet spec.            | Tested By: <i>William [Signature]</i>       | Date: 3-4-98 |
| Corrective Action: Adjustments made to crusher,<br>resample and retested | IME Project Manager: <i>Tom [Signature]</i> | Date: 4-1-98 |
|  | PMC Construction Manager:                   | Date:        |



### Rock Products Quality Control Gradation Results

|  |  |                     |
|--|--|---------------------|
| Non-Conformance Description: Dsg 1" and 4" did not meet spec | Tested By: <i>William G</i>              | Date: <i>3-5-98</i> |
| Corrective Action: Adjustments made to crusher,              | IME Project Manager: <i>John Bohland</i> | Date: <i>4-1-98</i> |
| resampled and retested                                       | PMC Construction Manager:                | Date:               |

### Rock Products Quality Control Gradation Results

|   |   |               |
|---|---|---------------|
| Non-Conformance Description: Dss 1" and 6" did not meet spec. | Tested By: <i>Willis V</i>              | Date: 3-11-98 |
| Corrective Action: Adjustments made to Dss 1", resampled      | IME Project Manager: <i>[Signature]</i> | Date: 4-1-98  |
| and retested. Dss 6" production on hold                       | PMC Construction Manager:               | Date:         |

### Rock Products Quality Control Gradation Results

[illegible]

|  |   |                      |
|--|---|----------------------|
| Non-Conformance Description: <u>Down 1" and 9.6" d.J not meet spec</u> | Tested By: <u>W. M. M.</u>              | Date: <u>3-12-98</u> |
| Corrective Action: <u>Adjustments made to crusher and</u>              | IME Project Manager: <u>[Signature]</u> | Date: <u>4-1-98</u>  |
| <u>grizzly, resampled, retested.</u>                                   | PMC Construction Manager:               | Date:                |





### Rock Products Quality Control Gradation Results

|   |  |                      |
|---|--|----------------------|
| Non-Conformance Description: Dwg 1" did not meet spec | Tested By: <i>William G.</i>             | Date: <i>3-17-98</i> |
| Corrective Action: <i>Adjustments made to closer,</i> | IME Project Manager: <i>James Bohner</i> | Date: <i>4-1-98</i>  |
| <i>resampled and retested</i>                         | PMC Construction Manager:                | Date:                |

DD FORM 1 APR 64

### Rock Products Quality Control Gradation Results

[illegible]

|  |  |                      |
|--|--|----------------------|
| Non-Conformance Description: <i>NONE</i> | Tested By: <i>William J</i>              | Date: <i>3-20-98</i> |
| Corrective Action:                       | IME Project Manager: <i>Ken M. Brown</i> | Date: <i>4-1-98</i>  |
|  | PMC Construction Manager:                | Date:                |





### Rock Products Quality Control Gradation Results

|  |   |               |
|--|---|---------------|
| Non-Conformance Description: Dn 6" d.d not met spec. | Tested By: William J                      | Date: 3-26-98 |
| Corrective Action:                                   | IME Project Manager: J. M. R. [Signature] | Date: 4-1-98  |
|  | PMC Construction Manager:                 | Date:         |

### Rock Products Quality Control Gradation Results

[illegible]

|   |   |               |
|---|---|---------------|
| Non-Conformance Description: D50.6" did not meet grading specs. | Tested By: William Y                    | Date: 3/27/98 |
| Corrective Action: Adjustment mtd to crusher, resample and      | IME Project Manager: <i>[Signature]</i> | Date: 4-21-98 |
| retest  | PMC Construction Manager:               | Date:         |



### Rock Products Quality Control Gradation Results

|                              |  |                      |
|------------------------------|--|----------------------|
| Non-Conformance Description: | Tested By: <i>Gould Miller</i>               | Date: <i>4-10-98</i> |
| Corrective Action:           | IME Project Manager: <i>John M. Robinson</i> | Date:                |
|                              | PMC Construction Manager:                    | Date:                |

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No.       | Date | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    | Pass(P) |
|---------------------------|-------------------|------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|------|----|------|----|------|-------|----|---------|
|                           |                   |      |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5" | 3" | 2.5" | 2" | 1.5" | 1.25" | 1" | .75"    |
| < 1"                      | <del>1</del><br>2 | 5-11 |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      | 100   |    | P       |
| < 1"                      | <del>3</del><br>2 | 5-11 |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      | 100   |    | P       |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                   |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |

|                              |                           |               |
|------------------------------|---------------------------|---------------|
| Non-Conformance Description: | Tested By: JLB            | Date: 5-11-98 |
| Corrective Action:           | IME Project Manager: GMB  | Date: 5-11-98 |
|                              | PMC Construction Manager: | Date:         |

### Rock Products Quality Control Gradation Results

|   |                                 |                      |
|---|---------------------------------|----------------------|
| Non-Conformance Description: <i>Outlet Spec on 1 1/2"</i> | Tested By: <i>GMB</i>           | Date: <i>5-14-98</i> |
| Corrective Action: <i>Adjust screws</i>                   | IME Project Manager: <i>GMB</i> | Date: <i>5-14-98</i> |
|   | PMC Construction Manager:       | Date:                |

Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project

Rock Products Quality Control Gradation Results

| Design<br>D <sub>50</sub> | Test<br>No. | Date | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       | Pass(P) |      |
|---------------------------|-------------|------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|-----|------|------|------|-----|------|-------|---------|------|
|                           |             |      |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4"  | 3.5" | 3"   | 2.5" | 2"  | 1.5" | 1.25" | 1"      | .75" |
| 2.17                      | 2           | 5-15 |                              |                 |        |     |     |     |      |    |      |    |    | 100 | 100  | 76.5 | 32.6 | 7.5 |      |       |         | P    |
| 1.63                      | 3RG         | 5-15 |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         | F    |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      |       |         |      |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |     |      |      |      |     |      | </    |         |      |

|  |                           |               |
|--|---------------------------|---------------|
| Non-Conformance Description: 1.63 at .75 spec. of 1 1/2" | Tested By: JLB/GMB        | Date: 5-15-98 |
| Corrective Action: Adjust Screens                        | IME Project Manager: GMB  | Date: 5-15-98 |
|  | PMC Construction Manager: | Date:         |

### Rock Products Quality Control Gradation Results

|                              |                           |              |
|------------------------------|---------------------------|--------------|
| Non-Conformance Description: | Tested By: JLB            | Date: 6-5-98 |
| Corrective Action:           | IME Project Manager:      | Date:        |
|                              | PMC Construction Manager: | Date:        |



### Rock Products Quality Control Gradation Results

|   |  |               |
|---|--|---------------|
| Non-Conformance Description: 4" MAT'l Sampled From<br>Stockpile   | Tested By: JPM   | Date: 6-11-98 |
| Corrective Action: Production of 4' DSW has been<br>completed. Collection of representative sample may<br>be impractical. | IME Project Manager: <i>[Signature]</i><br>PMC Construction Manager: | Date: 6-16-98 |

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date    | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      | Pass(P)  |
|---------------------------|-------------|---------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|------|----|------|----|------|-------|-------|------|----------|
|                           |             |         |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5" | 3" | 2.5" | 2" | 1.5" | 1.25" | 1"    | .75" | Fail (F) |
| Filter                    | 5           | 7-16-98 |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       | 100.0 |      | P        |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |       |      |          |

|                              |                                 |                |
|------------------------------|---------------------------------|----------------|
| Non-Conformance Description: | Tested By: JFM                  | Date: 7-27-98  |
| Corrective Action:           | IME Project Manager: <i>GWS</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:       | Date:          |

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date    | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    | Pass(P) |          |
|---------------------------|-------------|---------|------------------------------|-----------------|--------|-----|-----|-----|-------|------|------|------|------|----|------|----|------|----|------|-------|----|---------|----------|
|                           |             |         |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6"  | 8"   | 6.4" | 6"   | 5"   | 4" | 3.5" | 3" | 2.5" | 2" | 1.5" | 1.25" | 1" | .75"    | Fail (F) |
| 6"                        | 3           | 7-28-98 |                              |                 |        |     |     |     | 100.0 | 81.9 | —    | 42.6 | 12.1 |    |      |    |      |    |      |       |    |         | P        |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         | P        |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |
|                           |             |         |                              |                 |        |     |     |     |       |      |      |      |      |    |      |    |      |    |      |       |    |         |          |

|                              |                                 |                |
|------------------------------|---------------------------------|----------------|
| Non-Conformance Description: | Tested By: JRM                  | Date: 7-28-98  |
| Corrective Action:           | IME Project Manager: <i>Bay</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:       | Date:          |

Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project

Rock Products Quality Control Gradation Results

| Design<br>D <sub>50</sub> | Test<br>No. | Date    | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    | Pass(P) |
|---------------------------|-------------|---------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|------|----|------|----|------|-------|----|---------|
|                           |             |         |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5" | 3" | 2.5" | 2" | 1.5" | 1.25" | 1" | .75"    |
| Filter                    | 6           | 7-29-98 |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      | 100.0 |    | P       |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |    |      |       |    |         |

|                              |                                 |                |
|------------------------------|---------------------------------|----------------|
| Non-Conformance Description: | Tested By: JPM                  | Date: 7-21-98  |
| Corrective Action:           | IME Project Manager: <i>ENG</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:       | Date:          |

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date   | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    | Pass(P) |
|---------------------------|-------------|--------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|-------|------|------|------|------|-------|----|---------|
|                           |             |        |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5"  | 3"   | 2.5" | 2"   | 1.5" | 1.25" | 1" | .75"    |
| 1.63                      | 4           | 8-5-98 |                              |                 |        |     |     |     |      |    |      |    |    |    | 100.0 | 97.4 | 95.1 | 33.2 |      |       |    | P       |
| Filter                    | 7           | 8-5-98 |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      | 100.0 |    | P       |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |
|                           |             |        |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |    |         |

|                              |                                |                |
|------------------------------|--------------------------------|----------------|
| Non-Conformance Description: | Tested By: JPM                 | Date: 8-5-98   |
| Corrective Action:           | IME Project Manager: <i>GM</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:      | Date:          |

Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project

Rock Products Quality Control Gradation Results

| Design<br>D <sub>50</sub> | Test<br>No. | Date    | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    | Pass(P) |
|---------------------------|-------------|---------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|------|----|-------|----|------|-------|----|---------|
|                           |             |         |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5" | 3" | 2.5"  | 2" | 1.5" | 1.25" | 1" | .75"    |
| F.Het                     | 8           | 8-14-98 |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    | 100.0 |    |      |       |    | P       |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       | </ |      |       |    |         |

|                              |                           |               |
|------------------------------|---------------------------|---------------|
| Non-Conformance Description: | Tested By: JFM            | Date: 8-14-98 |
| Corrective Action:           | IME Project Manager:      | Date:         |
|                              | PMC Construction Manager: | Date:         |

### Rock Products Quality Control Gradation Results

|                              |                           |       |
|------------------------------|---------------------------|-------|
| Non-Conformance Description: | Tested By:                | Date: |
| Corrective Action:           | IME Project Manager:      | Date: |
|                              | PMC Construction Manager: | Date: |

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**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No.         | Date    | Cumulative<br>Volume<br>(cy) | Percent Passing |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    | Pass(P) |
|---------------------------|---------------------|---------|------------------------------|-----------------|--------|------|------|------|------|----|------|----|----|----|------|----|------|----|------|-------|----|---------|
|                           |                     |         |                              | 20.42"          | 16.42" | 15"  | 12"  | 10"  | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5" | 3" | 2.5" | 2" | 1.5" | 1.25" | 1" | .75"    |
| 12" Quartzite             | 2<br>lower<br>stack | 8-21-98 |                              | 73.0            | —      | 48.5 | 29.1 | 19.4 |      |    |      |    |    |    |      |    |      |    |      |       |    | —       |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    |         |
|                           |                     |         |                              |                 |        |      |      |      |      |    |      |    |    |    |      |    |      |    |      |       |    | </      |

|                              |                           |               |
|------------------------------|---------------------------|---------------|
| Non-Conformance Description: | Tested By: JEM            | Date: 8-21-98 |
| Corrective Action:           | IME Project Manager:      | Date:         |
|                              | PMC Construction Manager: | Date:         |



### Rock Products Quality Control Gradation Results

[illegible]

|                              |                                  |                |
|------------------------------|----------------------------------|----------------|
| Non-Conformance Description: | Tested By: JFM                   | Date: 8-21-98  |
| Corrective Action:           | IME Project Manager: <i>Greg</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:        | Date:          |

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date    | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    | Pass(P) |
|---------------------------|-------------|---------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|------|----|------|-------|------|-------|----|---------|
|                           |             |         |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5" | 3" | 2.5" | 2"    | 1.5" | 1.25" | 1" | .75"    |
| Filter                    | 9           | 9-23-98 |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      | 100.0 |      |       |    | P       |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |       |      |       |    |         |

|                              |   |                |
|------------------------------|---|----------------|
| Non-Conformance Description: | Tested By: JFM                          | Date: 9-23     |
| Corrective Action:           | IME Project Manager: <i>[Signature]</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:               | Date:          |

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date    | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      | Pass(P)  |
|---------------------------|-------------|---------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|------|----|------|------|------|-------|------|------|----------|
|                           |             |         |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5" | 3" | 2.5" | 2"   | 1.5" | 1.25" | 1"   | .75" | Fail (F) |
| 1"                        | 5           | 10-1-98 |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    | 100  | 26.2 | 50.5 | 34.5  | 13.4 |      | P        |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |      |      |      |       |      |      |          |

|                              |                                 |                |
|------------------------------|---------------------------------|----------------|
| Non-Conformance Description: | Tested By: JPM                  | Date: 10-1-98  |
| Corrective Action:           | IME Project Manager: <i>leg</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:       | Date:          |

### Rock Products Quality Control Gradation Results

|                              |   |                |
|------------------------------|---|----------------|
| Non-Conformance Description: | Tested By: JPM                          | Date: 10-2-98  |
| Corrective Action:           | IME Project Manager: <i>[Signature]</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:               | Date:          |

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date    | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    | Pass(P) |
|---------------------------|-------------|---------|------------------------------|-----------------|--------|-----|-----|-------|------|------|------|------|-----|----|------|----|------|----|------|-------|----|---------|
|                           |             |         |                              | 20.42"          | 16.42" | 15" | 12" | 10"   | 9.6" | 8"   | 6.4" | 6"   | 5"  | 4" | 3.5" | 3" | 2.5" | 2" | 1.5" | 1.25" | 1" | .75"    |
| 6"                        | 4           | 10-9-98 |                              |                 |        |     |     | 100.0 | 87.7 | 78.2 | —    | 39.6 | 2.8 |    |      |    |      |    |      |       |    | P       |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |
|                           |             |         |                              |                 |        |     |     |       |      |      |      |      |     |    |      |    |      |    |      |       |    |         |

|                              |                                 |                |
|------------------------------|---------------------------------|----------------|
| Non-Conformance Description: | Tested By: JPM                  | Date: 10-9-98  |
| Corrective Action:           | IME Project Manager: <i>GMZ</i> | Date: 11-18-98 |
|                              | PMC Construction Manager:       | Date:          |

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date    | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       | Pass(P) |      |          |
|---------------------------|-------------|---------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|-------|------|------|------|------|-------|---------|------|----------|
|                           |             |         |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5"  | 3"   | 2.5" | 2"   | 1.5" | 1.25" | 1"      | .75" | Fail (F) |
| 2.17                      | 4           | 10-7-78 |                              |                 |        |     |     |     |      |    |      |    |    |    | 100.0 | 93.1 | 49.6 | 18.2 | 3.3  |       |         |      | P        |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |
|                           |             |         |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |      |      |       |         |      |          |

|                              |                                 |                |
|------------------------------|---------------------------------|----------------|
| Non-Conformance Description: | Tested By: JRM                  | Date: 10-9-98  |
| Corrective Action:           | IME Project Manager: <i>GAS</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:       | Date:          |

### Rock Products Quality Control Gradation Results

[illegible]

|                              |   |                |
|------------------------------|---|----------------|
| Non-Conformance Description: | Tested By: JPM                          | Date: 10-12-98 |
| Corrective Action:           | IME Project Manager: <i>[Signature]</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:               | Date:          |

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date     | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    | Pass(P) |
|---------------------------|-------------|----------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|------|----|-------|----|------|-------|----|---------|
|                           |             |          |                              | 20 42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5" | 3" | 2.5"  | 2" | 1.5" | 1.25" | 1" | .75"    |
| Filter                    | 12          | 10-21-98 |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    | 100.0 |    |      |       | P  |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    |    |    |      |    |       |    |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |     |      |    |      |    | </ |    |      |    |       |    |      |       |    |         |

|                              |                                 |                |
|------------------------------|---------------------------------|----------------|
| Non-Conformance Description: | Tested By: JFM                  | Date: 9-18-98  |
| Corrective Action:           | IME Project Manager: <i>EMZ</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:       | Date:          |



### Rock Products Quality Control Gradation Results

[illegible]

|                              |                                 |                |
|------------------------------|---------------------------------|----------------|
| Non-Conformance Description: | Tested By: JPM                  | Date: 10-29-98 |
| Corrective Action:           | IME Project Manager: <i>ENE</i> | Date: 11-20-98 |
|                              | PMC Construction Manager:       | Date:          |

### Rock Products Quality Control Gradation Results

[illegible]

|                              |                           |                |
|------------------------------|---------------------------|----------------|
| Non-Conformance Description: | Tested By: JRM            | Date: 11-3-98  |
| Corrective Action:           | IME Project Manager: GVR  | Date: 11-20-98 |
|                              | PMC Construction Manager: | Date:          |

### Rock Products Quality Control Gradation Results

[illegible]

|                              |                                 |                |
|------------------------------|---------------------------------|----------------|
| Non-Conformance Description: | Tested By: JRM                  | Date: 10-26-98 |
| Corrective Action:           | IME Project Manager: <i>CSH</i> | Date: 11-24-98 |
|                              | PMC Construction Manager:       | Date:          |



### Rock Products Quality Control Gradation Results

[illegible]

|                                    |                                |                |
|------------------------------------|--------------------------------|----------------|
| Non-Conformance Description: 1.63" | Tested By: JPM                 | Date: 11-12-98 |
| Corrective Action: Took a retest.  | IME Project Manager: <i>SM</i> | Date: 11-20-98 |
|                                    | PMC Construction Manager:      | Date:          |



Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project

Rock Products Quality Control Gradation Results

| Design<br>D <sub>50</sub> | Test<br>No. | Date     | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    | Pass(P) |
|---------------------------|-------------|----------|------------------------------|-----------------|--------|-----|-----|------|------|------|------|----|-----|-----|------|----|-------|-------|------|-------|----|---------|
|                           |             |          |                              | 20.42"          | 16.42" | 15" | 12" | 10"  | 9.6" | 8"   | 6.4" | 6" | 5"  | 4"  | 3.5" | 3" | 2.5"  | 2"    | 1.5" | 1.25" | 1" | .75"    |
| 1 1/2" max                | 17          | 11-18-98 |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       | 100.0 |      |       |    | P       |
| 1.03"                     | 6R(3)       | 11-18-98 |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    | 100.0 | 83.6  | 42.7 |       |    | F       |
| .66                       | 1           | 11-18-98 |                              |                 |        |     |     | 90.0 | -    | 18.6 | 7.0  | -  | 5.5 | 1.8 |      |    |       |       |      |       |    | F       |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |
|                           |             |          |                              |                 |        |     |     |      |      |      |      |    |     |     |      |    |       |       |      |       |    |         |

|                                    |                           |                |
|------------------------------------|---------------------------|----------------|
| Non-Conformance Description: 1.03" | Tested By: JFM            | Date: 11-18-98 |
| Corrective Action: .66             | IME Project Manager:      | Date:          |
| Took retests                       | PMC Construction Manager: | Date:          |

### Rock Products Quality Control Gradation Results

[illegible]

|                              |                           |                |
|------------------------------|---------------------------|----------------|
| Non-Conformance Description: | Tested By: JPM            | Date: 11-20-98 |
| Corrective Action:           | IME Project Manager:      | Date:          |
|                              | PMC Construction Manager: | Date:          |





### Rock Products Quality Control Gradation Results

[illegible]

|                              |                           |            |
|------------------------------|---------------------------|------------|
| Non-Conformance Description: | Tested By: JPM            | Date: 12-2 |
| Corrective Action:           | IME Project Manager:      | Date:      |
|                              | PMC Construction Manager: | Date:      |

Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project

Rock Products Quality Control Gradation Results

| Design<br>D <sub>50</sub> | Test<br>No. | Date | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    | Pass(P) |
|---------------------------|-------------|------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|------|-------|------|------|------|-------|----|---------|
|                           |             |      |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5" | 3"    | 2.5" | 2"   | 1.5" | 1.25" | 1" | .75"    |
| 1.63                      | 8           | 12-2 |                              |                 |        |     |     |     |      |    |      |    |    |    |      | 100.0 | 81.1 | 42.1 |      |       |    | F       |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |      |      |      |       |    |         |

|                              |                           |               |
|------------------------------|---------------------------|---------------|
| Non-Conformance Description: | Tested By: JPM            | Date: 12-2-98 |
| Corrective Action: Resample  | IME Project Manager:      | Date:         |
|                              | PMC Construction Manager: | Date:         |



### Rock Products Quality Control Gradation Results

[illegible]

|                              |                           |               |
|------------------------------|---------------------------|---------------|
| Non-Conformance Description: | Tested By: JPM            | Date: 12-1-98 |
| Corrective Action:           | IME Project Manager:      | Date:         |
|                              | PMC Construction Manager: | Date:         |

### Rock Products Quality Control Gradation Results

[illegible]

|                              |                           |                |
|------------------------------|---------------------------|----------------|
| Non-Conformance Description: | Tested By: JPM            | Date: 12-21-98 |
| Corrective Action:           | IME Project Manager:      | Date:          |
|                              | PMC Construction Manager: | Date:          |

# **LIMESTONE SIZE TESTING**

**1999**

# **FILTER BED MATERIAL**

**1999**



SUBJECT Crushed Limestone FilterPROJECT NO. 8152 RM PAGECLIENT PathfinderDATE 1-3-78BY JPMPROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 21Total Sample Wt. 57.5

|                 | 1 5/8" | Pan   |
|-----------------|--------|-------|
| Weight Retained | - 0 -  | 57.5  |
| % Retained      | - 0 -  | 100.0 |
| % Passing       | 100.0  | - 0 - |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 1-6-99

BY JPM

PROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 23

Total Sample Wt. 58.2

|                 | 1 5/8" | Pan   |
|-----------------|--------|-------|
| Weight Retained | -0-    | 58.2  |
| % Retained      | -0-    | 100.0 |
| % Passing       | 100.0  | -0-   |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 2-3-91

BY JPM

PROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 23

Total Sample Wt. 57.35

|                 | 1 5/8" | Pan   |
|-----------------|--------|-------|
| Weight Retained | -0-    | 57.35 |
| % Retained      | -0-    | 100.0 |
| % Passing       | 100.0  | -0-   |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 2-15-99

BY JPM

PROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 24

Total Sample Wt. 53.0

|                 | 1 5/8" | Pen   |
|-----------------|--------|-------|
| Weight Retained | -0-    | 53.0  |
| % Retained      | -0-    | 100.0 |
| % Passing       | 100.0  | -0-   |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 2-18-99

BY JPM

PROJECT Lucky McMine Reclamation

CHECKED

BY

Sample #: 25

Total Sample Wt.: 62.0

| Weight Retained | 2 5/8" | Pan   |
|-----------------|--------|-------|
| % Retained      | - 0 -  | 62.0  |
| % Retained      | - 0 -  | 100.0 |
| % Passing       | 100.0  | - 0 - |

D<sub>50</sub> 1.63" ROCK MULCH

1999

**SUBJECT**

**PROJECT NO**

**PAGE**

**CLIENT**

DATE \_\_\_\_\_

BY \_\_\_\_\_

**PROJECT**

**CHECKED** \_\_\_\_\_

BY

Sample #

Total Sample Wt.

Wt. retained[illegible]

# Rock Size - 1.63" D<sup>50</sup>, Rock Designation - RED

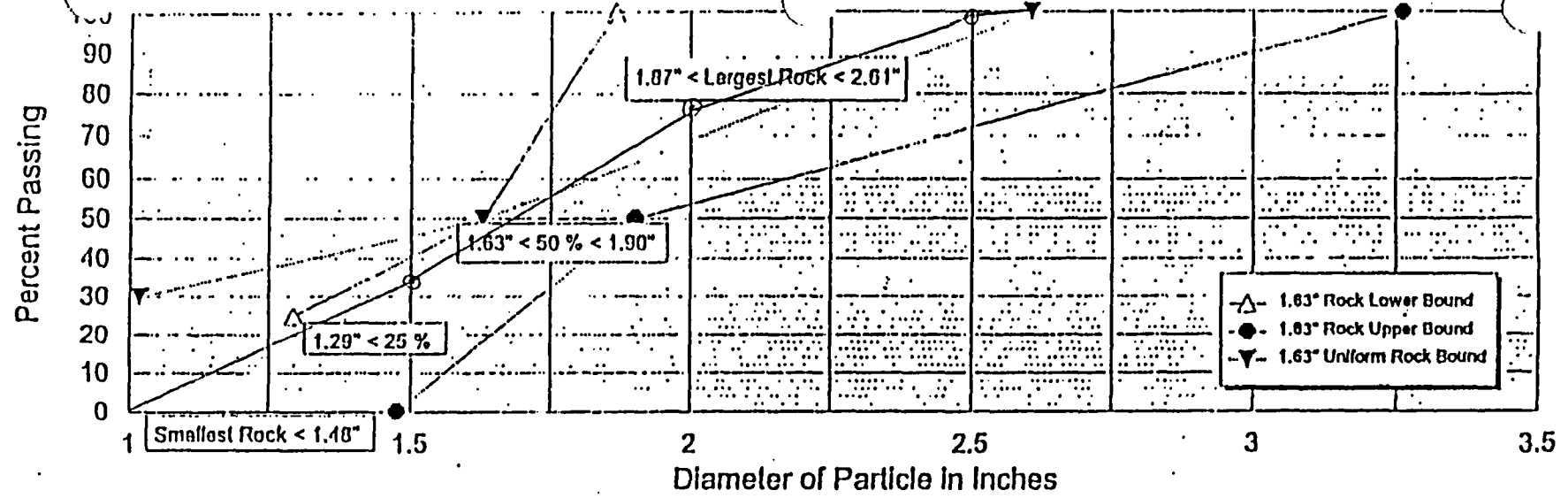


FIGURE 3

Passing





**SUBJECT**

PROJECT NO

8152 Ren

**PAGE**

**CLIENT**

DATE \_\_\_\_\_

BY JPM

**PROJECT**

**CHECKED**

BY

Sample

Total Sample

wt.

[illegible]

# Rock Size - 1.63" D<sup>70</sup>, Rock Designation - RED

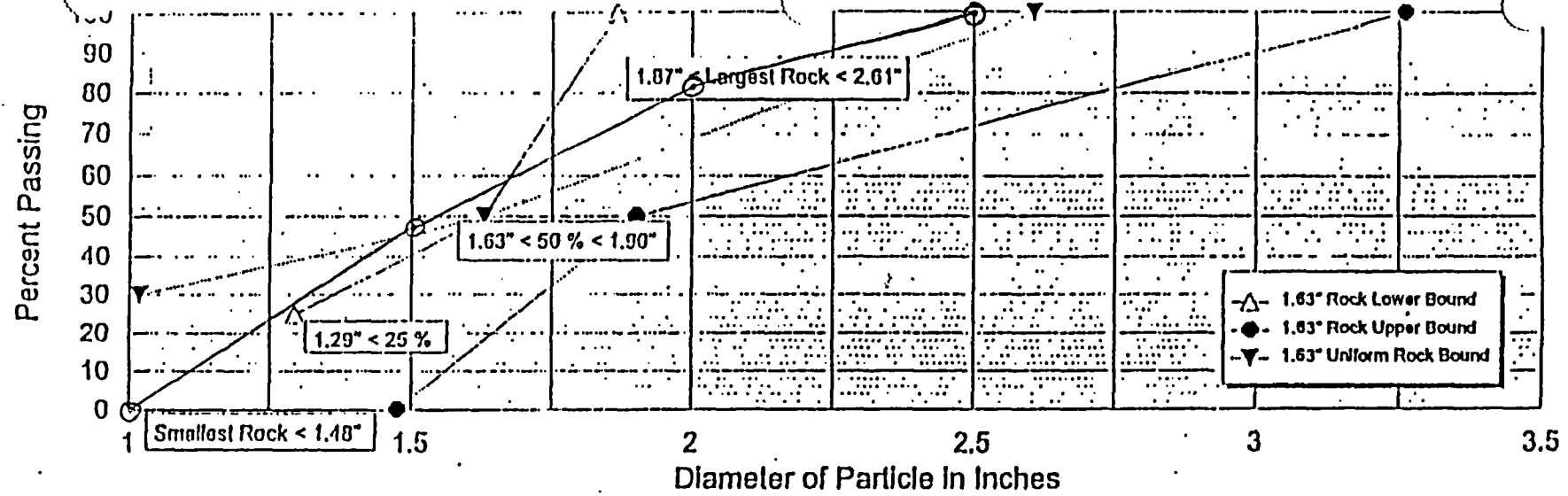


FIGURE 3

Failing - I'll retest tomorrow  
2-3-99 2-4-99



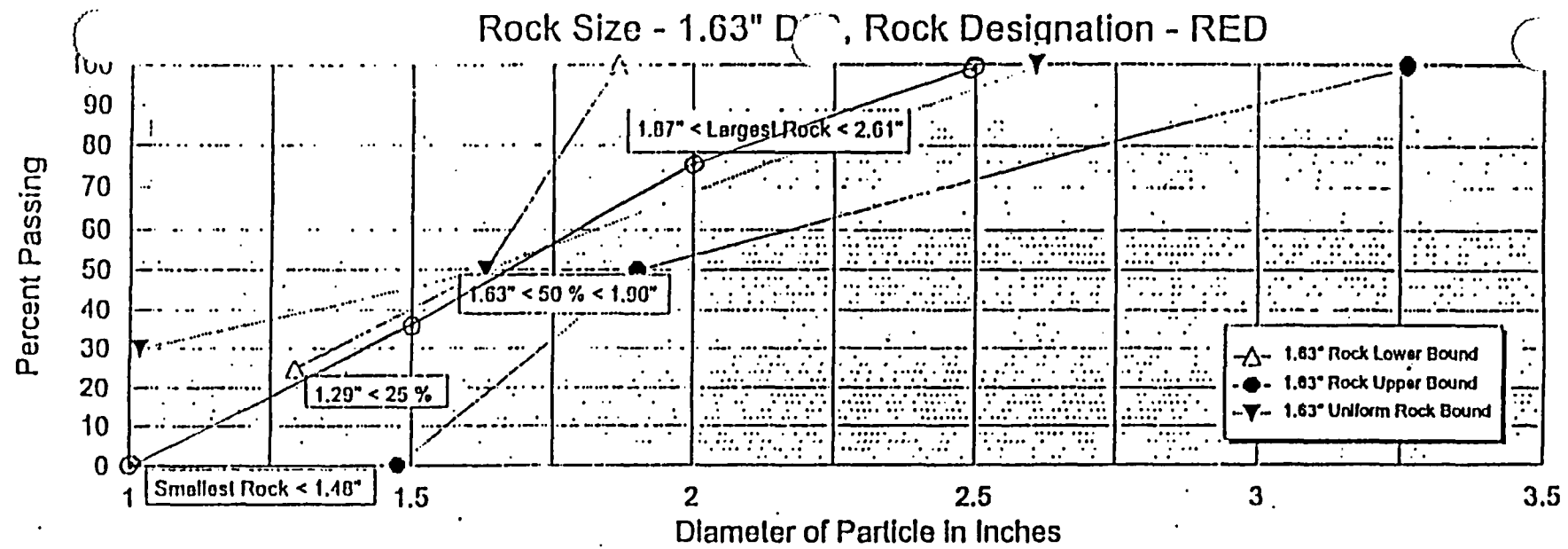


FIGURE 3

2-4-99 (Retest)  
Passing

SUBJECT D50 1.63" Red

PROJECT NO. 8152 Rev PAGE

CLIENT Pathfinder

DATE 2-15-99

BY JPM

PROJECT Limestone Rock Testing

**CHECKED**

BY

Sample # 14

Total Sample wt. 146.25

wt. retained

[illegible]

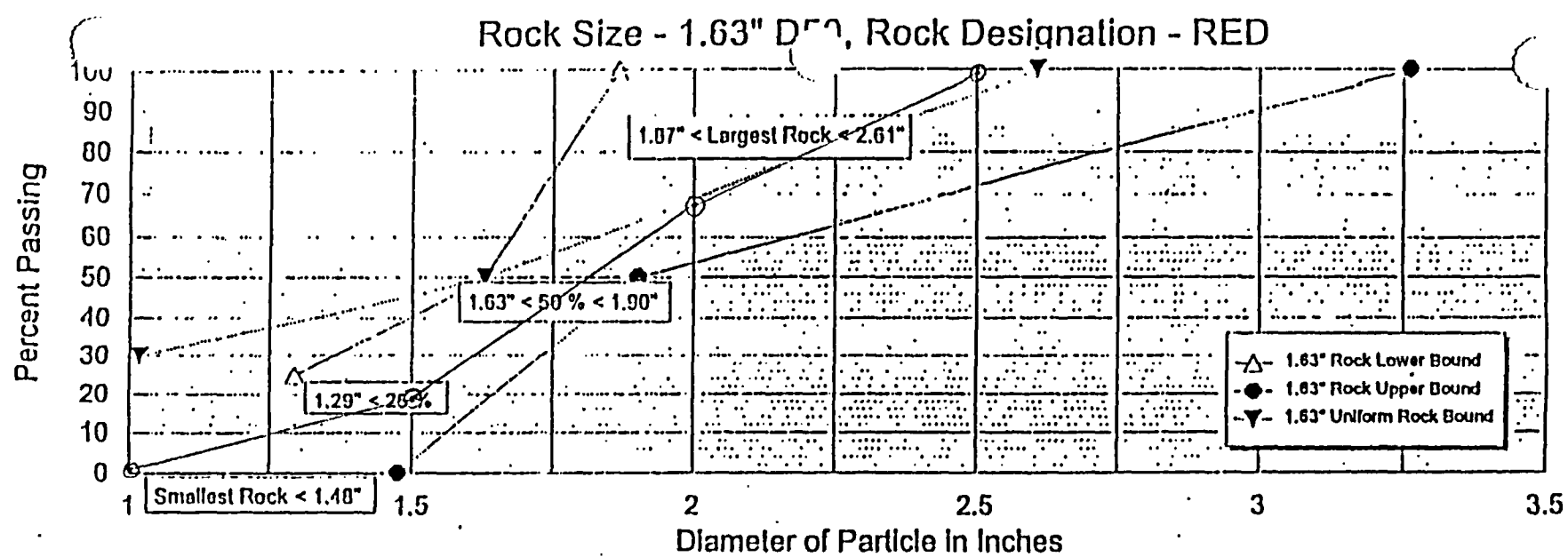


FIGURE 3

Passing 2-15-99

D<sub>50</sub> 2.17" ROCK MULCH

1999



SUBJECT D<sub>50</sub> 2.17" GreenPROJECT NO. 8157 RM PAGECLIENT PathfinderDATE 2-18-99BY JPMPROJECT Limestone Testing

CHECKED

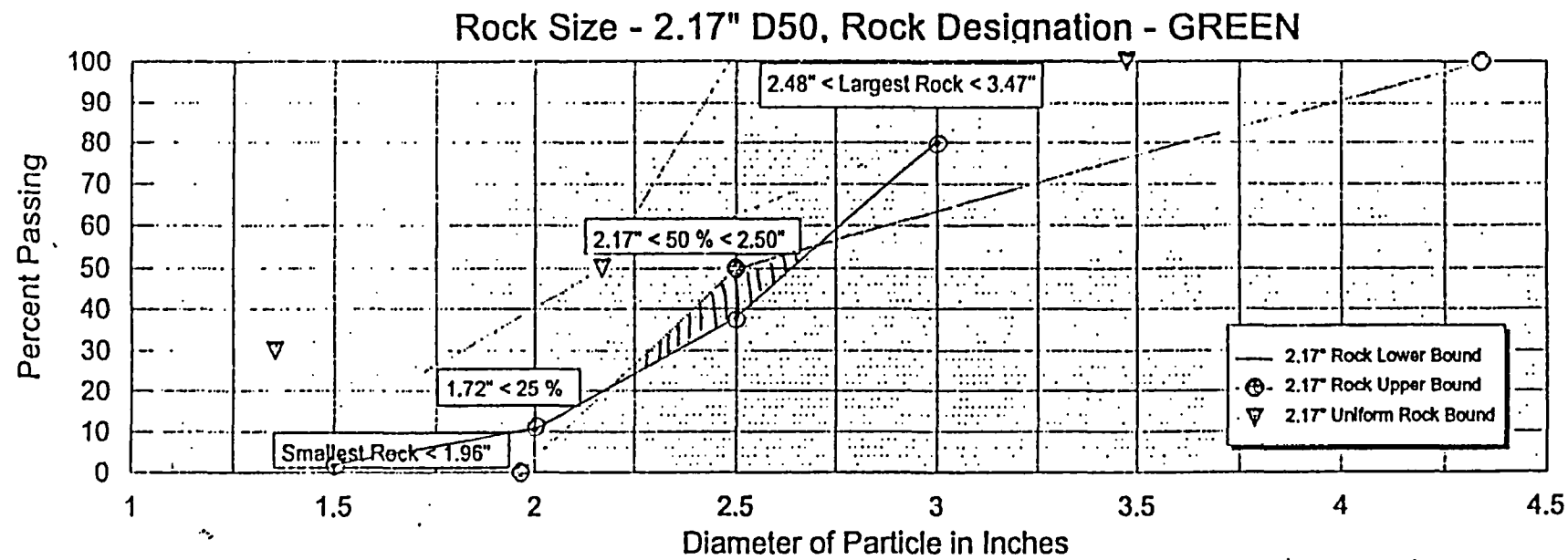
BY

Sample # 8Total sample wt. 233.7

Wt. Retained

Screen size →

| Screen size⇒ | 3.47" | 3"    | 2 1/2"               | -2"                   | 1 1/2" | pan  |
|--------------|-------|-------|----------------------|-----------------------|--------|------|
|              | -0-   | 45.65 | 38.8<br>46.1<br>12.2 | 42.85<br>16.15<br>8.4 | 16.9   | 6.65 |
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|              |       |       |                      |                       |        |      |



Failing, I'll retest Friday

**FIGURE 3 (Continued)**

SUBJECT D<sub>50</sub> 2.17" GreenPROJECT NO. 8152 RM PAGECLIENT Pathfinder

DATE

BY

PROJECT Limestone Testing

CHECKED

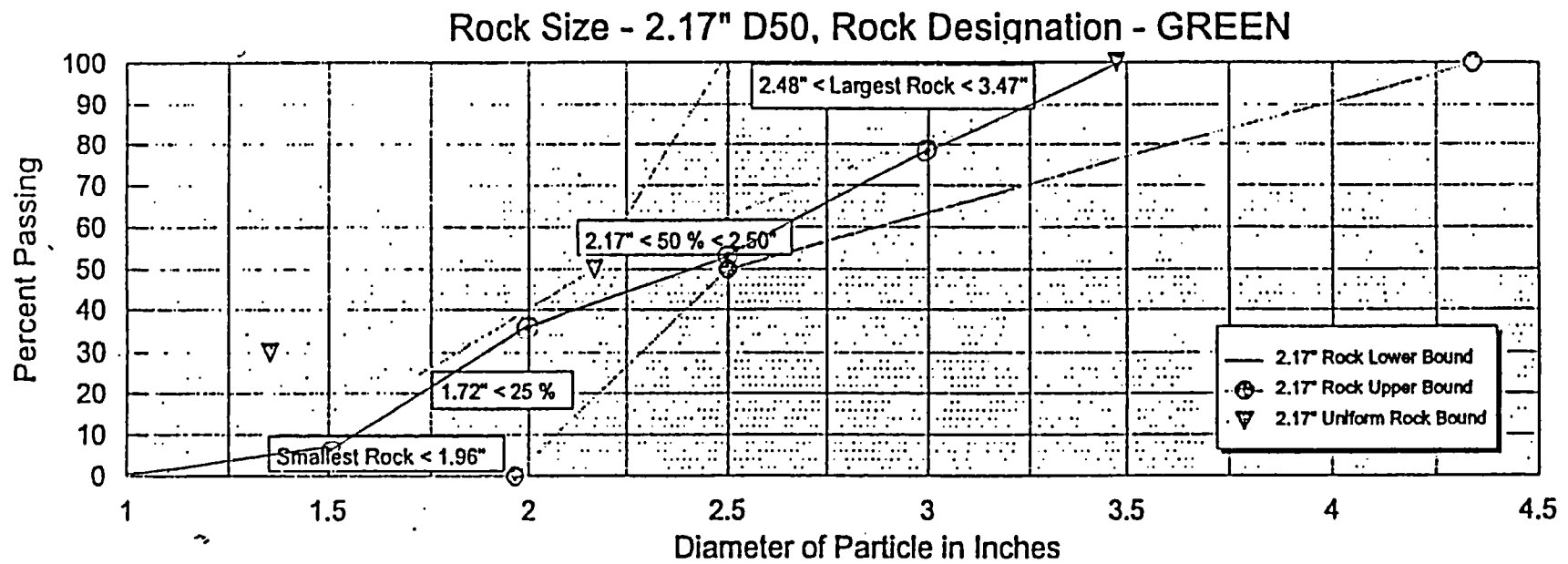
BY

Sample # 8R-2Total sample wt. 216.9

Wt. Retained

Screen size →

|            | 3.47" | 3"   | 2 1/2" | 2"   | 1 1/2" | pan  |
|------------|-------|------|--------|------|--------|------|
|            | -0-   | 45.1 | 59.9   | 54.8 | 42.5   | 15.6 |
| Total      | -0-   | 45.1 | 59.9   | 54.8 | 42.5   | 15.6 |
| % Retained | -0-   | 20.7 | 27.5   | 25.2 | 19.5   | 7.2  |
| % Passing  | 100.0 | 79.4 | 51.9   | 26.7 | 7.2    | -0-  |



**FIGURE 3 (Continued)**

SUBJECT D<sub>50</sub> 2.17" Green

PROJECT NO. 8152 RM PAGE

CLIENT Pathfinder

DATE 2-19-99

BY GLM

PROJECT Limestone Testing

CHECKED

BY

Sample # 9

Total sample wt. 208.73

Wt. Retained

Screen size →

| Screen size → | 3.47" | 3"    | 2 1/2" | 2"    | 1 1/2" | pan   |
|---------------|-------|-------|--------|-------|--------|-------|
| Ø             | 62.55 | 57.55 | 52.35  | 21.85 | 14.43  |       |
| Total         | Ø     | 62.55 | 57.55  | 52.35 | 21.85  | 14.43 |
| % Retained    |       | 30.0  | 27.6   | 25.1  | 10.5   | 6.9   |
| % Passing     | 100   | 70.0  | 42.4   | 17.3  | 6.8    |       |

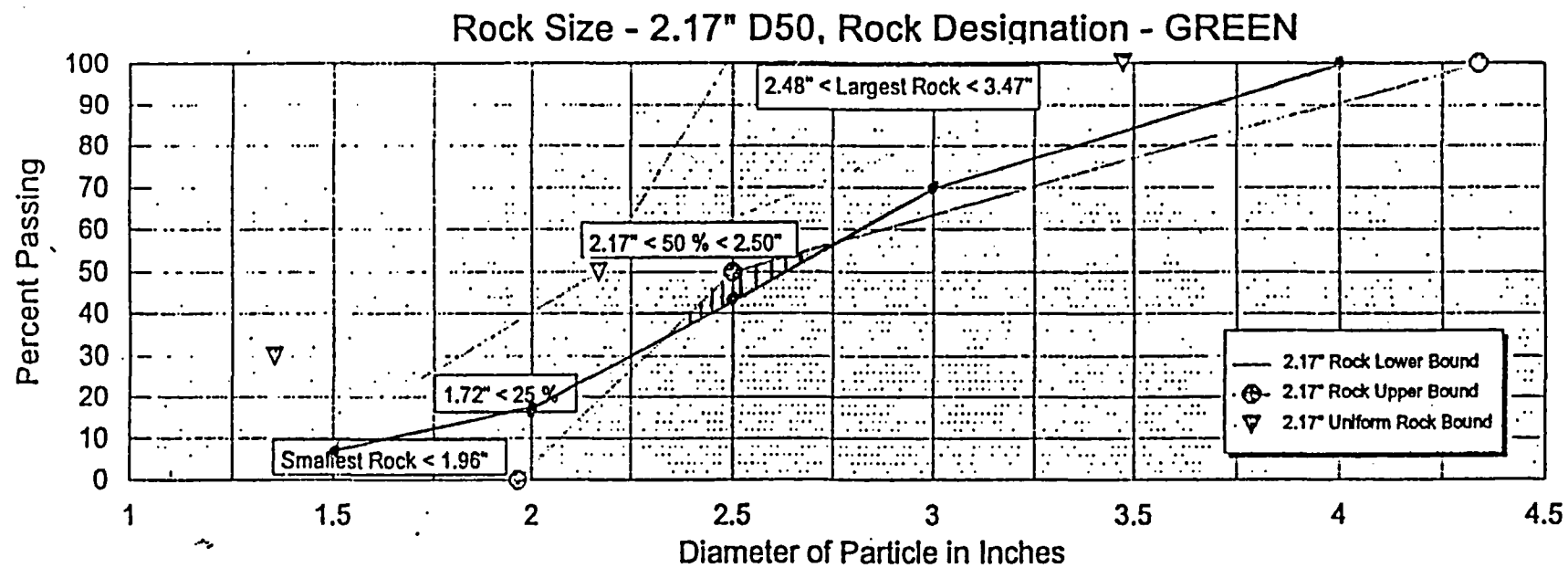


FIGURE 3 (Continued)

**LIMESTONE ROCK PRODUCTS  
QUALITY CONTROL  
GRADATION RESULTS**

**1999**

### Rock Products Quality Control Gradation Results

[illegible]

|                              |                           |              |
|------------------------------|---------------------------|--------------|
| Non-Conformance Description: | Tested By: JPM            | Date: 1-3-99 |
| Corrective Action:           | IME Project Manager:      | Date:        |
|                              | PMC Construction Manager: | Date:        |



## Rock Products Quality Control Gradation Results

[illegible]

|                              |                           |              |
|------------------------------|---------------------------|--------------|
| Non-Conformance Description: | Tested By: JPM            | Date: 1-6-99 |
| Corrective Action:           | IME Project Manager:      | Date:        |
|                              | PMC Construction Manager: | Date:        |

### Rock Products Quality Control Gradation Results

|                              |   |               |
|------------------------------|---|---------------|
| Non-Conformance Description: | Tested By: JPM                          | Date: 1-15-99 |
| Corrective Action:           | IME Project Manager: <i>[Signature]</i> | Date: 1-15-99 |
|                              | PMC Construction Manager:               | Date:         |

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    | Pass(P) |
|---------------------------|-------------|------|------------------------------|-----------------|--------|-----|-----|------------|------|------|------------|------------|----|----|------|----|------|----|------|-------|----|---------|
|                           |             |      |                              | 20.42"          | 16.42" | 15" | 12" | 10"<br>11" | 9.6" | 8"   | 6.4"<br>7" | 5"<br>5.5" | 5" | 4" | 3.5" | 3" | 2.5" | 2" | 1.5" | 1.25" | 1" | .75"    |
| .66                       | 1R          | 1-20 |                              |                 |        |     |     | 75.2       |      | 36.3 | 15.9       | 4.8        |    |    |      |    |      |    |      |       |    | P       |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |            |      |      |            |            |    |    |      |    |      |    |      |       |    |         |

|                              |   |               |
|------------------------------|---|---------------|
| Non-Conformance Description: | Tested By: JPM                          | Date: 1-20-99 |
| Corrective Action:           | IME Project Manager: <i>[Signature]</i> | Date: 1-20-99 |
|                              | PMC Construction Manager:               | Date:         |

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    | Pass(P) |          |
|---------------------------|-------------|------|------------------------------|-----------------|--------|-----|-----|----------------|------|------|--------------|----|----------------|----|------|----|------|----|------|-------|----|---------|----------|
|                           |             |      |                              | 20.42"          | 16.42" | 15" | 12" | 10 1/2"<br>11" | 9.6" | 8"   | 6 3/4"<br>7" | 6" | 5 1/4"<br>5.5" | 4" | 3.5" | 3" | 2.5" | 2" | 1.5" | 1.25" | 1" | .75"    | Fail (F) |
| .66                       | 2           | 2-2  |                              |                 |        |     |     | 69.2           |      | 35.1 | 17.5         |    | 1.8            |    |      |    |      |    |      |       |    |         | F        |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |                |      |      |              |    |                |    |      |    |      |    |      |       |    |         |          |

|                              |   |              |
|------------------------------|---|--------------|
| Non-Conformance Description: | Tested By: JPM                          | Date: 2-2-99 |
| Corrective Action: Retest    | IME Project Manager: <i>[Signature]</i> | Date: 2-2-99 |
|                              | PMC Construction Manager:               | Date:        |

Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project

Rock Products Quality Control Gradation Results

| Design<br>D <sub>50</sub> | Test<br>No. | Date | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      | Pass(P)  |
|---------------------------|-------------|------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|------|-------|-------|------|------|-------|----|------|----------|
|                           |             |      |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5" | 3"    | 2.5"  | 2"   | 1.5" | 1.25" | 1" | .75" | Fail (F) |
| Filter                    | 23          | 2-3  |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       | 100.0 |      |      |       |    | P    |          |
| 1.63                      | 13          | 2-3  |                              |                 |        |     |     |     |      |    |      |    |    |    |      | 100.0 | 81.3  | 48.4 |      |       |    | F    |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |
|                           |             |      | </                           |                 |        |     |     |     |      |    |      |    |    |    |      |       |       |      |      |       |    |      |          |

|                              |                                |              |
|------------------------------|--------------------------------|--------------|
| Non-Conformance Description: | Tested By: JPM                 | Date: 2-3-99 |
| Corrective Action:           | IME Project Manager: <i>SW</i> | Date: 2-3-99 |
|                              | PMC Construction Manager:      | Date:        |

Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project

Rock Products Quality Control Gradation Results

| Design<br>D <sub>50</sub> | Test<br>No. | Date | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      | Pass(P)  |
|---------------------------|-------------|------|------------------------------|-----------------|--------|-----|-----|-----|-------------|------|------------|----|-----|----|------|-------|------|------|------|-------|----|------|----------|
|                           |             |      |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6"<br>11" | 8"   | 6.3"<br>7" | 6" | 5"  | 4" | 3.5" | 3"    | 2.5" | 2"   | 1.5" | 1.25" | 1" | .75" | Fail (F) |
| .66                       | 2(R)        | 2-4  |                              |                 |        |     |     |     | 79.9        | 38.6 | 21.2       |    | 3.4 |    |      |       |      |      |      |       |    |      | P        |
| 1.63                      | 13(R)       | 2-4  |                              |                 |        |     |     |     |             |      |            |    |     |    |      | 100.0 | 75.5 | 37.5 |      |       |    |      | P        |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |
|                           |             |      |                              |                 |        |     |     |     |             |      |            |    |     |    |      |       |      |      |      |       |    |      |          |

|                              |                                |              |
|------------------------------|--------------------------------|--------------|
| Non-Conformance Description: | Tested By: JPM                 | Date: 2-4-99 |
| Corrective Action:           | IME Project Manager: <i>SM</i> | Date: 2-4-99 |
|                              | PMC Construction Manager:      | Date:        |

PMO/MLA - REV. 11/10/75

**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    | Pass(P) |
|---------------------------|-------------|------|------------------------------|-----------------|--------|-----|-----|-----|------|----|------|----|----|----|-------|------|------|-------|------|-------|----|---------|
|                           |             |      |                              | 20.42"          | 16.42" | 15" | 12" | 10" | 9.6" | 8" | 6.4" | 6" | 5" | 4" | 3.5"  | 3"   | 2.5" | 2"    | 1.5" | 1.25" | 1" | .75"    |
| 1.63                      | 14          | 2-15 |                              |                 |        |     |     |     |      |    |      |    |    |    | 100.0 | 99.4 | 65.9 | 19.6  |      |       |    | P       |
| filter                    | 24          | 2-15 |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      | 100.0 |      |       |    | P       |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
|                           |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |
| </                        |             |      |                              |                 |        |     |     |     |      |    |      |    |    |    |       |      |      |       |      |       |    |         |

|                              |                                |               |
|------------------------------|--------------------------------|---------------|
| Non-Conformance Description: | Tested By: JMM                 | Date: 2-15-99 |
| Corrective Action:           | IME Project Manager: <i>LM</i> | Date: 2-15-99 |
|                              | PMC Construction Manager:      | Date:         |

### Rock Products Quality Control Gradation Results

|   |                           |               |
|---|---------------------------|---------------|
| Non-Conformance Description: On The course side | Tested By: JPM            | Date: 2-18    |
| Corrective Action: Retest.                      | IME Project Manager: GJR  | Date: 2-18-99 |
|   | PMC Construction Manager: | Date:         |



**Pathfinder Mines Corporation  
Lucky Mc Mine Reclamation Project**

**Rock Products Quality Control Gradation Results**

| Design<br>D <sub>50</sub> | Test<br>No. | Date | Cumulative<br>Volume<br>(cy) | Percent Passing |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    | Pass(P) |          |
|---------------------------|-------------|------|------------------------------|-----------------|--------|-----|-----|------------|------|------|----------|------------|----|----|------|----|------|----|------|-------|----|---------|----------|
|                           |             |      |                              | 20.42"          | 16.42" | 15" | 12" | 10"<br>11" | 9.6" | 8"   | 6"<br>7" | 5"<br>5.5" | 5" | 4" | 3.5" | 3" | 2.5" | 2" | 1.5" | 1.25" | 1" | .75"    | Fail (F) |
| .66                       | 3           | 2-17 |                              |                 |        |     |     | 74.0       |      | 37.6 | 16.2     | 6.9        |    |    |      |    |      |    |      |       |    |         | P        |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |
|                           |             |      |                              |                 |        |     |     |            |      |      |          |            |    |    |      |    |      |    |      |       |    |         |          |

|                              |   |               |
|------------------------------|---|---------------|
| Non-Conformance Description: | Tested By: JPM                          | Date: 2-17-99 |
| Corrective Action:           | IME Project Manager: <i>[Signature]</i> | Date: 2-17-99 |
|                              | PMC Construction Manager:               | Date:         |

### Rock Products Quality Control Gradation Results

|                                  |                           |               |
|----------------------------------|---------------------------|---------------|
| Non-Conformance Description: --- | Tested By: JPM            | Date: 2-25-99 |
| Corrective Action:               | IME Project Manager: GUR  | Date: 2-25-99 |
|                                  | PMC Construction Manager: | Date:         |

# **LIMESTONE SIZE TESTING**

**2001**

**SUBJECT**

PROJECT NO

**CLIENT**

DATE 3-8-01

BY JPM

## PROJECT

**CHECKED**

BY

Sample # 5

Total Sample wt. 966

wt. retained[illegible]

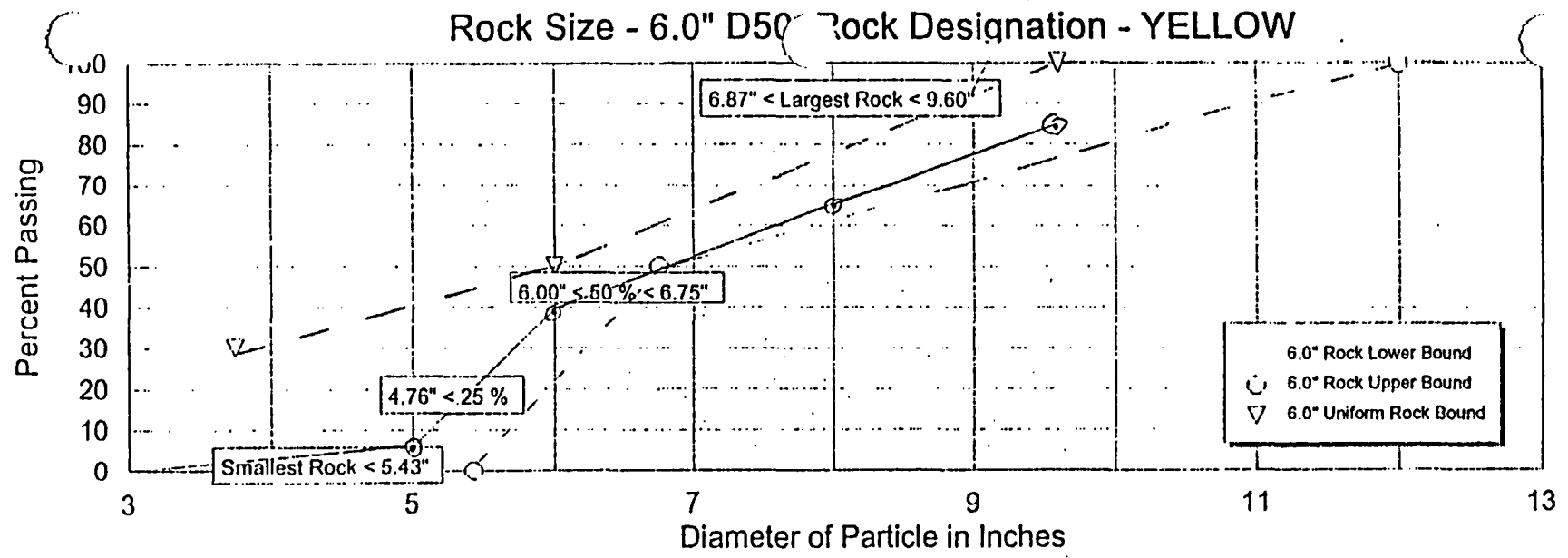


FIGURE 2

3-8-01      SAMPLE #5

SUBJECT D 2.17" Green

PROJECT NO. 8152.124 PAGE

CLIENT Portl Fnder

DATE 2-6-01

BY JPM

PROJECT Limestone Testing

CHECKED

BY

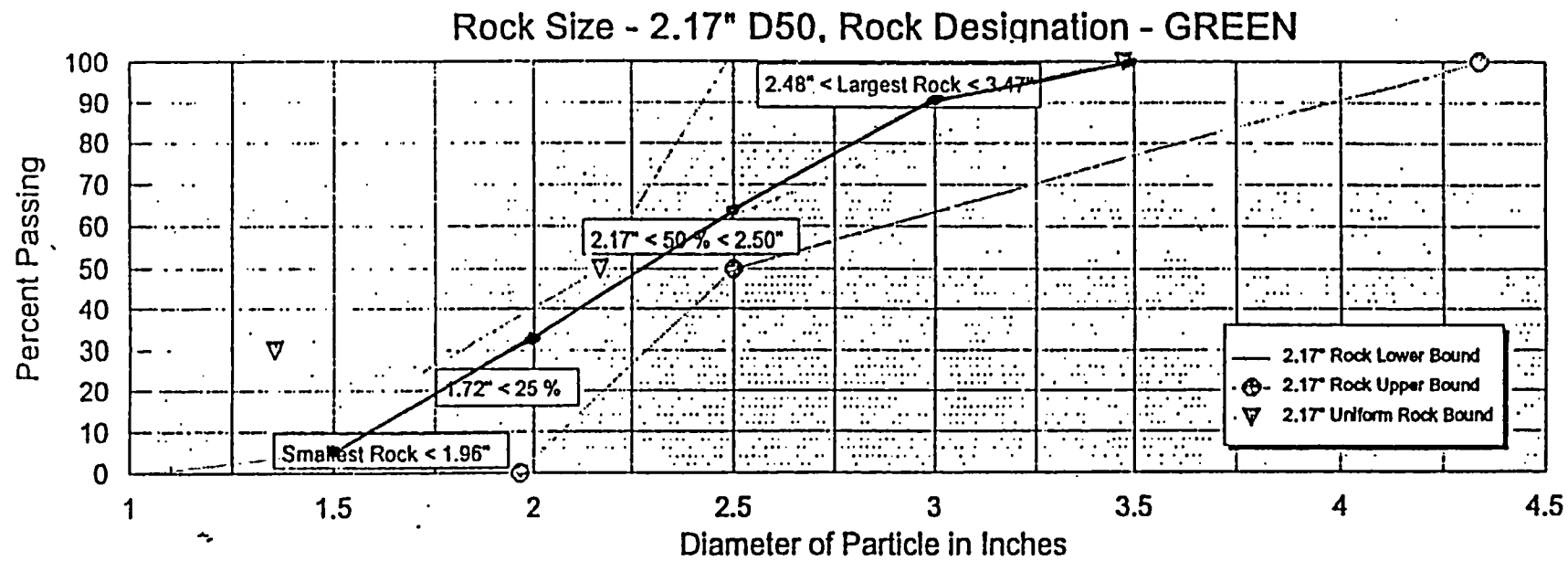
Sample # 9

Total sample wt. 210.7

Wt. Retained

Screen size →

| Screen size → | 3.47" | 3"    | 2 1/2" | 2"    | 1 1/2" | pan  |
|---------------|-------|-------|--------|-------|--------|------|
|               | -0-   | 18.4  | 63.7   | 60.8  | 55.3   | 12.5 |
| Total         | -0-   | 18.4  | 63.7   | 60.8  | 55.3   | 12.5 |
| % Retained    | -0-   | 8.73  | 30.23  | 28.86 | 26.25  | 5.93 |
| % Passing     | 100.0 | 91.27 | 61.04  | 32.12 | 5.93   | -0-  |

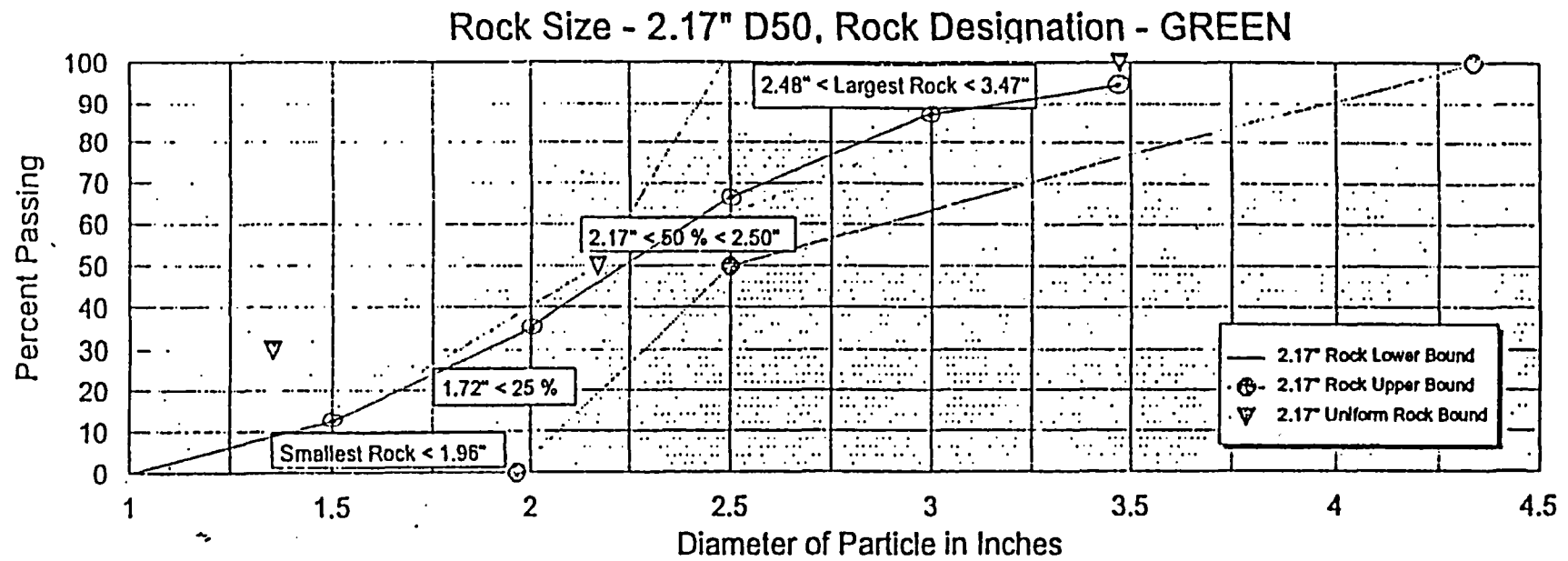


sample #9 3-6-01

FIGURE 3 (Continued)







Sample #10 4-16-01

FIGURE 3 (Continued)

**SUBJECT**

PROJECT NO

PAGE

**CLIENT**

DATE \_\_\_\_\_

BY

**PROJECT**

**CHECK**

BY \_\_\_\_\_

# Sample

Total Sample Wt

wt.

[illegible]

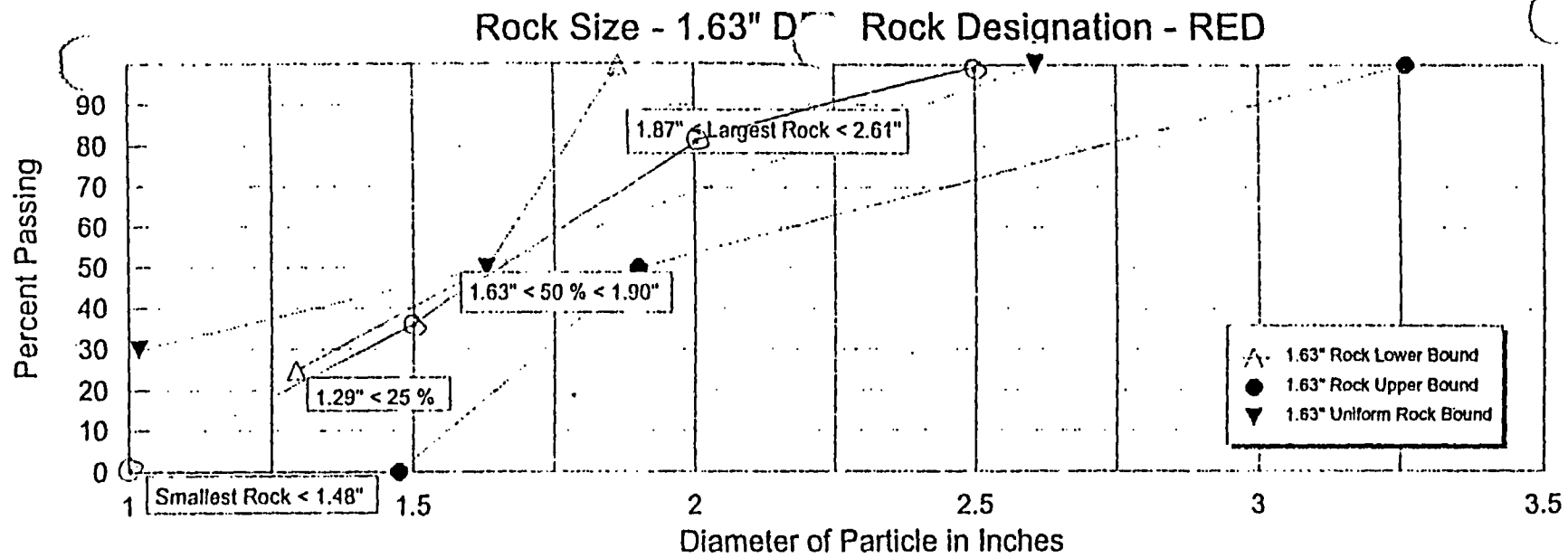


FIGURE 3

3-6-01 Sample #15



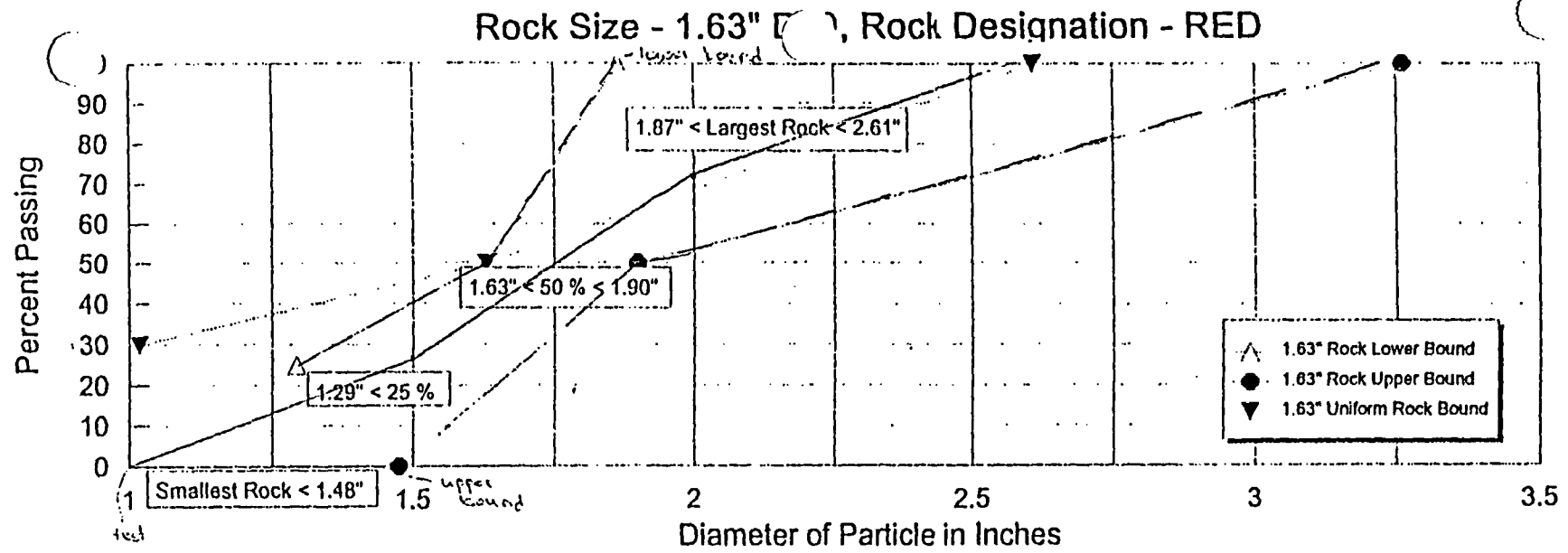


FIGURE 3

3-21-01  
JPM  
Sample #16

**SUBJECT**

**PROJECT NO**

**CLIENT**

DATE 4-3-01

BY JAM

**PROJECT**

**CHECKED**

BY

Sample # 17

Total Sample Wt. 171.35

Wt. retained[illegible]

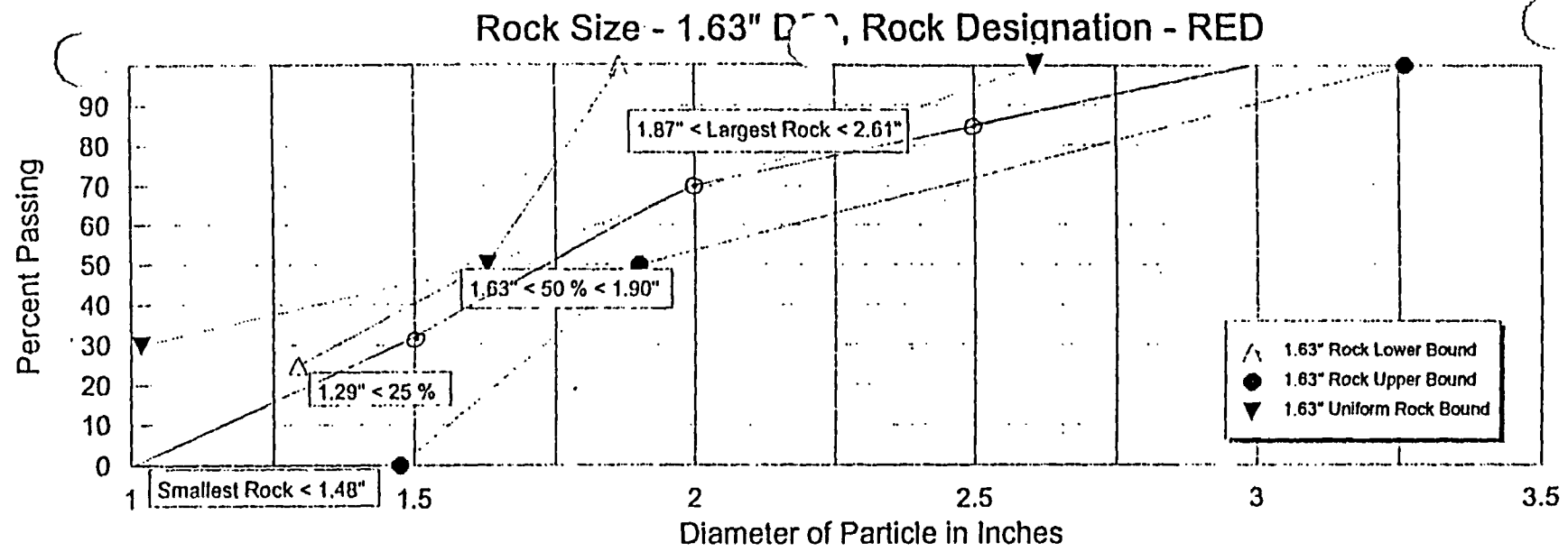


FIGURE 3

4-3-01 SAMPLE #17

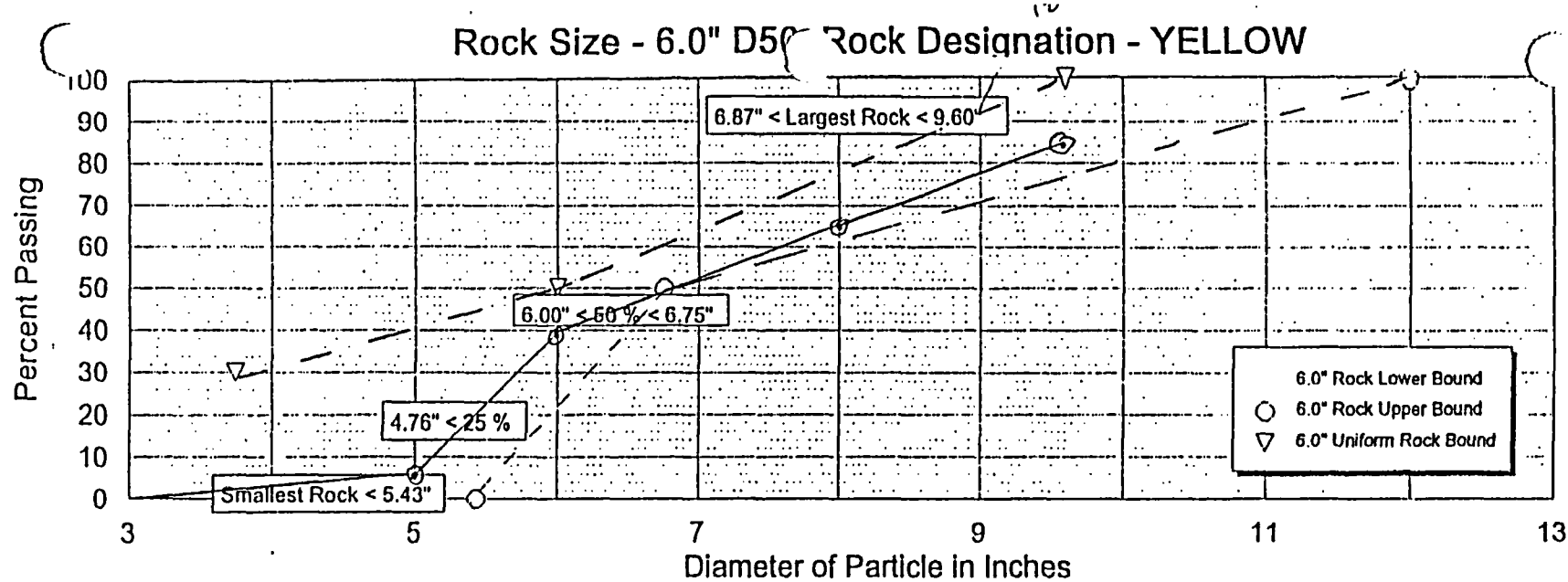
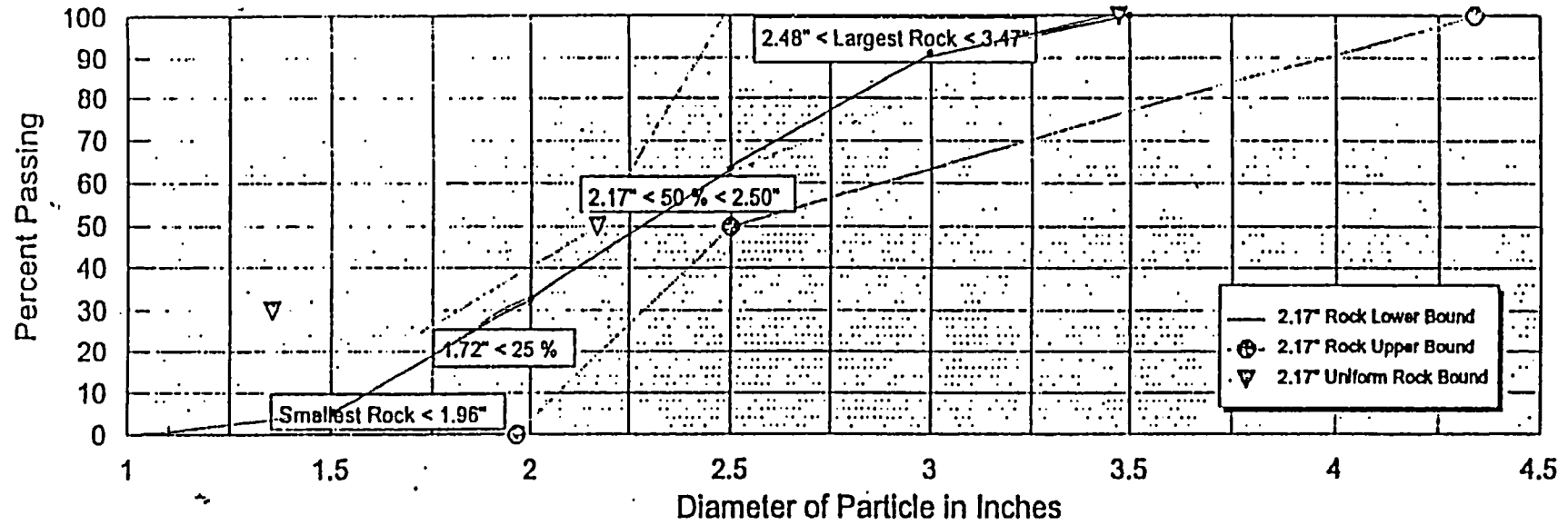


FIGURE 2

| <u>Size</u> | <u>% Passing</u> |
|-------------|------------------|
| 9.6"        | 84.2             |
| 8"          | 64.6             |
| 6"          | 39.2             |
| 5"          | 6.2              |



# Rock Size - 2.17" D50, Rock Designation - GREEN



| Size   | % Passing |
|--------|-----------|
| 3.47"  | 100       |
| 3"     | 91.3      |
| 2 1/2" | 61.0      |
| 2"     | 32.2      |
| 1 1/2" | 5.9       |

FIGURE 3 (Continued)

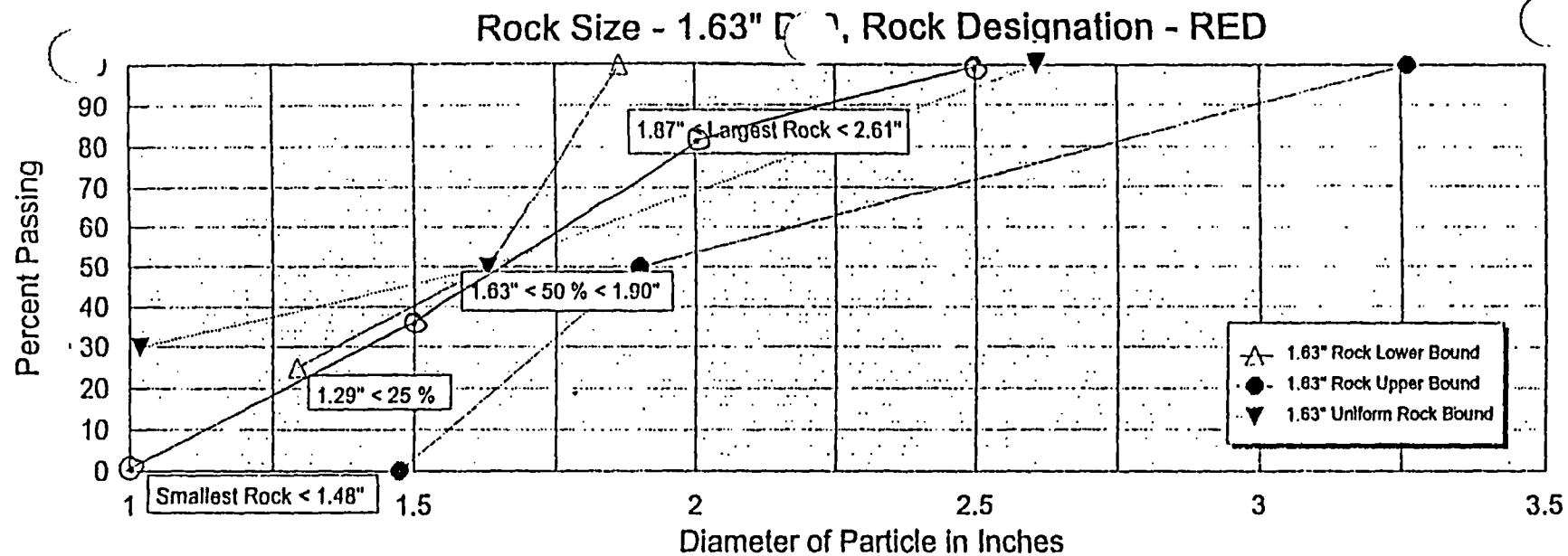


FIGURE 3

| <u>Size</u> | <u>% Passing</u> |
|-------------|------------------|
| 2 1/2"      | 99.4%            |
| 2"          | 80.0             |
| 1 1/2"      | 37.1             |

SUBJECT Crushed Limestone FilterPROJECT NO. 8152-1  
8152 RM

PAGE

CLIENT PathfinderDATE 3-6-01BY JPMPROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 26Total Sample Wt. 53.2

|                 | 1 5/8" | Pan   |
|-----------------|--------|-------|
| Weight Retained | - 0 -  | 53.2  |
| % Retained      | - 0 -  | 100.0 |
| % Passing       | 100.0  | - 0 - |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152 AM

PAGE

CLIENT Pathfinder

DATE 2-21-01

BY JPM

PROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 27

Total Sample Wt. 74.0

|                 | <u>1 5/8"</u> | <u>Pen</u>   |
|-----------------|---------------|--------------|
| Weight Retained | <u>-0-</u>    | <u>74.0</u>  |
| % Retained      | <u>-0-</u>    | <u>100.0</u> |
| % Passing       | <u>100.0</u>  | <u>-0-</u>   |

SUBJECT Crushed Limestone FilterPROJECT NO. 8152RM PAGECLIENT PathfinderDATE 4-3-01BY JPMPROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 28Total Sample Wt. 57.0

|                 | 1 5/8" | Pen   |
|-----------------|--------|-------|
| Weight Retained | - 0 -  | 57.0  |
| % Retained      | - 0 -  | 100.0 |
| % Passing       | 100.0  | - 0 - |

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152RM PAGE

CLIENT Pathfinder

DATE 4-16-01 BY JPM

PROJECT Lucky McMine Reclamation

CHECKED BY

Sample # 29

Total Sample Wt. 62.8

|                 | 1 5/8" | Pen   |
|-----------------|--------|-------|
| Weight Retained | 5.15   | 57.65 |
| % Retained      | 8.2    | 91.8  |
| % Passing       | 91.8   | -0-   |

All rock passed the 2" screen.

SUBJECT Crushed Limestone Filter

PROJECT NO. 8152 RM PAGE

CLIENT Pathfinder

DATE 4-18-01 BY JPM

PROJECT Lucky McMine Reclamation

CHECKED BY

Sample # 29A

Total Sample Wt. 89.7

|                 | <u>1 5/8"</u> | <u>Pan</u> |
|-----------------|---------------|------------|
| Weight Retained | 13.7          | 76.0       |
| % Retained      | 15.3          | 84.7       |
| % Passing       | 84.7          | —          |

100% is -2"

SUBJECT Crushed Limestone FilterPROJECT NO. 8152 RM PAGECLIENT PathfinderDATE 5-9-01BY JPMPROJECT Lucky McMine Reclamation

CHECKED

BY

Sample # 30Total Sample Wt. 77.8

|                 | 1 5/8" | Pen  |
|-----------------|--------|------|
| Weight Retained | 10.6   | 67.2 |
| % Retained      | 13.6   | 86.4 |
| % Passing       | 86.4   | -0-  |

100% passing 2" screen



SUBJECT Crushed Limestone FilterPROJECT NO. 8152 RM PAGECLIENT PathfinderDATE 5-13-01 BY JPMPROJECT Lucky McMine Reclamation

CHECKED BY

Sample # 31Total Sample Wt. 111.0

|                 | 1 5/8" | Pan   |
|-----------------|--------|-------|
| Weight Retained | 10.7   | 100.3 |
| % Retained      | 9.6    | 90.4  |
| % Passing       | 90.4   | -0-   |

100% passing 2" screen

**SOUTH PASS  
IRON MINE RIP RAP  
SIZE TESTING**

1/25/02      Sample taken at South Pass site – marginally too small for 9.6" rock.

2/9/02      Sample of delivered South Pass rock at Lucky Mc – significantly undersized for 9.6" rock.

2/11/02      Sample tested at South Pass site – still significantly undersized for 9.6" rock.

2/15/02      Sample of delivered South Pass rock at Lucky Mc after processing/screening adjustment – rock generally meets 9.6" specification with the exception of a few oversized rocks which could be carefully placed to fit within rock layer.

2/18/02      Sample of delivered South Pass rock at Lucky Mc – rock intended to augment the undersized rock that had been previously delivered. Several combination gradations were evaluated to forecast result of augmentation.

3/12/02      Sample of placed composite South Pass rock at Lucky Mc – rock generally meets 9.6" specification with the exception of a few oversized rocks which could be carefully placed to fit within rock layer.

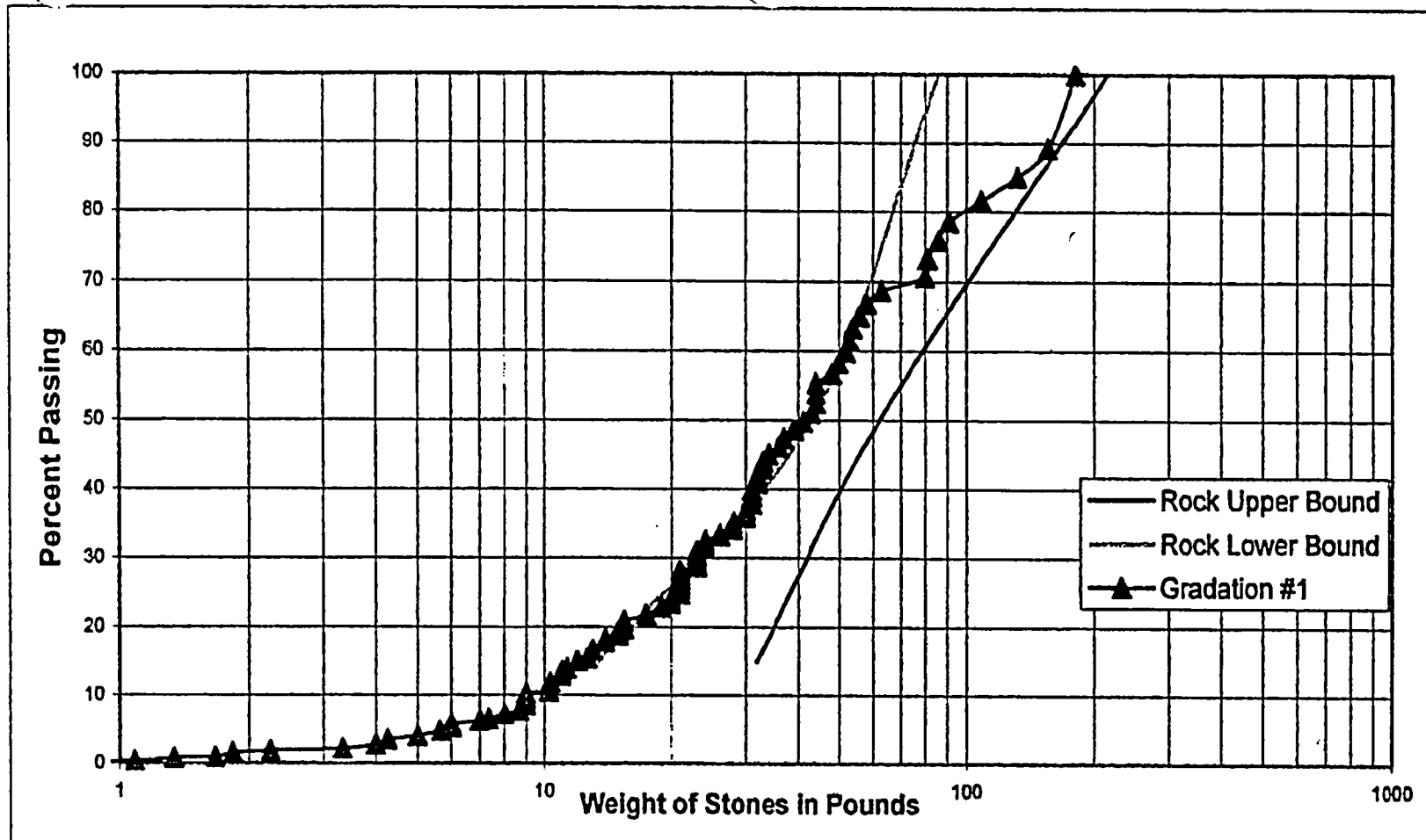
5/20/02      Sample of placed composite South Pass rock at Lucky Mc – rock generally meets 9.6" specification. The exceedence of upper bound D50 is obviated by the fact that the South Pass rock has a much greater density than the 160 lb/ft<sup>3</sup> assumed in the design process.

9/3/02      Sample taken at South Pass site – rock meets for 9.6" specification.

9/20/02      Sample of 12" South Pass rock at Lucky Mc – rock meets 12" specification.

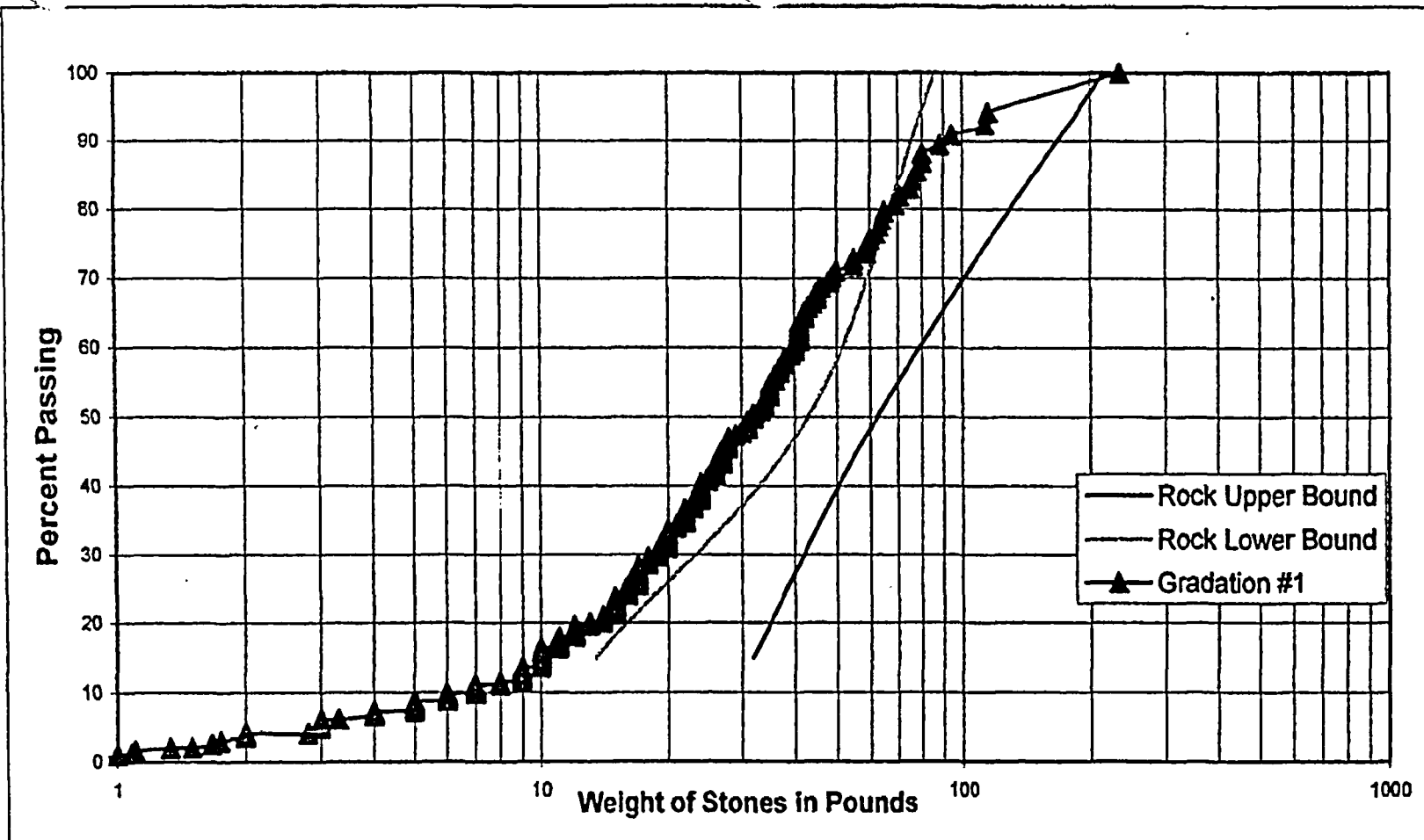
1/30/03      Initial sample taken at South Pass site – rock is slightly larger than 12" rock specification.

1/30/03      Second sample taken at South Pass site – rock nearly fits 12" rock specification.



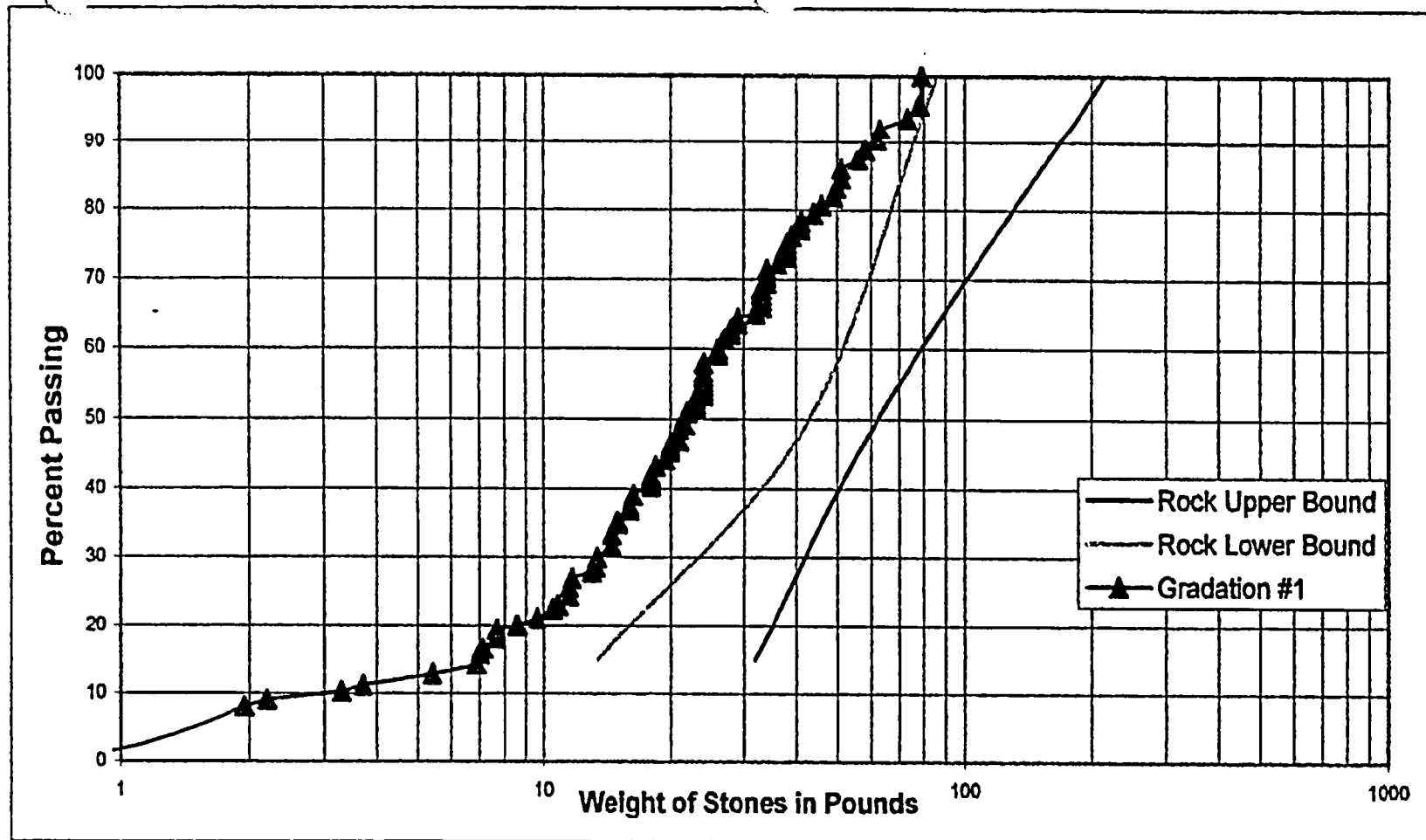
### 1/25/02 SAMPLE OF 9.6" SOUTH PASS ROCK

|                   | W15 (lb)                 | W25 (lb) | W50 (lb) | W100 (lb) |                 | Assumed Sp. Wt. |
|-------------------|--------------------------|----------|----------|-----------|-----------------|-----------------|
| ACOE Upper Bound  | 31.8                     |          | 62.2     | 214.5     | Layer Thickness | 16.3            |
| ACOE Lower Bound  | 13.4                     | 13.4     | 42.9     | 85.8      | Shape Factor    | 1.40            |
| Gradation Results | 12.0                     | 21.0     | 41.3     | 180.0     | Spherical D100  | 15.5            |
|                   | Grad #1 % in Combination |          |          | 100       | D100 with Shape |                 |
|                   | Grad #2 % in Combination |          |          | 0         | Factor (Inch)   | 13.8            |



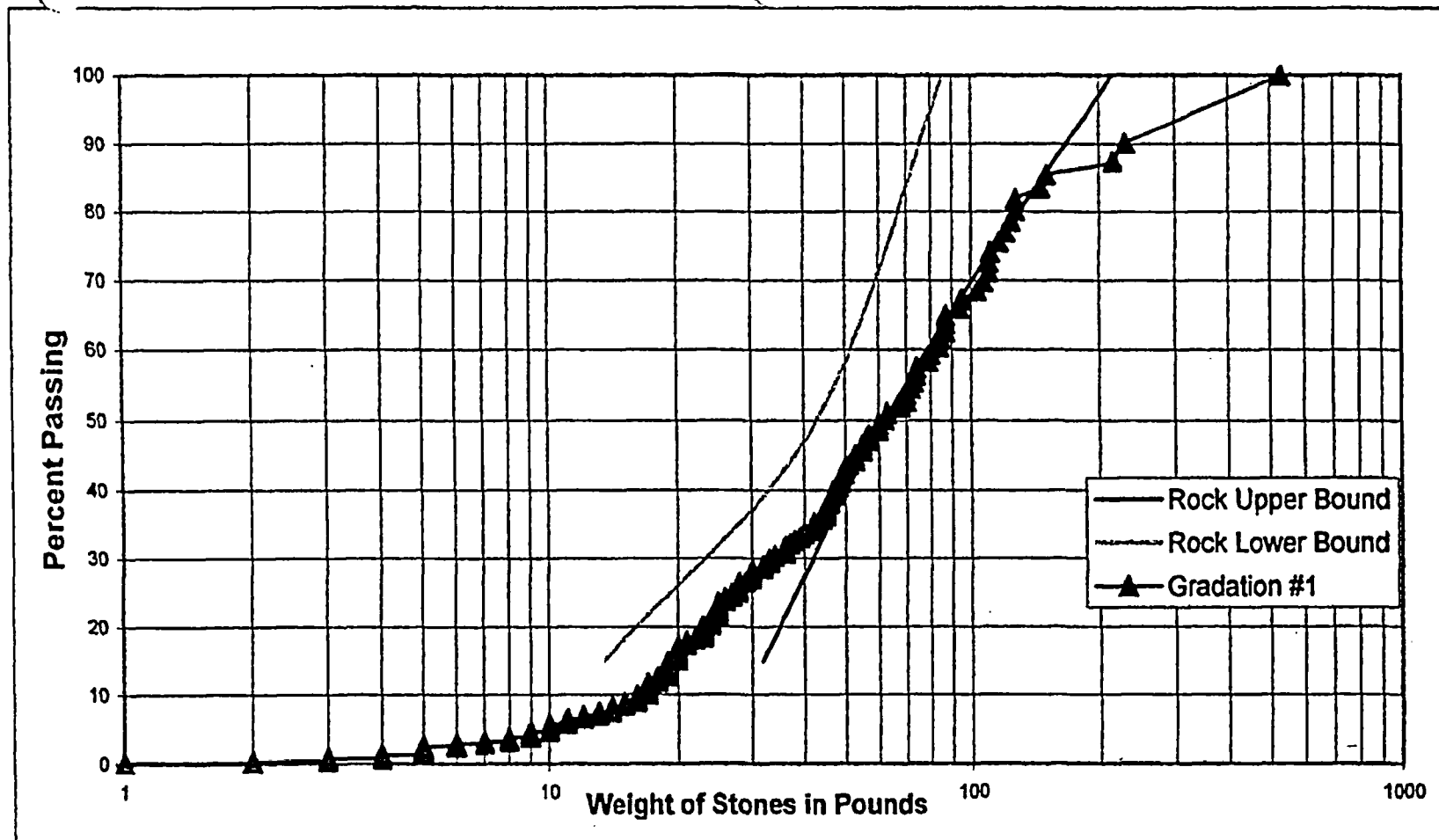
### 2/8/02 SAMPLE OF DELIVERED 9.6" ROCK FROM SOUTH PASS

|                   | W15 (lb)                 | W25 (lb) | W50 (lb) | W100 (lb) |                 | Assumed Sp. Wt. |
|-------------------|--------------------------|----------|----------|-----------|-----------------|-----------------|
| ACOE Upper Bound  | 31.8                     |          | 62.2     | 214.5     | Layer Thickness | 16.3            |
| ACOE Lower Bound  | 13.4                     | 13.4     | 42.9     | 85.8      | Shape Factor    | 1.40            |
| Gradation Results | 10.0                     | 16.0     | 32.0     | 234.0     | Spherical D100  | 16.9            |
|                   | Grad #1 % in Combination |          |          | 100       | D100 with Shape |                 |
|                   | Grad #2 % in Combination |          |          | 0         | Factor (inch)   | 15.1            |



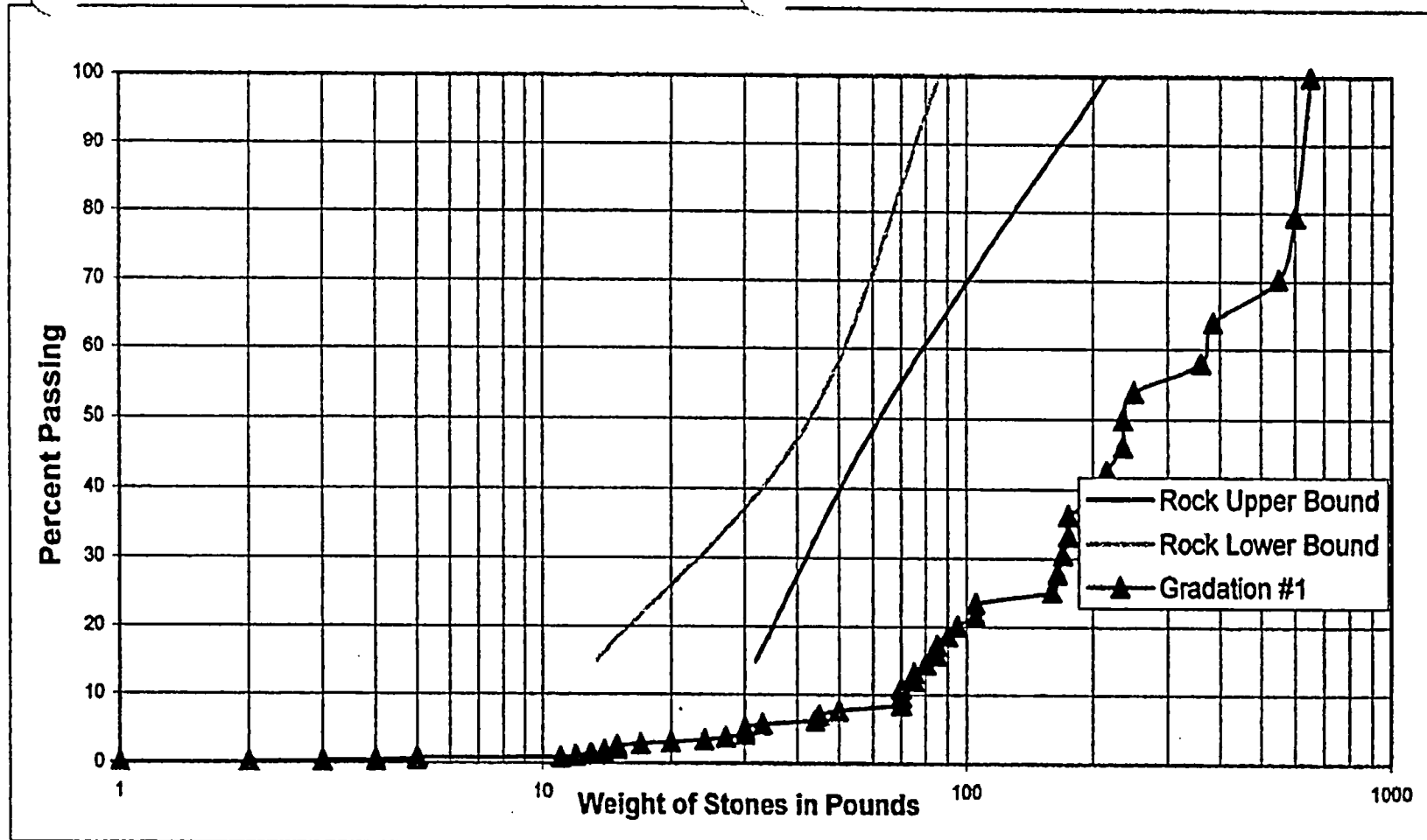
### 2/11/02 SAMPLE OF 9.6" ROCK TESTED AT SOUTH PASS

|                   | W15 (lb)                 | W25 (lb) | W50 (lb) | W100 (lb) | Assumed Sp. Wt. |      |     |
|-------------------|--------------------------|----------|----------|-----------|-----------------|------|-----|
| ACOE Upper Bound  | 31.8                     |          | 62.2     | 214.5     | Layer Thickness | 16.3 | 160 |
| ACOE Lower Bound  | 13.4                     | 13.4     | 42.9     | 85.8      | Shape Factor    | 1.40 |     |
| Gradation Results | 6.9                      | 11.5     | 21.8     | 79.0      | Spherical D100  | 11.8 |     |
|                   | Grad #1 % in Combination |          |          | 100       | D100 with Shape |      |     |
|                   | Grad #2 % in Combination |          |          | 0         | Factor (inch)   | 10.5 |     |



### 2/15/02 SAMPLE OF DELIVERED 9.6" SOUTH PASS ROCK AFTER SCREENING ADJUSTMENT

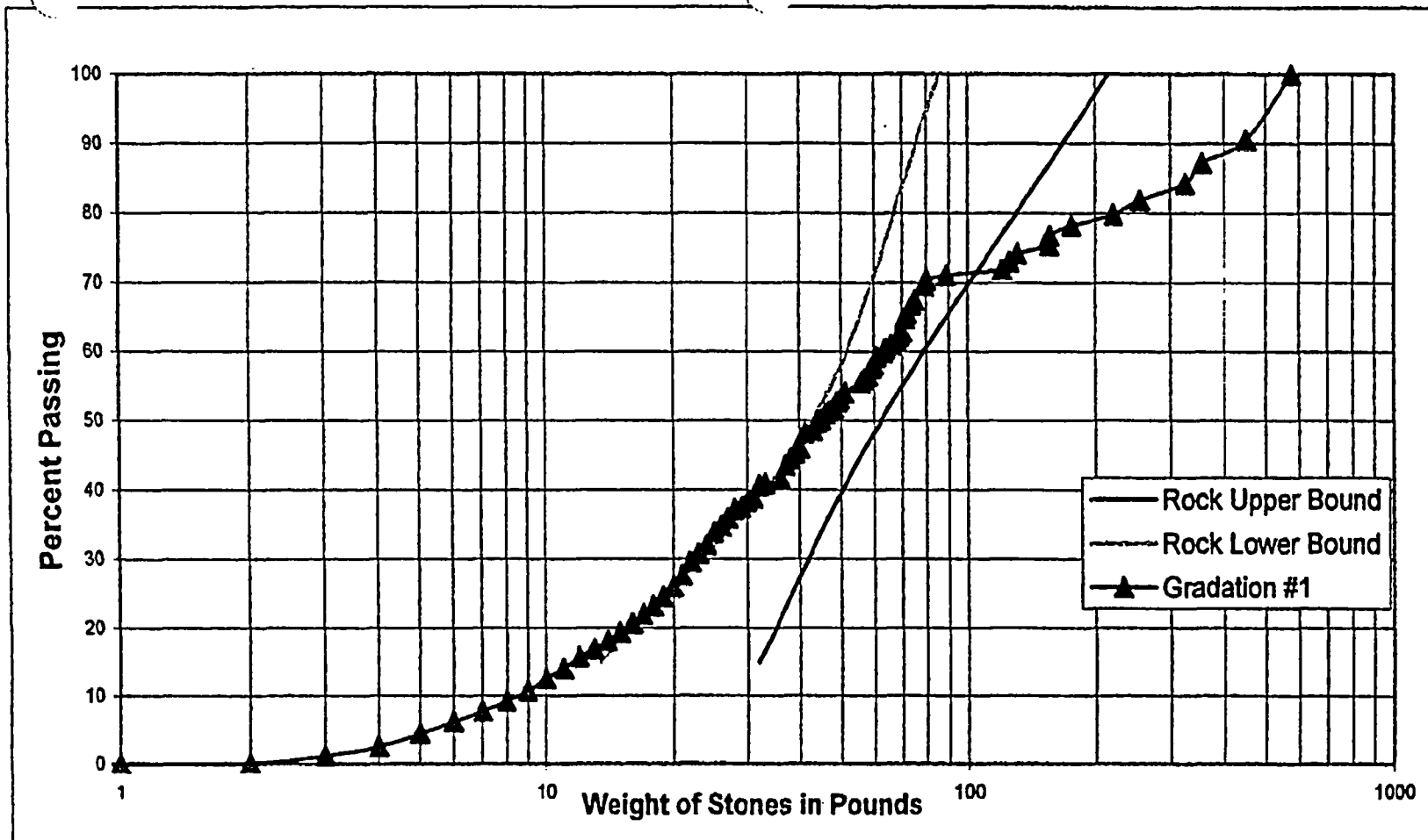
|                               | W15 (lb) | W25 (lb) | W50 (lb) | W100 (lb) | Assumed Sp. Wt. |
|-------------------------------|----------|----------|----------|-----------|-----------------|
| ACOE Upper Bound              | 31.8     |          | 62.2     | 214.5     | 160             |
| ACOE Lower Bound              | 13.4     | 13.4     | 42.9     | 85.8      |                 |
| Gradation Results             | 19.8     | 27.5     | 61.4     | 530.0     |                 |
| Grad #1 % in Combination      | 100      |          |          |           |                 |
| Grad #2 % in Combination      | 0        |          |          |           |                 |
| Layer Thickness               | 16.3     |          |          |           |                 |
| Shape Factor                  | 1.40     |          |          |           |                 |
| Spherical D100                | 22.2     |          |          |           |                 |
| D100 with Shape Factor (inch) | 19.8     |          |          |           |                 |



# 2/18/02 SAMPLE OF DELIVERED LARGE SOUTH PASS ROCK TO AUGMENT UNDERSIZED RO

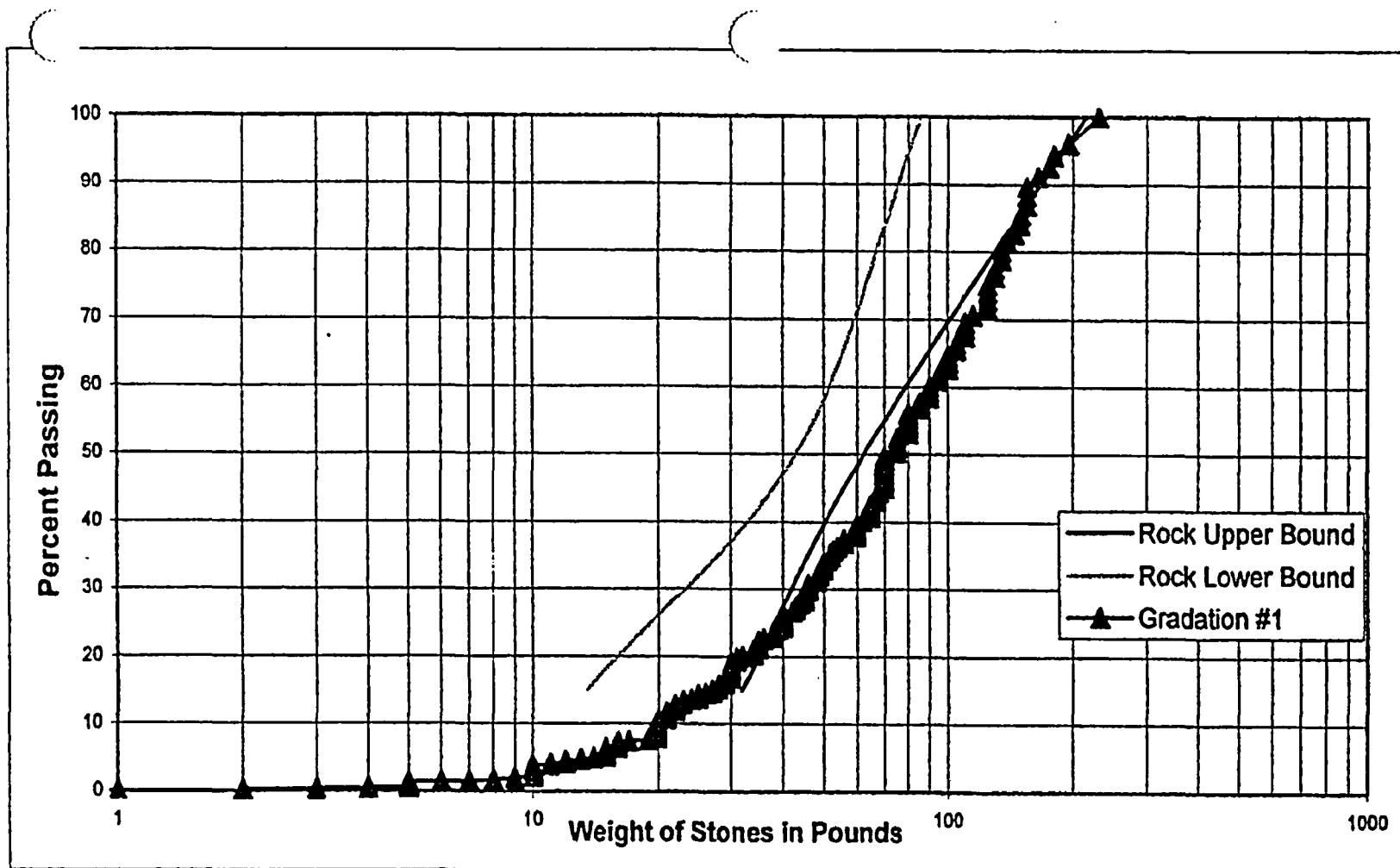
|                   | W15 (lb)                 | W25 (lb) | W50 (lb) | W100 (lb) |                 | Assumed Sp. Wt. |
|-------------------|--------------------------|----------|----------|-----------|-----------------|-----------------|
| ACOE Upper Bound  | 31.8                     |          | 62.2     | 214.5     | Layer Thickness | 16.3            |
| ACOE Lower Bound  | 13.4                     | 13.4     | 42.9     | 85.8      | Shape Factor    | 1.40            |
| Gradation Results | 81.8                     | 154.4    | 235.0    | 650.0     | Spherical D100  | 23.8            |
|                   | Grad #1 % in Combination |          |          | 100       | D100 with Shape |                 |
|                   | Grad #2 % in Combination |          |          | 0         | Factor (Inch)   | 21.2            |





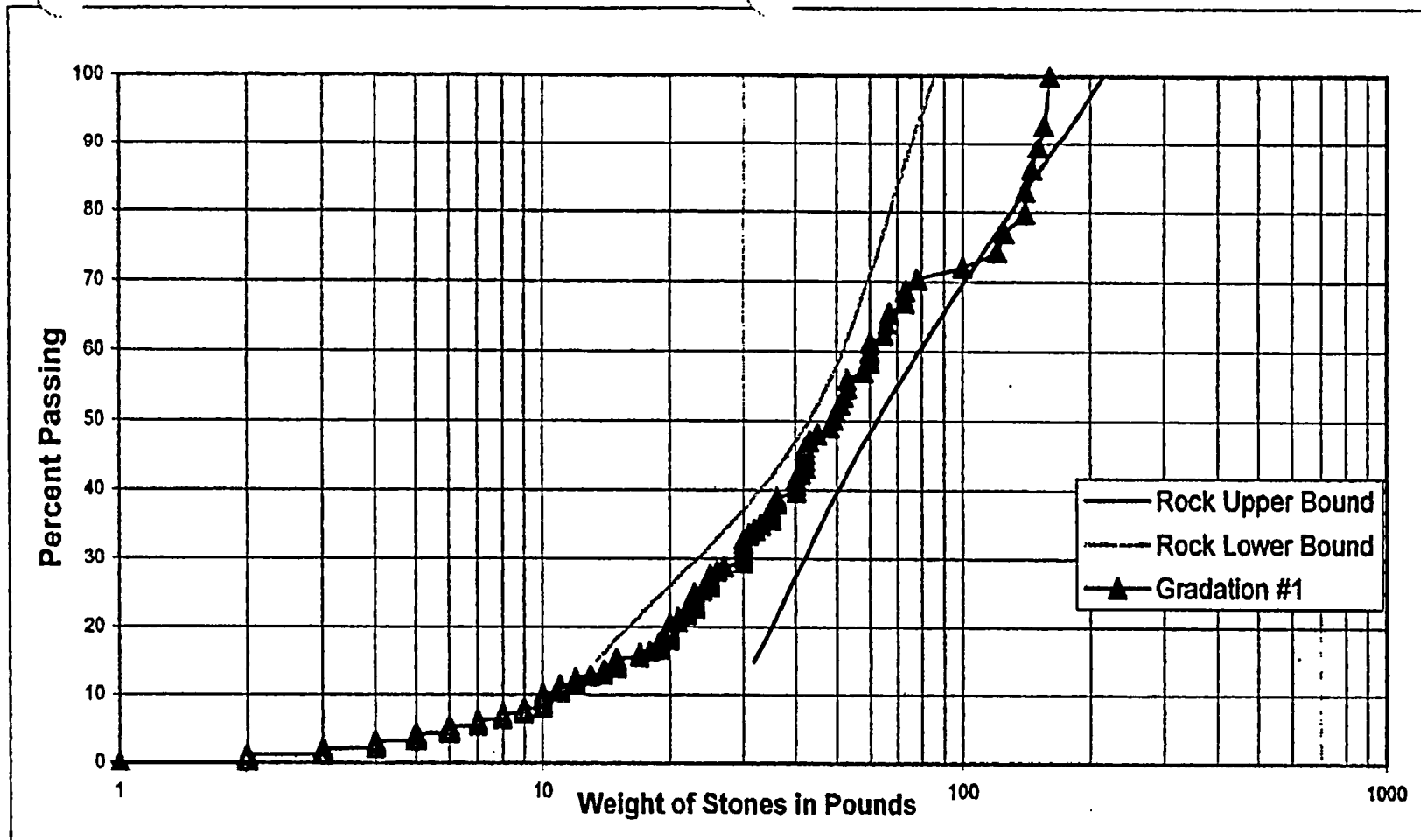
### 3/12/02 SAMPLE OF PLACED COMPOSITE SOUTH PASS ROCK

|                   | W15 (lb)                 | W25 (lb) | W50 (lb) | W100 (lb) |                 | Assumed Sp. Wt. |
|-------------------|--------------------------|----------|----------|-----------|-----------------|-----------------|
| ACOE Upper Bound  | 31.8                     |          | 62.2     | 214.5     | Layer Thickness | 16.3            |
| ACOE Lower Bound  | 13.4                     | 13.4     | 42.9     | 85.8      | Shape Factor    | 1.40            |
| Gradation Results | 11.5                     | 19.3     | 44.7     | 575.0     | Spherical D100  | 22.8            |
|                   | Grad #1 % in Combination |          |          | 100       | D100 with Shape |                 |
|                   | Grad #2 % in Combination |          |          | 0         | Factor (Inch)   | 20.4            |



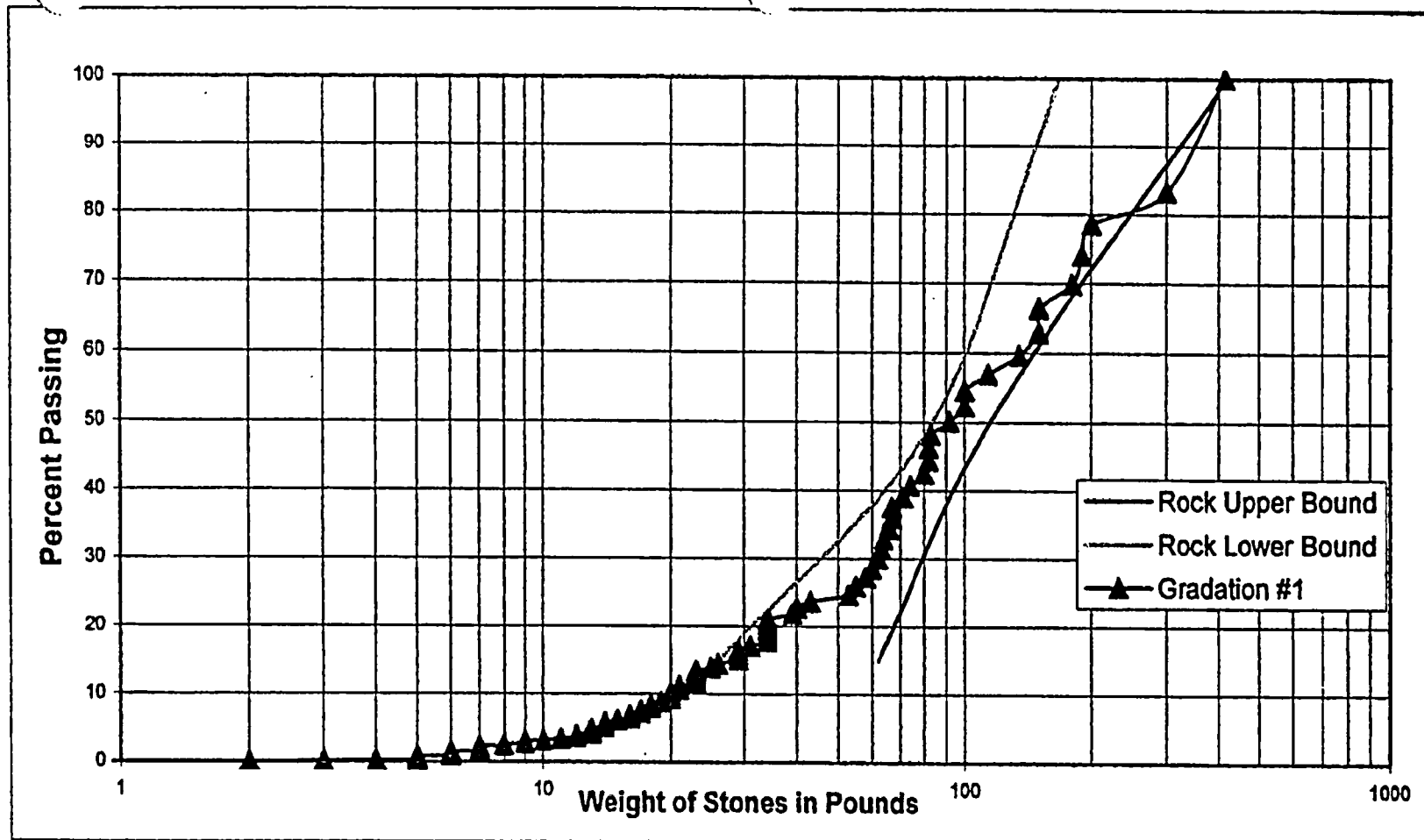
### 5/20/02 SAMPLE OF PLACED SOUTH PASS ROCK

|                               | W15 (lb) | W25 (lb) | W50 (lb) | W100 (lb) | Assumed Sp. Wt. |
|-------------------------------|----------|----------|----------|-----------|-----------------|
| ACOE Upper Bound              | 31.8     |          | 62.2     | 214.5     | 160             |
| ACOE Lower Bound              | 13.4     | 13.4     | 42.9     | 85.8      |                 |
| Gradation Results             | 27.0     | 40.0     | 72.8     | 230.0     |                 |
| Grad #1 % in Combination      | 100      |          |          |           |                 |
| Grad #2 % in Combination      | 0        |          |          |           |                 |
| Layer Thickness               | 16.3     |          |          |           |                 |
| Shape Factor                  | 1.40     |          |          |           |                 |
| Spherical D100                | 16.8     |          |          |           |                 |
| D100 with Shape Factor (inch) | 15       |          |          |           |                 |



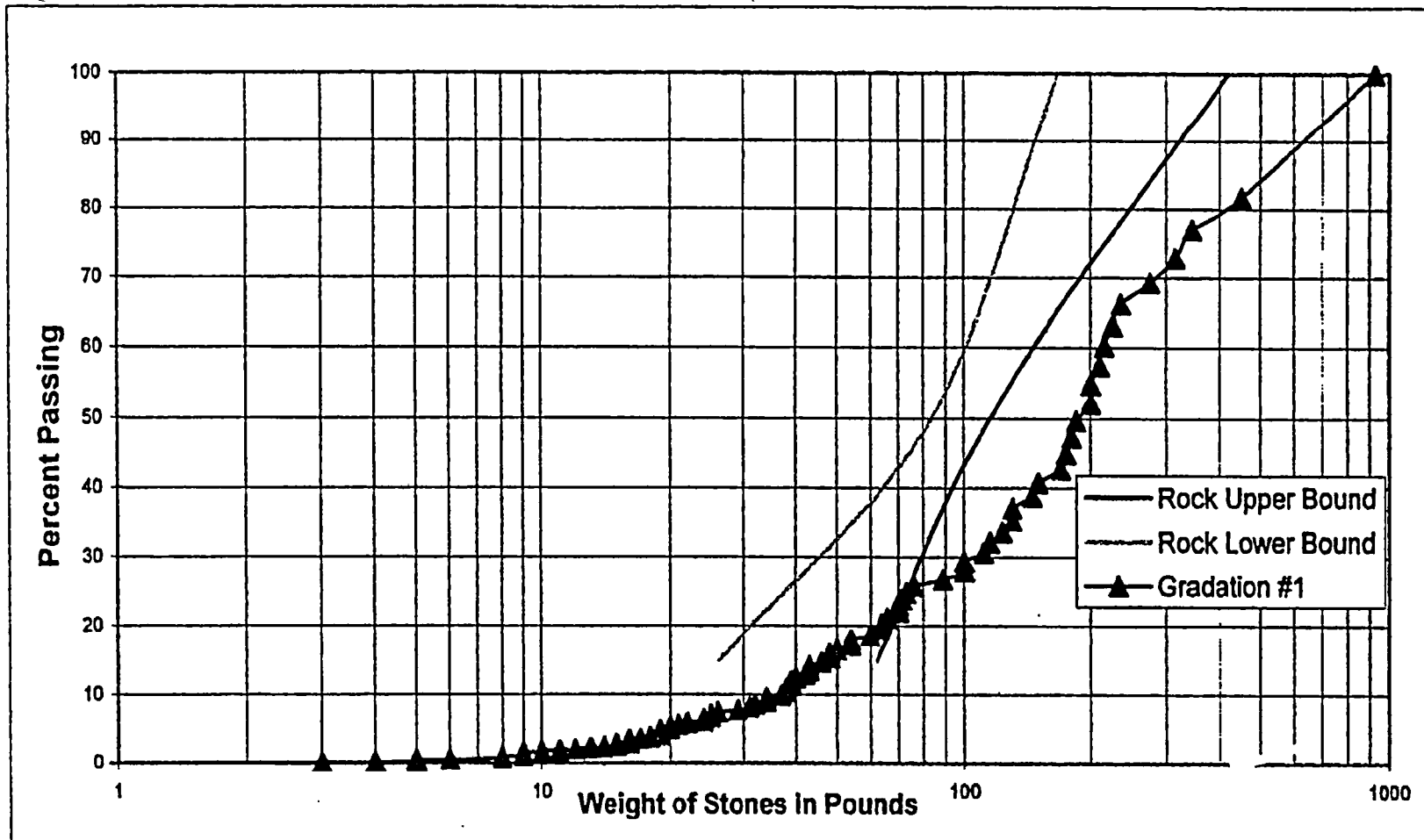
### 9/3/02 SAMPLE OF 9.6" SOUTH PASS ROCK

|                   | W15 (lb)                 | W25 (lb) | W50 (lb) | W100 (lb) |                 | Assumed Sp. Wt. |
|-------------------|--------------------------|----------|----------|-----------|-----------------|-----------------|
| ACOE Upper Bound  | 31.8                     |          | 62.2     | 214.5     | Layer Thickness | 16.3            |
| ACOE Lower Bound  | 13.4                     | 13.4     | 42.9     | 85.8      | Shape Factor    | 1.40            |
| Gradation Results | 15.0                     | 23.2     | 48.8     | 160.0     | Spherical D100  | 14.9            |
|                   | Grad #1 % in Combination |          |          | 100       | D100 with Shape |                 |
|                   | Grad #2 % in Combination |          |          | 0         | Factor (inch)   | 13.3            |



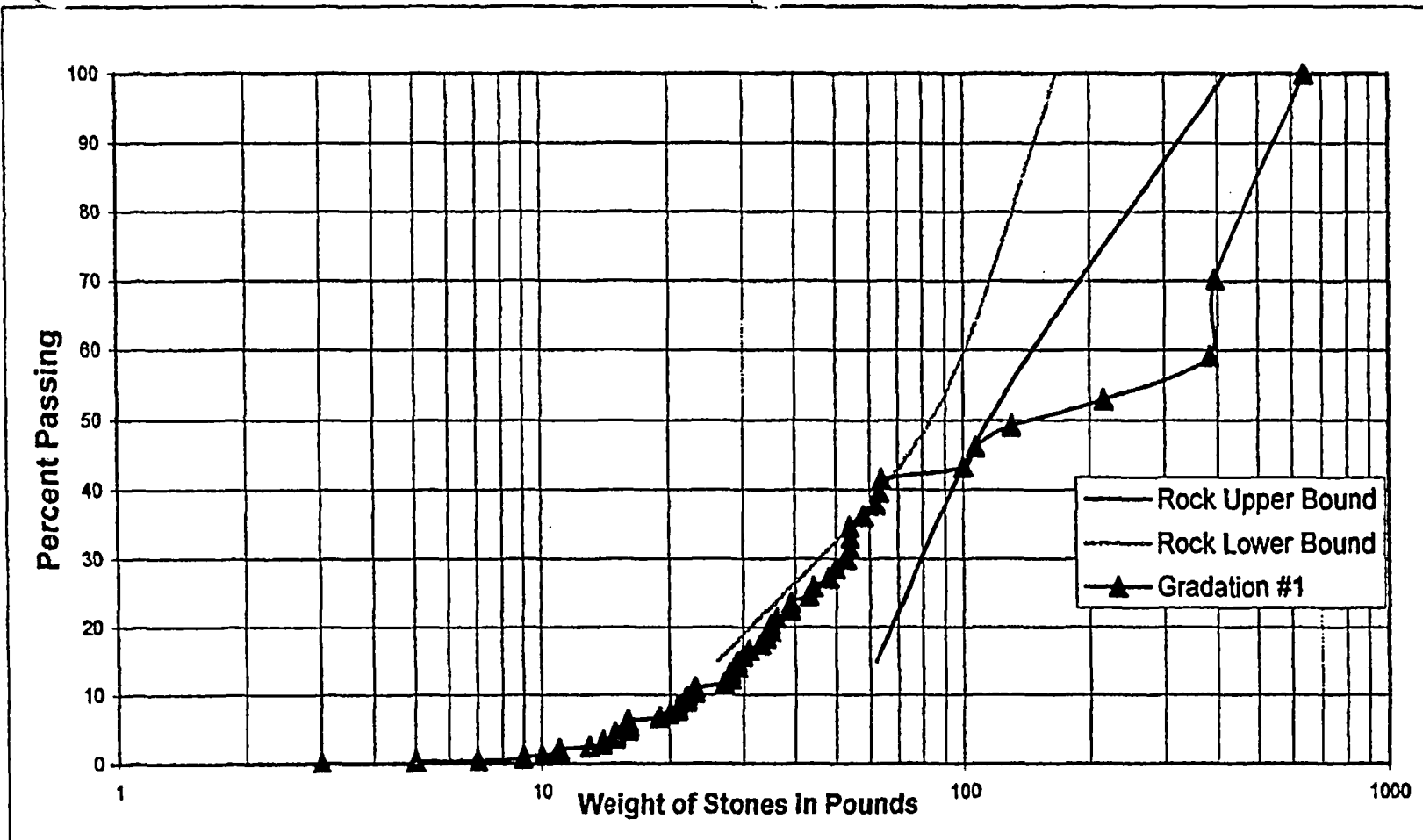
### 9/20/02 SAMPLE OF 12" SOUTH PASS ROCK

|                   | W15 (lb)                 | W25 (lb) | W50 (lb) | W100 (lb) | Assumed Sp. Wt. |      |     |
|-------------------|--------------------------|----------|----------|-----------|-----------------|------|-----|
| ACOE Upper Bound  | 62.1                     |          | 114.9    | 418.9     | Layer Thickness | 20.0 | 160 |
| ACOE Lower Bound  | 26.2                     | 26.2     | 83.8     | 167.6     | Shape Factor    | 1.40 |     |
| Gradation Results | 28.6                     | 53.5     | 91.2     | 415.0     | Spherical D100  | 20.5 |     |
|                   | Grad #1 % in Combination |          |          | 100       | D100 with Shape |      |     |
|                   | Grad #2 % in Combination |          |          | 0         | Factor (inch)   | 18.3 |     |



### 1/30/03 INITIAL SAMPLE OF SOUTH PASS ROCK

|                   | W15 (lb)                 | W25 (lb) | W50 (lb) | W100 (lb) | Assumed Sp. Wt. |      |     |
|-------------------|--------------------------|----------|----------|-----------|-----------------|------|-----|
| ACOE Upper Bound  | 62.1                     |          | 114.9    | 418.9     | Layer Thickness | 20.0 | 160 |
| ACOE Lower Bound  | 26.2                     | 26.2     | 83.8     | 167.6     | Shape Factor    | 1.40 |     |
| Gradation Results | 46.9                     | 73.4     | 186.9    | 930.0     | Spherical D100  | 26.8 |     |
|                   | Grad #1 % in Combination |          |          | 100       | D100 with Shape |      |     |
|                   | Grad #2 % in Combination |          |          | 0         | Factor (inch)   | 23.9 |     |



### 1/30/03 SUPPLEMENTAL SAMPLE OF SOUTH PASS ROCK

|                   | W15 (lb)                 | W25 (lb) | W50 (lb) | W100 (lb) |                 | Assumed Sp. Wt. |
|-------------------|--------------------------|----------|----------|-----------|-----------------|-----------------|
| ACOE Upper Bound  | 62.1                     |          | 114.9    | 418.9     | Layer Thickness | 20.0            |
| ACOE Lower Bound  | 26.2                     | 26.2     | 83.8     | 167.6     | Shape Factor    | 1.40            |
| Gradation Results | 29.1                     | 43.2     | 146.7    | 640.0     | Spherical D100  | 23.6            |
|                   | Grad #1 % in Combination |          |          | 100       | D100 with Shape |                 |
|                   | Grad #2 % in Combination |          |          | 0         | Factor (inch)   | 21.1            |

# APPENDIX

H

**LIMESTONE  
DURABILITY TESTS**



# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

May 28, 1998

8152-RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

ATTENTION: JIM CROUCH

RE: LABORATORY TESTING RESULTS AND  
NRC SCORING OF ROCK SAMPLES FROM  
LUCKY MCMINE RECLAMATION PROJECT  
E. GAS HILLS, WYOMING

Gentlemen:

We have tested the first limestone rock sample which was collected on March 5, 1998 at the quarry site located on the above-referenced facility near E. Gas Hills, Wyoming. As specified in your QA/QC Scope of Work, we have performed Specific Gravity and Absorption (nominal size 2"), L.A. Abrasion (100 rev.), and Sodium Sulfate Soundness (sieves 3 through 1"; 5 cycles). We have used a "weighted average" based on the crushed rock product for D<sub>50</sub> of 1.63 inches to calculate the percent loss of the sodium sulfate soundness test. (Although only the Bulk Specific Gravity is used for the NRC scoring, we have included the Apparent Specific Gravity and Bulk Saturated Surface Dry Specific Gravity for your reference.)

We have "scored" the samples according to Table D1 of the NRC's Staff Technical Position (STP) Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites, August 1990. Table 1 shows the test results and calculations for Test Number 1.

| TABLE 1   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY - LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 1                          |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.698  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.677  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.670  | 8.4   | 12     | 100.8          | 120           |
| Absorption, % ASTM C127                             | 0.49   | 8.0   | 13     | 104.0          | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 2.87   | 9.1   | 4      | 36.4           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.8    | 8.1   | 1      | 8.1            | 10            |
| TOTAL SCORE   |        |       |        | 249.3          | 300           |
| Durability Rating = $249.3 / 300 \times 100 = 83.1$ |        |       |        |                |               |

Pathfinder Mines Corporation  
May 28, 1998  
Page Two

8152-RM

We appreciate the opportunity to be of service to you thus far. If you have any questions regarding the enclosed information or if we may be of additional assistance, please contact us.

Sincerely,

INBERG-MILLER ENGINEERS

A handwritten signature in black ink, appearing to read "Glen M. Bobnick". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:jlw:geotech/8152-RM

# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

May 28, 1998

8152-RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

ATTENTION: JIM CROUCH

RE: LABORATORY TESTING RESULTS AND  
NRC SCORING OF ROCK SAMPLES FROM  
LUCKY MCMINE RECLAMATION PROJECT  
E. GAS HILLS, WYOMING

Gentlemen:

We have tested the second limestone rock sample which was collected on April 14, 1998 at the quarry site located on the above-referenced facility near E. Gas Hills, Wyoming. As specified in your QA/QC Scope of Work, we have performed Specific Gravity and Absorption (nominal size 2"), L.A. Abrasion (100 rev.), and Sodium Sulfate Soundness (sieves 3 through 1"; 5 cycles). We have used a "weighted average" based on the crushed rock product for D<sub>50</sub> of 1.63 inches to calculate the percent loss of the sodium sulfate soundness test. (Although only the Bulk Specific Gravity is used for the NRC scoring, we have included the Apparent Specific Gravity and Bulk Saturated Surface Dry Specific Gravity for your reference.)

We have "scored" the samples according to Table D1 of the NRC's Staff Technical Position (STP) Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites, August 1990. Table 1 shows the test results and calculations for Test Number 2.

| TABLE 1   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY - LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 2                          |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.695  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.679  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.670  | 8.4   | 12     | 100.8          | 120           |
| Absorption, % ASTM C127                             | 0.34   | 8.8   | 13     | 114.4          | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 2.15   | 9.4   | 4      | 37.6           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.7    | 8.1   | 1      | 8.1            | 10            |
| TOTAL SCORE   |        |       |        | 260.9          | 300           |
| Durability Rating = $260.9 / 300 \times 100 = 87.0$ |        |       |        |                |               |


Pathfinder Mines Corporation  
May 28, 1998  
Page Two

8152-RM

We appreciate the opportunity to be of service to you thus far. If you have any questions regarding the enclosed information or if we may be of additional assistance, please contact us.

Sincerely,

INBERG-MILLER ENGINEERS

A handwritten signature in black ink, appearing to read "Glen M. Bobnick". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:jlw:geotech/8152-RM

# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

June 3, 1998

8152-RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

ATTENTION: JIM CROUCH

RE: LABORATORY TESTING RESULTS AND  
NRC SCORING OF ROCK SAMPLES FROM  
LUCKY MCMINE RECLAMATION PROJECT  
E. GAS HILLS, WYOMING

Gentlemen:

We have tested the third limestone rock sample which was collected on May 6, 1998 at the quarry site located on the above-referenced facility near E. Gas Hills, Wyoming. As specified in your QA/QC Scope of Work, we have performed Specific Gravity and Absorption (nominal size 2"), L.A. Abrasion (100 rev.), and Sodium Sulfate Soundness (sieves 3 through 1"; 5 cycles). We have used a "weighted average" based on the crushed rock product for D<sub>50</sub> of 1.63 inches to calculate the percent loss of the sodium sulfate soundness test. (Although only the Bulk Specific Gravity is used for the NRC scoring, we have included the Apparent Specific Gravity and Bulk Saturated Surface Dry Specific Gravity for your reference.)

We have "scored" the samples according to Table D1 of the NRC's Staff Technical Position (STP) Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites, August 1990. Table 1 shows the test results and calculations for Test Number 3.

| TABLE 1   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY - LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 3                          |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.686  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.662  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.649  | 8.0   | 12     | 96.0           | 120           |
| Absorption, % ASTM C127                             | 0.52   | 7.9   | 13     | 102.7          | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 0.70   | 10.0  | 4      | 40.0           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.8    | 8.1   | 1      | 8.1            | 10            |
| TOTAL SCORE   |        |       |        | 246.8          | 300           |
| Durability Rating = $246.8 / 300 \times 100 = 82.2$ |        |       |        |                |               |

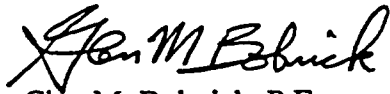
Pathfinder Mines Corporation  
June 3, 1998  
Page Two

8152-RM

We appreciate the opportunity to be of service to you thus far. If you have any questions regarding the enclosed information or if we may be of additional assistance, please contact us.

Sincerely,

INBERG-MILLER ENGINEERS

A handwritten signature in black ink, appearing to read "Glen M. Bobnick". The signature is written in a cursive, flowing style with a large initial "G".

Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:jlw:geotech/8152-RM

# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

June 17, 1998

8152-RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

ATTENTION: JIM CROUCH

RE: LABORATORY TESTING RESULTS AND  
NRC SCORING OF ROCK SAMPLES FROM  
LUCKY MCMINE RECLAMATION PROJECT  
E. GAS HILLS, WYOMING

Gentlemen:

We have tested the fourth limestone rock sample which was collected on May 6, 1998 at the quarry site located on the above-referenced facility near E. Gas Hills, Wyoming. As specified in your QA/QC Scope of Work, we have performed Specific Gravity and Absorption (nominal size 2"), L.A. Abrasion (100 rev.), and Sodium Sulfate Soundness (sieves 3 through 1"; 5 cycles). We have used a "weighted average" based on the crushed rock product for D<sub>50</sub> of 1.63 inches to calculate the percent loss of the sodium sulfate soundness test. (Although only the Bulk Specific Gravity is used for the NRC scoring, we have included the Apparent Specific Gravity and Bulk Saturated Surface Dry Specific Gravity for your reference.)

We have "scored" the samples according to Table D1 of the NRC's Staff Technical Position (STP) Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites, August 1990. Table 1 shows the test results and calculations for Test Number 4.

| TABLE 1   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY - LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 4                          |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.698  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.674  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.659  | 8.2   | 12     | 98.4           | 120           |
| Absorption, % ASTM C127                             | 0.55   | 7.7   | 13     | 100.1          | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 0.34   | 10.0  | 4      | 40.0           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 5.0    | 8.0   | 1      | 8.0            | 10            |
| TOTAL SCORE   |        |       |        | 246.5          | 300           |
| Durability Rating = $246.5 / 300 \times 100 = 82.2$ |        |       |        |                |               |

Pathfinder Mines Corporation  
June 17, 1998  
Page Two

8152-RM

We appreciate the opportunity to be of service to you thus far. If you have any questions regarding the enclosed information or if we may be of additional assistance, please contact us.

Sincerely,

INBERG-MILLER ENGINEERS

A handwritten signature in black ink, reading "Glen M. Bobnick". The signature is written in a cursive, flowing style.

Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:jlw:geotech/8152-RM



**INBERG-MILLER ENGINEERS**

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

July 21, 1998

8152-RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

ATTENTION: JIM CROUCH

RE: LABORATORY TESTING RESULTS AND  
NRC SCORING OF ROCK SAMPLES FROM  
LUCKY MCMINE RECLAMATION PROJECT  
E. GAS HILLS, WYOMING

Gentlemen:

We have tested the fifth limestone rock sample which was collected on May 6, 1998 at the quarry site located on the above-referenced facility near E. Gas Hills, Wyoming. As specified in your QA/QC Scope of Work, we have performed Specific Gravity and Absorption (nominal size 2"), L.A. Abrasion (100 rev.), and Sodium Sulfate Soundness (sieves 3 through 1"; 5 cycles). We have used a "weighted average" based on the crushed rock product for  $D_{50}$  of 1.63 inches to calculate the percent loss of the sodium sulfate soundness test. (Although only the Bulk Specific Gravity is used for the NRC scoring, we have included the Apparent Specific Gravity and Bulk Saturated Surface Dry Specific Gravity for your reference.)

We have "scored" the samples according to Table D1 of the NRC's Staff Technical Position (STP) Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites, August 1990. Table 1 shows the test results and calculations for Test Number 5.

| TABLE 1   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY - LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 5                          |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.703  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.678  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.664  | 8.3   | 12     | 99.6           | 120           |
| Absorption, % ASTM C127                             | 0.55   | 7.7   | 13     | 100.1          | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 0.34   | 10.0  | 4      | 40.0           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 6.1    | 7.4   | 1      | 7.4            | 10            |
| TOTAL SCORE   |        |       |        | 247.1          | 300           |
| Durability Rating = $247.1 / 300 \times 100 = 82.4$ |        |       |        |                |               |

Pathfinder Mines Corporation  
July 21, 1998  
Page Two

8152-RM

We appreciate the opportunity to be of service to you thus far. If you have any questions regarding the enclosed information or if we may be of additional assistance, please contact us.

Sincerely,

INBERG-MILLER ENGINEERS

A handwritten signature in black ink, appearing to read "Glen M. Bobnick". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:jlw:geotech/8152-RM-July Results

# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

November 19, 1998

8152-RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

ATTENTION: JIM CROUCH

RE: LABORATORY TESTING RESULTS AND  
NRC SCORING OF ROCK SAMPLES FROM  
LUCKY MCMINE RECLAMATION PROJECT  
E. GAS HILLS, WYOMING

Gentlemen:

We have tested the sixth through the ninth limestone rock samples which were collected at the quarry site located on the above-referenced facility near E. Gas Hills, Wyoming. As specified in your QA/QC Scope of Work, we have performed Specific Gravity and Absorption (nominal size 2"), L.A. Abrasion (100 rev.), and Sodium Sulfate Soundness (sieves 3 through 1"; 5 cycles). We have used a "weighted average" based on the crushed rock product for D<sub>50</sub> of 1.63 inches to calculate the percent loss of the sodium sulfate soundness test. (Although only the Bulk Specific Gravity is used for the NRC scoring, we have included the Apparent Specific Gravity and Bulk Saturated Surface Dry Specific Gravity for your reference.)

We have "scored" the samples according to Table D1 of the NRC's Staff Technical Position (STP) Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites, August 1990. Tables 1 through 4 show the test results and calculations for Test Number 6 through 9, respectively.

| TABLE 1   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY - LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 6                          |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.711  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.683  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.666  | 8.2   | 12     | 98.4           | 120           |
| Absorption, % ASTM C127                             | 0.61   | 7.4   | 13     | 96.2           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 0.91   | 10.0  | 4      | 40.0           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 5.1    | 7.9   | 1      | 7.9            | 10            |
| TOTAL SCORE   |        |       |        | 242.5          | 300           |
| Durability Rating = $242.5 / 300 \times 100 = 80.8$ |        |       |        |                |               |

| TABLE 2   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 7                          |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.702  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.676  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.661  | 8.2   | 12     | 98.4           | 120           |
| Absorption, % ASTM C127                             | 0.57   | 7.6   | 13     | 98.8           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 0.43   | 10.0  | 4      | 40.0           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 5.7    | 7.6   | 1      | 7.6            | 10            |
| TOTAL SCORE   |        |       |        | 244.8          | 300           |
| Durability Rating = $244.8 / 300 \times 100 = 81.6$ |        |       |        |                |               |

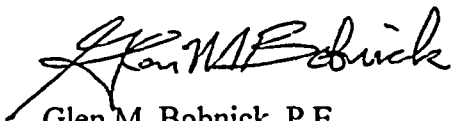
| TABLE 3   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 8                          |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.706  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.678  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.662  | 8.2   | 12     | 98.4           | 120           |
| Absorption, % ASTM C127                             | 0.61   | 7.6   | 13     | 98.8           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 0.31   | 10.0  | 4      | 40.0           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 2.5    | 9.3   | 1      | 9.3            | 10            |
| TOTAL SCORE   |        |       |        | 246.5          | 300           |
| Durability Rating = $246.5 / 300 \times 100 = 82.2$ |        |       |        |                |               |

| TABLE 4   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY - LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 9                          |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.706  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.683  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.670  | 8.4   | 12     | 100.8          | 120           |
| Absorption, % ASTM C127                             | 0.51   | 7.9   | 13     | 102.7          | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 0.31   | 10.0  | 4      | 40.0           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 2.5    | 9.3   | 1      | 9.3            | 10            |
| TOTAL SCORE   |        |       |        | 252.8          | 300           |
| Durability Rating = $252.8 / 300 \times 100 = 84.3$ |        |       |        |                |               |

We appreciate the opportunity to be of service to you thus far. If you have any questions regarding the enclosed information or if we may be of additional assistance, please contact us.

Sincerely,

INBERG-MILLER ENGINEERS



Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:jlw:geotech/8152-rm-(6-9)

cc. JOW  
2.182

# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

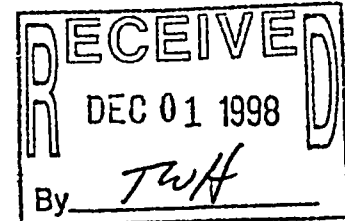
RIVERTON, WYOMING 82501-4397

307-856-8136

November 25, 1998

8152 RM

Pathfinder Mines Corporation  
Post Office Box 831  
Riverton, Wyoming 82501



ATTENTION: TOM HARDGROVE

RE: SAMPLE NO. 12 ROCK DURABILITY SCORE  
CORRECTIVE ACTION  
LUCKY MC MINE RECLAMATION PROJECT

Dear Sir:

This letter summarizes corrective action for a recent low rock durability score that was determined for crushed limestone rock products at the above project.

Inberg-Miller Engineers collected rock sample No. 12 on November 6, 1998 and performed a rock durability test on the sample. The test results were used to score the sample in accordance with the Nuclear Regulatory Commission's (NRC) Table D1 "Scoring Criteria for Determining Rock Quality". We calculated a score of 70.6%, which is below the minimum of 80% where no oversizing is required.

We reviewed the rock durability score of 70.6% with you on November 19, 1998, and you requested that we review gradation results for rock products that were represented by the same sample. We understand that the rock crusher was not in operation for a period following satisfactory rock durability testing of sample No. 11. The rock-crushing contractor began producing 1.63" and 2.17" D50 rock products after the crusher was back in operation and prior to November 19, 1998. Only one gradation test result met project specifications during this time interval, and all other produced material was rejected. The acceptable gradation was for 2.17" D50 material. The actual D50 for the acceptable material as tested is 2.44".

In summary, the rock durability score of 70.6% would require that products represented by associated test data be oversized. In accordance with the "Final Staff Technical Position - Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailings Sites", dated August 1990, the product should be oversized by a percentage of the rock diameter equal to the difference between the score and 80. Based on the score for sample No. 12, the rock products should be oversized by 9.4%.

There is only one rock product apparently affected by the rock durability score of 70.6%. The actual D50 gradation data indicates that this product is oversized by 12.4% as compared to the D50 specifications. The 12.4% oversizing exceeds the NRC oversizing requirement of 9.4%.

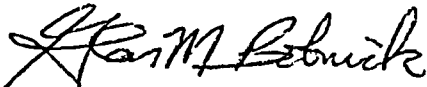
Pathfinder Mines Corporation  
November 25, 1998  
Page Two

8152-RM

We also understand that the apparent reason for the 70.6% score was due to the presence of sandstone overburden materials that had become mixed with the crushed limestone. You indicated that rock mining operations will be changed after November 19, 1998 to limit the likelihood that sandstone would get into the limestone.

Sincerely,

INBERG-MILLER ENGINEERS

A handwritten signature in black ink, appearing to read "Glen M. Bobnick". The signature is stylized with a large, sweeping initial "G" and "B".

Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:ltr\8152rk

# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

January 15, 1999

8152-RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

ATTENTION: JACK WADSWORTH

RE: LABORATORY TESTING RESULTS AND  
NRC SCORING OF ROCK SAMPLES FROM  
LUCKY MCMINE RECLAMATION PROJECT  
E. GAS HILLS, WYOMING

Gentlemen:

We have tested the tenth through the thirteenth limestone rock samples which were collected at the quarry site located on the above-referenced facility near E. Gas Hills, Wyoming. As specified in your QA/QC Scope of Work, we have performed Specific Gravity and Absorption (nominal size 2"), L.A. Abrasion (100 rev.), and Sodium Sulfate Soundness (sieves 3 through 1"; 5 cycles). We have used a "weighted average" based on the crushed rock product for  $D_{50}$  of 1.63 inches to calculate the percent loss of the sodium sulfate soundness test. (Although only the Bulk Specific Gravity is used for the NRC scoring, we have included the Apparent Specific Gravity and Bulk Saturated Surface Dry Specific Gravity for your reference.)

We have "scored" the samples according to Table D1 of the NRC's Staff Technical Position (STP) Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites, August 1990. Tables 1 through 4 show the test results and calculations for Test Number 10 through 13, respectively.

| TABLE 1   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY - LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 10                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.717  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.686  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.672  | 8.4   | 12     | 101.2          | 120           |
| Absorption, % ASTM C127                             | 0.62   | 7.3   | 13     | 94.9           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 1.0    | 10.0  | 4      | 40.0           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.9    | 8.1   | 1      | 8.1            | 10            |
| TOTAL SCORE   |        |       |        | 244.2          | 300           |
| Durability Rating = $244.2 / 300 \times 100 = 81.4$ |        |       |        |                |               |



| TABLE 2   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 11                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.679  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.647  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.660  | 8.2   | 12     | 98.4           | 120           |
| Absorption, % ASTM C127                             | 0.55   | 7.7   | 13     | 100.1          | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 1.68   | 9.7   | 4      | 38.8           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 2.6    | 9.2   | 1      | 9.2            | 10            |
| TOTAL SCORE   |        |       |        | 246.5          | 300           |
| Durability Rating = $246.5 / 300 \times 100 = 82.2$ |        |       |        |                |               |

| TABLE 3   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 12                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.708  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.670  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.649  | 8.0   | 12     | 96.0           | 120           |
| Absorption, % ASTM C127                             | 0.82   | 6.1   | 13     | 79.3           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 6.6    | 7.2   | 4      | 28.6           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 5.2    | 7.9   | 1      | 7.9            | 10            |
| TOTAL SCORE   |        |       |        | 211.8          | 300           |
| Durability Rating = $211.8 / 300 \times 100 = 70.6$ |        |       |        |                |               |

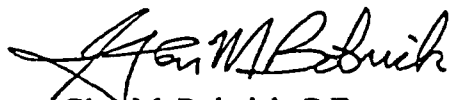
| TABLE 4   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 13                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.684  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.661  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.648  | 8.0   | 12     | 96.0           | 120           |
| Absorption, % ASTM C127                             | 0.49   | 8.1   | 13     | 105.3          | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 1.15   | 9.9   | 4      | 39.6           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.7    | 8.2   | 1      | 8.2            | 10            |
| TOTAL SCORE   |        |       |        | 249.1          | 300           |
| Durability Rating = $249.1 / 300 \times 100 = 83.0$ |        |       |        |                |               |

Please refer to our November 25, 1998 letter regarding corrective action with regard to the rock durability score for Sample No. 12.

We appreciate the opportunity to be of service to you thus far. If you have any questions regarding the enclosed information or if we may be of additional assistance, please contact us.

Sincerely,

INBERG-MILLER ENGINEERS



Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:msr:geotech/8152-rm-(10-13)

# INBERG-MILLER ENGINEERS

124 East Main Street  
Riverton, Wyoming 82501  
307-856-8136

DATE: 1-8-99 COVER + 1 PAGES

TO: Lach Wadsworth

COMPANY: PMC FAX: 4576629

PROJECT: Lucky Mc Mine

PROJECT NO.: B152-RM

FROM: GM Bobnick FAX: 307-856-3851

## WE ARE TRANSMITTING:

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☐ For approval ☒ For your use ☐ As requested ☐ Review/comment

## MESSAGE:

Rock Durability Scores:

| <u>Sa #</u> | <u>Score</u> |
|-------------|--------------|
| <u>10</u>   | <u>81.4</u>  |
| <u>11</u>   | <u>82.2</u>  |
| <u>12</u>   | <u>70.6</u>  |
| <u>13</u>   | <u>82.6</u>  |
| <u>14</u>   | <u>80.3</u>  |
| <u>15</u>   | <u>75.8</u>  |

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# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

February 16, 1999

8152 RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, Wyoming 82501

ATTENTION: JACK WADSWORTH

RE: ROCK DURABILITY SCORING  
LUCKY MC MINE RECLAMATION PROJECT  
GAS HILLS, WYOMING

Dear Sir:

This letter summarizes the basis for rock durability scoring as you requested during a February 1, 1999 meeting between representatives of Pathfinder Mines Corporation and Inberg-Miller Engineers.

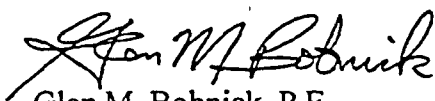
We discussed rock durability testing issues with Mr. Jim Crouch at the onset of crushed rock production and testing early in 1998. We explained the test procedures and factors affecting the tests. Test setup and calculation of results depends on product gradation. We also indicated to Mr. Crouch that it is impractical to test products larger than approximately 4 inches because of the dimensional limitations of conventional test equipment and methods specifically outlined in the test standards. Mr. Crouch selected the 1.63" D<sub>50</sub> product as a basis for testing for the following reasons:

- The 1.63" D<sub>50</sub> product has relatively small particle sizes compared to all but one of the other crushed rock products. The small particle sizes would likely yield conservative test results as compared with larger sized products. Rock durability is related to particle surface area. Smaller sized materials have a larger surface area per unit volume and are exposed to greater loss due to wear and weathering.
- The 1.63" D<sub>50</sub> product comprises the largest percentage of the combined volume of the various crushed rock products produced for the project.

Please feel free to call if you have any questions.

Sincerely,

INBERG-MILLER ENGINEERS



Glen M. Bobnick, P.E.  
Geotechnical Engineer

# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

February 18, 1999

8152-RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

ATTENTION: JACK WADSWORTH

RE: LABORATORY TESTING RESULTS AND  
NRC SCORING OF ROCK SAMPLES FROM  
LUCKY MCMINE RECLAMATION PROJECT  
E. GAS HILLS, WYOMING

Gentlemen:

We have tested the tenth through the thirteenth limestone rock samples which were collected at the quarry site located on the above-referenced facility near E. Gas Hills, Wyoming. As specified in your QA/QC Scope of Work, we have performed Specific Gravity and Absorption (nominal size 2"), L.A. Abrasion (100 rev.), and Sodium Sulfate Soundness (sieves 3 through 1"; 5 cycles). We have used a "weighted average" based on the crushed rock product for  $D_{50}$  of 1.63 inches to calculate the percent loss of the sodium sulfate soundness test. (Although only the Bulk Specific Gravity is used for the NRC scoring, we have included the Apparent Specific Gravity and Bulk Saturated Surface Dry Specific Gravity for your reference.)

We have "scored" the samples according to Table D1 of the NRC's Staff Technical Position (STP) Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites, August 1990. Tables 1 through 4 show the test results and calculations for Test Number 14 through 17, respectively.

| TABLE 1   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY - LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 14                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.708  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.681  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.665  | 8.3   | 12     | 99.6           | 120           |
| Absorption, % ASTM C127                             | 0.60   | 7.4   | 13     | 96.2           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 2.7    | 9.2   | 4      | 36.8           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.7    | 8.2   | 1      | 8.2            | 10            |
| TOTAL SCORE   |        |       |        | 240.8          | 300           |
| Durability Rating = $240.8 / 300 \times 100 = 80.3$ |        |       |        |                |               |

| TABLE 2   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 15                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.701  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.705  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.651  | 8.0   | 12     | 96.0           | 120           |
| Absorption, % ASTM C127                             | 0.71   | 6.8   | 13     | 88.4           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 3.4    | 8.8   | 4      | 35.2           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 5.1    | 7.9   | 1      | 7.9            | 10            |
| TOTAL SCORE   |        |       |        | 227.5          | 300           |
| Durability Rating = $227.5 / 300 \times 100 = 75.8$ |        |       |        |                |               |


| TABLE 3   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 16                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.700  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.670  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.653  | 8.1   | 12     | 97.2           | 120           |
| Absorption, % ASTM C127                             | 0.65   | 7.1   | 13     | 92.3           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 1.5    | 9.8   | 4      | 39.2           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 5.2    | 7.9   | 1      | 7.9            | 10            |
| TOTAL SCORE   |        |       |        | 236.6          | 300           |
| Durability Rating = $236.6 / 300 \times 100 = 78.9$ |        |       |        |                |               |

| TABLE 4   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 17                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.701  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.671  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.664  | 8.3   | 12     | 99.6           | 120           |
| Absorption, % ASTM C127                             | 0.52   | 7.9   | 13     | 102.7          | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 1.4    | 9.8   | 4      | 39.2           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.6    | 8.2   | 1      | 8.2            | 10            |
| TOTAL SCORE   |        |       |        | 249.7          | 300           |
| Durability Rating = $249.7 / 300 \times 100 = 83.2$ |        |       |        |                |               |

We appreciate the opportunity to be of service to you thus far. If you have any questions regarding the enclosed information or if we may be of additional assistance, please contact us.

Sincerely,

INBERG-MILLER ENGINEERS

  
Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:msr:geotech/8152-rm-(10-13)

# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

March 25, 1999

8152-RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

ATTENTION: JACK WADSWORTH

RE: LABORATORY TESTING RESULTS AND  
NRC SCORING OF ROCK SAMPLES FROM  
LUCKY MCMINE RECLAMATION PROJECT  
E. GAS HILLS, WYOMING

Gentlemen:

We have tested the eighteenth through the twenty-first limestone rock samples which were collected at the quarry site located on the above-referenced facility near E. Gas Hills, Wyoming. As specified in your QA/QC Scope of Work, we have performed Specific Gravity and Absorption (nominal size 2"), L.A. Abrasion (100 rev.), and Sodium Sulfate Soundness (sieves 3 through 1"; 5 cycles). We have used a "weighted average" based on the crushed rock product for D<sub>50</sub> of 1.63 inches to calculate the percent loss of the sodium sulfate soundness test. (Although only the Bulk Specific Gravity is used for the NRC scoring, we have included the Apparent Specific Gravity and Bulk Saturated Surface Dry Specific Gravity for your reference.)

We have "scored" the samples according to Table D1 of the NRC's Staff Technical Position (STP) Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites, August 1990. Tables 1 through 4 show the test results and calculations for Test Number 18 through 21, respectively.

| TABLE 1   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY - LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 18                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.699  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.671  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.654  | 8.0   | 12     | 96.0           | 120           |
| Absorption, % ASTM C127                             | 0.63   | 7.3   | 13     | 94.9           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 1.2    | 9.9   | 4      | 39.6           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.8    | 8.1   | 1      | 8.1            | 10            |
| TOTAL SCORE   |        |       |        | 238.6          | 300           |
| Durability Rating = $238.6 / 300 \times 100 = 79.5$ |        |       |        |                |               |



| TABLE 2   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 19                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.686  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.672  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.656  | 8.1   | 12     | 97.2           | 120           |
| Absorption, % ASTM C127                             | 0.63   | 7.2   | 13     | 93.6           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 0.67   | 10.0  | 4      | 40.0           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.4    | 8.3   | 1      | 8.3            | 10            |
| TOTAL SCORE   |        |       |        | 239.1          | 300           |
| Durability Rating = $239.1 / 300 \times 100 = 79.7$ |        |       |        |                |               |


| TABLE 3   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 20                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.693  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.666  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.651  | 8.0   | 12     | 96.0           | 120           |
| Absorption, % ASTM C127                             | 0.59   | 7.5   | 13     | 97.5           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 2.5    | 9.3   | 4      | 37.2           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.9    | 8.1   | 1      | 8.1            | 10            |
| TOTAL SCORE   |        |       |        | 238.8          | 300           |
| Durability Rating = $238.8 / 300 \times 100 = 79.6$ |        |       |        |                |               |

| TABLE 4   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 21                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.702  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.675  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.659  | 8.2   | 12     | 98.4           | 120           |
| Absorption, % ASTM C127                             | 0.59   | 7.5   | 13     | 97.5           | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 1.4    | 9.8   | 4      | 39.2           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 5.2    | 7.9   | 1      | 7.9            | 10            |
| TOTAL SCORE   |        |       |        | 243.0          | 300           |
| Durability Rating = $243.0 / 300 \times 100 = 81.0$ |        |       |        |                |               |

We appreciate the opportunity to be of service to you thus far. If you have any questions regarding the enclosed information or if we may be of additional assistance, please contact us.

Sincerely,

INBERG-MILLER ENGINEERS

  
Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:msr:geotech/8152-rm-(18-21)

# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

April 26, 1999

8152-RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

ATTENTION: JACK WADSWORTH.

RE: LABORATORY TESTING RESULTS AND NRC SCORING OF ROCK SAMPLES  
FROM LUCKY MCMINE RECLAMATION PROJECT  
E. GAS HILLS, WYOMING

Gentlemen:

We have tested the twenty-second and twenty-third limestone rock samples which were collected at the quarry site located on the above-referenced facility near E. Gas Hills, Wyoming. As specified in your QA/QC Scope of Work, we have performed Specific Gravity and Absorption (nominal size 2"), L.A. Abrasion (100 rev.), and Sodium Sulfate Soundness (sieves 3 through 1"; 5 cycles). We have used a "weighted average" based on the crushed rock product for  $D_{50}$  of 1.63 inches to calculate the percent loss of the sodium sulfate soundness test. (Although only the Bulk Specific Gravity is used for the NRC scoring, we have included the Apparent Specific Gravity and Bulk Saturated Surface Dry Specific Gravity for your reference.)

We have "scored" the samples according to Table D1 of the NRC's Staff Technical Position (STP) Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites, August 1990. Tables 1 and 2 show the test results and calculations for Test Number 22 and 23, respectively.

Pathfinder Mines Corporation  
ATTENTION: JACK WADSWORTH  
April 26, 1999  
Page Two

8152-RM

| TABLE 1   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 22                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.691  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.667  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.652  | 8.0   | 12     | 96.0           | 120           |
| Absorption, % ASTM C127                             | 0.55   | 7.7   | 13     | 100.1          | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 4.0    | 8.5   | 4      | 34.0           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.1    | 8.5   | 1      | 8.5            | 10            |
| TOTAL SCORE   |        |       |        | 238.6          | 300           |
| Durability Rating = $238.6 / 300 \times 100 = 79.5$ |        |       |        |                |               |

| TABLE 2   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY – LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE: Test Number 23                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.698  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.674  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.660  | 8.2   | 12     | 98.4           | 120           |
| Absorption, % ASTM C127                             | 0.53   | 7.8   | 13     | 101.4          | 130           |
| Sodium Sulfate Soundness, % Loss ASTM C88           | 0.8    | 10.0  | 4      | 40             | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.8    | 8.1   | 1      | 8.1            | 10            |
| TOTAL SCORE   |        |       |        | 247.9          | 300           |
| Durability Rating = $247.9 / 300 \times 100 = 82.6$ |        |       |        |                |               |

# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

July 15, 1999

8152 RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, Wyoming 82501

ATTENTION: TOM HARDGROVE

RE: LIMESTONE ROCK  
SPECIFIC GRAVITY AND ABSORPTION RESULTS  
LUCKY MC MINE PROJECT

Dear Sir;

This letter summarizes the results of testing that Inberg-Miller Engineers performed on large size (greater than 6 inch diameter) rock samples that were submitted to our Riverton, Wyoming laboratory.

The tests were performed in accordance with ASTM C127 "Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate", except for the submersion period. Because of the substantially smaller surface area to weight ratio of the large rocks as compared to the 2.17" D<sub>50</sub> rock samples that were tested during rock crushing for the project, a longer submersion period was used. The rocks were submerged in water for a period of 96 hours instead of 24 hours. The longer submersion results in higher percent asorption and more conservative results

Due to the large size, rocks designated HD9.6, HD12, and RH (eight rocks total) were tested individually rather than as a sample made up of several rocks at a total test-sample weight.

The results of testing are tabulated below:

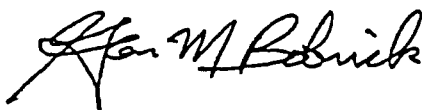
| Sample No. | Bulk Specific Gravity | Percent Absorption | Oven-dry Sample Wt. (lb) |
|------------|-----------------------|--------------------|--------------------------|
| HD6-1      | 2.665                 | 0.34               | 59.30                    |
| HD6-2      | 2.682                 | 0.70               | 64.10                    |
| HD6-3      | 2.667                 | 0.48               | 62.55                    |
| HD9.6-1    | 2.673                 | 0.21               | 96.75                    |
| HD9.6-2    | 2.658                 | 0.62               | 72.30                    |
| HD9.6-3    | 2.688                 | 0.55               | 63.85                    |
| HD12-1     | 2.703                 | 0.27               | 55.00                    |
| HD12-2     | 2.671                 | 0.39               | 102.15                   |
| HD12-3     | 2.659                 | 0.48               | 83.90                    |
| RH-1       | 2.670                 | 0.27               | 37.65                    |
| RH-2       | 2.642                 | 0.40               | 62.75                    |

Pathfinder Mines Corporation  
ATTENTION: TOM HARDGROVE  
July 15, 1999  
Page Two

8152-RM

Please feel free to call if you have any questions.

Sincerely,  
Inberg-Miller Engineers

A handwritten signature in black ink, appearing to read "Glen M. Bobnick". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:jlw:client ltrs\8152-RM-Rock Springs

# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

March 15, 2001

8152.1-RM

Mr. Bob Niezwaag  
Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

RE: LABORATORY TESTING RESULTS AND NRC SCORING  
OF ROCK SAMPLES FROM LUCY MC MINE RECLAMATION PROJECT  
EAST GAS HILLS, WYOMING

Dear Mr. Niezwaag:

We have tested the twenty-fourth (24) limestone rock sample which was collected at the quarry site located on the above-referenced facility near E. Gas Hills, Wyoming. As specified in your QA/QC Scope of Work, we have performed Specific Gravity and Absorption (nominal size 2-inches), L.A. Abrasion (100 rev.), and Sodium Sulfate Soundness (sieves 3 through 1"; 5 cycles). We have used a "weighted average" based on the crushed rock project for  $D_{50}$  of 1.63 inches to calculate the percent loss of the sodium sulfate soundness test. (Although, only the Bulk Specific Gravity is used for the NRC scoring, we have included the Apparent Specific Gravity and Bulk Saturated Surface Dry Specific Gravity for your reference).

We have "scored" the samples according to Table D1 of the NRC's Staff Technical Position (STP) Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites, August 1990. Table 1 shows the test results and calculations for Test Number 24.

Mr. Bob Niezwaag  
Pathfinder Mines Corporation  
March 16, 2001  
Page 2

8152.1-RM

| TABLE 1   |        |       |        |                |               |
|---|--------|-------|--------|----------------|---------------|
| ROCK TYPE: SEDIMENTARY - LIMESTONE                  |        |       |        |                |               |
| ROCK SAMPLE. TEST NUMBER 24                         |        |       |        |                |               |
| Laboratory Test                                     | Result | Score | Weight | Score x Weight | Maximum Score |
| Apparent Specific Gravity ASTM C127                 | 2.686  | N/A   | N/A    | N/A            | N/A           |
| Saturated Surface Dry Specific Gravity ASTM C127    | 2.659  | N/A   | N/A    | N/A            | N/A           |
| Bulk Specific Gravity ASTM C127                     | 2.644  | 7.8   | 12     | 93.6           | 120           |
| Absorption, %ASTM C127                              | 0.592  | 7.5   | 13     | 97.5           | 130           |
| Sodium Sulfate Soundness, %Loss ASTM C88            | 2.6    | 9.2   | 4      | 36.8           | 40            |
| L.A. Abrasion, % Loss ASTM C535                     | 4.1    | 8.5   | 1      | 8.5            | 10            |
| TOTAL SCORE   |        |       |        | 236.4          | 300           |
| Durability Rating = $236.4 / 300 \times 100 = 78.8$ |        |       |        |                |               |

We appreciate the opportunity to be of service to you thus far. If you have any questions regarding the enclosed information or if we may be of additional assistance, please contact us.

Sincerely,

INBERG-MILLER ENGINEERS



Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:ksp:\ltr\8152.1-RM



SUBJECT Durability

PROJECT NO. 2152.1RM PAGE 1

CLIENT Pathfinder

DATE 4-4-01

BY JPM

PROJECT Lucky McMine Rec.

CHECKED

BY

Durability #25

|                     | Results | Score | Weight | Score x      | Max Score  |
|---------------------|---------|-------|--------|--------------|------------|
| A.S.G.              | 2.699   | —     | —      | —            | —          |
| Bulk SSD            | 2.681   | —     | —      | —            | —          |
| Bulk S <sub>6</sub> | 2.67    | 8.4   | 12     | 100.8        | 126        |
| Absorption          | .405    | 8.5   | 13     | 110.5        | 130        |
| Sodium Sulfate      | 1.22    | 9.9   | 4      | 39.6         | 40         |
| LA Abrasion         | 2.63    | 9.2   | 1      | 9.2          | 10         |
|                     |         |       |        | <u>260.1</u> | <u>300</u> |

86.7%

Bulk S<sub>6</sub>

A 2.7  
B 2.67  
C 2.65

$\frac{B-C}{A-C} = x$   
 $x + 8 = \text{Answer}$   
 8.4

LA Abrasion

A 3  
B 2.63  
C 1

Absorption

A .5  
B .405  
C .3

8.53

Sodium Sulfate

A 3  
B 1.22  
C 1

# **AGGREGATE TESTS** **LOS ANGELES ABRASION/SULFATE SOUNDNESS**

ASTM C535, ASTM C131, ASTM C88

|                                       |                          |
|---------------------------------------|--------------------------|
| CLIENT <u>Pathfinder</u>              | JOB NO.: <u>8152.1RM</u> |
| SAMPLE DESCRIPTION <u>Limestone</u>   | DATE: <u>3-22-01</u>     |
| PRODUCER <u>Schmidt sand + gravel</u> | TEST NO.: <u>25</u>      |
| PROJECT <u>Lucky Mine Gradation</u>   |                          |

## **LOS ANGELES ABRASION**

- ☐ ASTM C131, GRADING \_\_\_\_\_
- ☒ ASTM C535, GRADING \_\_\_\_\_

CHECK GRADATION OF SAMPLE BEFORE  
 SELECTING GRADING,

INITIAL DRY WT., W1 9996.6 g

FINAL DRY WT., W2 10266.8 g

WT. LOSS (W1-W2)= 270.2 g

% LOSS =  $\frac{\text{WT. LOSS}}{W1} \times 100 = \underline{2.63} \checkmark$

## **SULFATE SOUNDNESS**

ASTM C88 ☐

SODIUM ☐

MAGNESIUM ☐

\_\_\_\_\_ CYCLES

| SIEVE SIZE |         |          | 1<br>INITIAL WT<br>OF<br>SAMPLE<br>(GRAMS) | 2<br>FINAL WT.<br>OF SAMPLE<br>AFTER TEST<br>(GRAMS) | 3<br>ACTUAL<br>%<br>LOSS | 4<br>GRADING OF<br>ORIGINAL<br>SAMPLE<br>% RETAINED | 5<br>CORRECTED<br>%<br>LOSS |
|------------|---------|----------|--|--|--------------------------|---|-----------------------------|
| PAN        | PASSING | RETAINED |  |  |                          |   |                             |
|            | 1.5"    | 1"       | 1016.6                                     | 990.4  | 2.58                     | 24  | .62 ✓                       |
|            | 2.0"    | 1.5"     | 2011.1                                     | 1985.5   | 1.27                     | 40  | .51 ✓                       |
|            | 2.5"    | 2.0"     | 3133.9                                     | 3126.2   | .25                      | 32  | .08 ✓                       |
|            | 3.0"    | 2.5"     | 6550.8                                     | 6537.7   | .19                      | 4   | .01 ✓                       |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          | % LOSS =  | 1.22 ✓                      |

3 = ((1 - 2) / 1) X 100

5 = (4 / 100) X 3)

TEST BY TFM

INBERG-MILLER ENGINEERS

RIVERTON, WYOMING

03/23/95

# SPECIFIC GRAVITY OF COARSE AGGREGATE

ASTM C127

CLIENT: Pathfinder  
 PROJECT: Lucky Mine Reclamation  
 SAMPLE DESCRIPTION: Limestone

JOB NO.: 8152.IRM  
 DATE: 3-22-01  
 TEST NO.: 25

| TEST NO.                            |                                  | 1-1.5" | 1.5-2"           |         |         |
|-------------------------------------|----------------------------------|--------|------------------|---------|---------|
| TEMPERATURE OF WATER AND AGG, T, °F |                                  |        |                  |         |         |
| WEIGHT IN GRAMS                     | TARE + SATURATED SURFACE-DRY AGG |        |                  |         |         |
|                                     | TARE                             |        |                  |         |         |
|                                     | SATURATED SURFACE-DRY AGG        | B      | 5005.3           | 5010.3  |         |
|                                     | (WIRE BASKET + AGG.) IN WATER    |        |                  |         |         |
|                                     | WIRE BASKET IN WATER             |        |                  |         |         |
|                                     | SATURATED AGG. IN WATER          | C      | 3151.3<br>3140.5 | 3140.5  |         |
|                                     | TARE + DRY AGG.                  |        |                  |         |         |
|                                     | TARE                             |        |                  |         |         |
|                                     | DRY AGG. IN AIR                  | A      | 4983.9           | 4991.3  | AVE     |
|                                     | APPARENT S.G. (A/(A-C))          |        | 2.70189          | 2.69683 | 2.69936 |
| BULK S.G. (A/(B-C))                 |                                  |        | 2.6709           | 2.66943 | 2.67017 |
| BULK S.S.D., S.G. (B/(B-C))         |                                  |        | 2.68237          | 2.67959 | 2.68098 |
| ABSORPTION (((B-A)/A)X100)          |                                  |        | .42938           | .38066  | .40502  |

.37922

.4043

REMARKS: \_\_\_\_\_

TEST PERFORMED BY: \_\_\_\_\_

INBERG-MILLER ENGINEERS

RIVERTON, WYOMING

03/23/95

SUBJECT Pathfinder DurabilityPROJECT NO. 8152.1RM PAGE 1 of 1CLIENT PathfinderDATE 4-11-01BY JFMPROJECT Lucky McMine

CHECKED

BY

Sample Z6

|             | Results | Score | Weight | Score X      | Max Score  |
|-------------|---------|-------|--------|--------------|------------|
| ASG         | 2.693   | —     | —      | —            | —          |
| Bulk SSD    | 2.662   | —     | —      | —            | —          |
| Bulk SG     | 2.673   | 8.2   | 12     | 98.4         | 120        |
| Absorption  | .435    | 8.35  | 13     | 108.55       | 130        |
| Sodium S.   | 1.49    | 9.38  | 4      | 37.52        | 40         |
| LA Abrasion | 5.56    | 7.67  | 1      | 7.67         | 10         |
|             |         |       |        | <u>240.6</u> | <u>300</u> |

252.14

86.7%

84.0%

|    |      |   |     |    |     |    |      |    |      |
|----|------|---|-----|----|-----|----|------|----|------|
| SG | 2.7  | A | .02 | AB | .6  | SS | 3    | LA | 6.7  |
|    | 2.67 | B | .05 |    | .43 |    | 1.49 |    | 5.56 |
|    | 2.65 | C |     |    | .3  |    | 1    |    | 7.67 |

ASTM C535, ASTM C131, ASTM C88

## LOS ANGELES ABRASION

$$\% \text{ LOSS} = \frac{\text{WT. LOSS}}{W_1} \times 100 = \underline{5.56}$$

5 CYCLES

% LOSS =  $\frac{1.49}{2.25}$

TEST BY JPM

Pathfinder Durability  
8152.1RM  
Test # 27

4-3-01

|             | Results                | Score | Weight | Score x | Max score |
|-------------|------------------------|-------|--------|---------|-----------|
| ASG         | 2.696                  | —     | —      | —       | —         |
| Bulk SSD    | 2.669                  | —     | —      | —       | —         |
| Bulk SG     | <del>2.675</del> 2.652 | 8.6   | 12     | 103.2   | 120       |
| Absorption  | .641                   | 7.2   | 13     | 93.6    | 130       |
| Sodium S.   | 1.34                   | 9.8   | 4      | 39.2    | 40        |
| LA Abrasion | 5.9                    | 7.5   | 1      | 7.5     | 10        |

Total; 243.5 300  
236.78  
81.2%  
78.9%

SL 2.7  
2.68 x = .6  
2.65

SS 3.0  
1.34 x = .17  
1.0

AB .67  
.64 x = .82  
.5

LA 6.7  
5.9  
5.0

# AGGREGATE TESTS LOS ANGELES ABRASION/SULFATE SOUNDNESS

ASTM C535, ASTM C131, ASTM C88

|   |                          |
|---|--------------------------|
| CLIENT <u>Pathfinder</u>                  | JOB NO.: <u>8152.1RM</u> |
| SAMPLE DESCRIPTION <u>Limestone</u>       | DATE: <u>4-3-01</u>      |
| PRODUCER <u>Schmidt Sand &amp; Gravel</u> | TEST NO.: <u>27</u>      |
| PROJECT <u>Lucky McMine Rec.</u>          |                          |

## LOS ANGELES ABRASION

☐ ASTM C131, GRADING \_\_\_\_\_

☐ ASTM C535, GRADING \_\_\_\_\_

INITIAL DRY WT., W1 10081.5 g

FINAL DRY WT., W2 9491.5 g

WT. LOSS (W1-W2)= 590 g

CHECK GRADATION OF SAMPLE BEFORE  
SELECTING GRADING,

% LOSS =  $\frac{\text{WT. LOSS}}{W1} \times 100 = \underline{5.9} \%$

## SULFATE SOUNDNESS

ASTM C88 ☐

SODIUM ☐

MAGNESIUM ☐

\_\_\_\_\_ CYCLES

| SIEVE SIZE |         |          | 1<br>INITIAL WT<br>OF<br>SAMPLE<br>(GRAMS) | 2<br>FINAL WT.<br>OF SAMPLE<br>AFTER TEST<br>(GRAMS) | 3<br>ACTUAL<br>%<br>LOSS | 4<br>GRADING OF<br>ORIGINAL<br>SAMPLE<br>% RETAINED | 5<br>CORRECTED<br>%<br>LOSS |
|------------|---------|----------|--|--|--------------------------|---|-----------------------------|
| PAN        | PASSING | RETAINED |  |  |                          |   |                             |
|            | 1.5     | 1.0      | 1015.8                                     | 999.5  | 1.60                     | 24  | <del>1</del> 0.33           |
|            | 2.0     | 1.5      | 1934.2                                     | 1902.2   | 1.65                     | 40  | .66                         |
|            | 2.5     | 2.0      | 3005.2                                     | 2981.2   | .8                       | 32  | <del>2</del> .26            |
|            | 3.0     | 2.5      | 6857.4                                     | 6838.4   | .28                      | 4   | .01                         |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          | % LOSS = <del>1.34</del> 1.31                       |                             |

3 =  $((1 - 2) / 1) \times 100$

5 =  $(4 / 100) \times 3$

TEST BY JPM

INBERG-MILLER ENGINEERS

RIVERTON, WYOMING

03/23/95

SUBJECT ROCK QUALITY SCORING PROJECT NO. 8152.1 PM PAGE 1

CLIENT PATHFINDER MINES DATE 4-27-01 BY JCH

PROJECT LUCKY MC MINE RECLAMATION CHECKED                      BY                     

|                              | RESULTS | SCORE | WEIGHT | SCORE X | MAX SCORE |
|------------------------------|---------|-------|--------|---------|-----------|
| Apparant S.G.                |         | —     | —      | —       | —         |
| Bulk SSD; S.G.               |         | —     | —      | —       | —         |
| Bulk S.G.                    | 2.659   | 8.18  | 12     | 98.16   | 120       |
| Absorption                   | 0.575   | 7.56  | 13     | 98.28   | 130       |
| Na SO <sub>4</sub> SOUNDNESS | 2.4     | 9.3   | 4      | 37.20   | 40        |
| L.A. ABRASION                | 5.2     | 7.88  | 1      | 7.88    | 10        |

TOTALS 241.52 300

Sample 2B

80.5%



# AGGREGATE TESTS LOS ANGELES ABRASION/SULFATE SOUNDNESS

ASTM C535, ASTM C131, ASTM C88

|   |                          |
|---|--------------------------|
| CLIENT <u>Pathfinder</u>                  | JOB NO.: <u>8152-IRM</u> |
| SAMPLE DESCRIPTION <u>Limestone</u>       | DATE: <u>4-14-01</u>     |
| PRODUCER <u>Schmidt Sand &amp; Gravel</u> | TEST NO.: <u>28</u>      |
| PROJECT <u>Lucky Mine Reclamation</u>     |                          |

## LOS ANGELES ABRASION

☐ ASTM C131, GRADING \_\_\_\_\_

☐ ASTM C535, GRADING \_\_\_\_\_

INITIAL DRY WT., W1 10023.3 g

FINAL DRY WT., W2 9503.3 g

WT. LOSS (W1-W2)= 520.0 g

CHECK GRADATION OF SAMPLE BEFORE  
SELECTING GRADING,

% LOSS =  $\frac{\text{WT. LOSS}}{\text{W1}} \times 100 = \underline{5.2\%}$

## SULFATE SOUNDNESS

ASTM C88 ☒

SODIUM ☒

MAGNESIUM ☐

5 CYCLES

| SIEVE SIZE |         |          | 1<br>INITIAL WT<br>OF<br>SAMPLE<br>(GRAMS) | 2<br>FINAL WT.<br>OF SAMPLE<br>AFTER TEST<br>(GRAMS) | 3<br>ACTUAL<br>%<br>LOSS | 4<br>GRADING OF<br>ORIGINAL<br>SAMPLE<br>% RETAINED | 5<br>CORRECTED<br>%<br>LOSS |
|------------|---------|----------|--|--|--------------------------|---|-----------------------------|
| PAN        | PASSING | RETAINED |  |  |                          |   |                             |
|            | 1.5"    | 1"       | 1011.8                                     | 1002.8   | .90                      | 24  | .22                         |
|            | 2.0"    | 1.5"     | 1994.0                                     | 1887.2   | 5.3                      | 40  | 2.1                         |
|            | 2.5"    | 2"       | 2924.2                                     | 2916.2   | .27                      | 32  | .09                         |
|            | 3"      | 2.5"     | 7622.4                                     | 6981.1   | .59                      | 4   | .02                         |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          | % LOSS = <u>2.4</u>                                 |                             |

3 =  $((1 - 2) / 1) \times 100$

5 =  $(4 / 100) \times 3$

TEST BY \_\_\_\_\_

INBERG-MILLER ENGINEERS

RIVERTON, WYOMING

03/23/95

# SPECIFIC GRAVITY OF COARSE AGGREGATE

ASTM C127

CLIENT: Pathfinder  
 PROJECT: Lucky McMine  
 SAMPLE DESCRIPTION: Limestone  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

JOB NO.: 8152-IRM  
 DATE: 4-14-01  
 TEST NO.: 28

| TEST NO.                            |                                  | 1-1.5"   | 1.5-2"           |        |       |
|-------------------------------------|----------------------------------|----------|------------------|--------|-------|
| TEMPERATURE OF WATER AND AGG, T, °F |                                  |          |                  |        |       |
| WEIGHT                              | TARE + SATURATED SURFACE-DRY AGG |          |                  |        |       |
|                                     | TARE                             |          |                  |        |       |
|                                     | SATURATED SURFACE-DRY AGG        | B 4966.1 | 3564.2<br>1401.9 | 5078.3 |       |
|                                     | (WIRE BASKET + AGG.) IN WATER    |          |                  |        |       |
|                                     | WIRE BASKET IN WATER             |          |                  |        |       |
| GRAMS                               | SATURATED AGG. IN WATER          | C 3166.5 | 2210.8<br>895.7  | 3180.9 |       |
|                                     | TARE + DRY AGG.                  |          | 5277.9           | 5796.0 |       |
|                                     | TARE                             | H        | 343.3            | 743.5  |       |
|                                     | DRY AGG. IN AIR                  | A        | 4934.6           | 5052.5 |       |
| APPARENT S.G. (A/(A-C))             |                                  |          | 2.699            | 2.700  |       |
| BULK S.G. (A/(B-C))                 |                                  |          | 2.654            | 2.663  | 2.659 |
| BULK S.S.D., S.G. (B/(B-C))         |                                  |          | 2.671            | 2.676  |       |
| ABSORPTION [((B-A)/A)X100]          |                                  |          | 0.638            | 0.511  | 0.575 |

REMARKS: \_\_\_\_\_

TEST PERFORMED BY: \_\_\_\_\_

SUBJECT ROCK QUALITY SCORING PROJECT NO. 8152.1 PM PAGE

CLIENT PATHFINDER MINES DATE 5-4-01 BY JCH

PROJECT LUCKY Mc Mine RECLAMATION CHECKED BY

|                              | RESULTS                   | SCORE                   | WEIGHT | SCORE X                    | MAX SCORE |
|------------------------------|---------------------------|-------------------------|--------|----------------------------|-----------|
| Apparant S.G.                |                           | —                       | —      | —                          | —         |
| Bulk SSD; S.G.               |                           | —                       | —      | —                          | —         |
| Bulk S.G.                    | 2.667<br><del>2.649</del> | 8.34<br><del>7.98</del> | 12     | 100.08<br><del>95.76</del> | 120       |
| Absorption                   | 0.54<br><del>0.83</del>   | 67.76                   | 13     | 100.08<br><del>70</del>    | 130       |
| Na SO <sub>4</sub> SOUNDNESS | 2.76                      | 9.12                    | 4      | 36.48                      | 40        |
| L.A. Abrasion                | 35.3                      | 08.1                    | 1      | 08.1                       | 10        |

4.8

TOTALS ~~210.24~~ 300

245.54

245.54 ~~210.24~~ = ~~70.1%~~

300

81.8%

sample 29

# **AGGREGATE TESTS** **LOS ANGELES ABRASION/SULFATE SOUNDNESS**

ASTM C535, ASTM C131, ASTM C88

|   |                         |
|---|-------------------------|
| CLIENT <u>Pathfinder</u>                  | JOB NO.: <u>8152 RM</u> |
| SAMPLE DESCRIPTION                        | DATE: <u>4-27-01</u>    |
| PRODUCER <u>Schmidt Sand &amp; Gravel</u> | TEST NO.: <u>29</u>     |
| PROJECT <u>Luckie Mr.</u>                 |                         |

## **LOS ANGELES ABRASION**

(23940)

☐ ASTM C131, GRADING

☒ ASTM C535, GRADING 1

|       |              |                     |                 |
|-------|--------------|---------------------|-----------------|
| 2 1/2 | 2500 ± 50    | INITIAL DRY WT., W1 | <u>9984.8 g</u> |
| 2     | 2500 ± 50    | FINAL DRY WT., W2   | <u>6458.8 g</u> |
| 1/2   | 5000 ± 50    | WT. LOSS (W1-W2)=   | <u>3526.0 g</u> |
|       | 10,000 ± 100 |                     |                 |

CHECK GRADATION OF SAMPLE BEFORE  
 SELECTING GRADING,

% LOSS =  $\frac{\text{WT. LOSS}}{\text{W1}} \times 100 = \underline{35.3\%}$

## **SULFATE SOUNDNESS**

ASTM C88 ☒

SODIUM ☒ 5 CYCLES

MAGNESIUM ☐

| SIEVE SIZE |         |          | 1<br>INITIAL WT<br>OF<br>SAMPLE<br>(GRAMS) | 2<br>FINAL WT.<br>OF SAMPLE<br>AFTER TEST<br>(GRAMS) | 3<br>ACTUAL<br>%<br>LOSS | 4<br>GRADING OF<br>ORIGINAL<br>SAMPLE<br>% RETAINED | 5<br>CORRECTED<br>%<br>LOSS |
|------------|---------|----------|--|--|--------------------------|---|-----------------------------|
| PAN        | PASSING | RETAINED |  |  |                          |   |                             |
| F          | 3       | 2 1/2    | 7336.6                                     | 7242.2   | 1.3%                     | 4   | 0.05                        |
| D          | 2 1/2   | 2        | 3149.3                                     | 3123.7   | .81%                     | 32  | 0.26                        |
| 102P       | 2       | 1 1/2    | 2002.3                                     | 1932.8   | 3.5%                     | 40  | 1.39                        |
| 103P       | 1 1/2   | 1        | 1016.3                                     | 971.3  | 4.4%                     | 24  | 1.06                        |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
| % LOSS =   |         |          |  |  |                          | <u>2.76</u>   |                             |

3 = ((1 - 2) / 1) X 100

5 = (4 / 100) X 3)

TEST BY \_\_\_\_\_

# SPECIFIC GRAVITY OF COARSE AGGREGATE

ASTM C127

CLIENT: Pathfinder  
 PROJECT: Lucky Mine  
 SAMPLE DESCRIPTION: Schmidt sand & Gravel

JOB NO.: 8152 Rm  
 DATE: 5-1-01  
 TEST NO.: 29

|                                     |                                  |    |         |  |  |
|-------------------------------------|----------------------------------|----|---------|--|--|
| TEST NO.                            |                                  | 29 |         |  |  |
| TEMPERATURE OF WATER AND AGG, T, °F |                                  |    |         |  |  |
| WEIGHT                              | TARE + SATURATED SURFACE-DRY AGG |    |         |  |  |
|                                     | TARE AK                          |    |         |  |  |
|                                     | SATURATED SURFACE-DRY AGG        | B  | 9905.7  |  |  |
|                                     | (WIRE BASKET + AGG.) IN WATER    |    |         |  |  |
|                                     | WIRE BASKET IN WATER             |    |         |  |  |
| GRAMS                               | SATURATED AGG. IN WATER          | C  | 6196.5  |  |  |
|                                     | TARE + DRY AGG.                  |    | 11445.5 |  |  |
|                                     | TARE AK                          |    | 1621.4  |  |  |
| ST                                  | DRY AGG. IN AIR                  | A  | 9824.1  |  |  |
| APPARENT S.G. (A/(A-C))             |                                  |    | 2.708   |  |  |
| BULK S.G. (A/(B-C))                 |                                  |    | 2.649   |  |  |
| BULK S.S.D., S.G. (B/(B-C))         |                                  |    | 2.671   |  |  |
| ABSORPTION [((B-A)/A)X100]          |                                  |    | .83%    |  |  |

REMARKS: \_\_\_\_\_

TEST PERFORMED BY: \_\_\_\_\_

160 Revol.  
#12

|                    |                      |
|--------------------|----------------------|
| CLIENT             | PMC                  |
| SAMPLE DESCRIPTION | Limestone            |
| PRODUCER           | Schmid Sand & Gravel |
| PROJECT            | Lucien Mac Mine      |

DATE: 5-6-01

TEST NO.: 29

☐ ASTM C131, GRADING \_\_\_\_\_

☐ ASTM C535, GRADING \_\_\_\_\_

INITIAL DRY WT., W1 10191.7 g

FINAL DRY WT., W2 9701.2 g

WT. LOSS (W1-W2)= 490.5 g

$$\% \text{ LOSS} = \frac{\text{WT. LOSS}}{W_1} \times 100 = \underline{4.8}$$

**CYCLES**

[illegible]

$$5 = (4 / 100) \times 3)$$

TEST BY

# SPECIFIC GRAVITY OF COARSE AGGREGATE

ASTM C127

CLIENT: Pathfinder  
 PROJECT: Lucky Mc Mine  
 SAMPLE DESCRIPTION: Limestone

JOB NO.: 8152.1 RM  
 DATE: 4-27-01  
 TEST NO.: 29

0-3 #11

|                                     |                                  |        |        |        |       |
|-------------------------------------|----------------------------------|--------|--------|--------|-------|
| TEST NO.                            |                                  | 1-1.5" | 1.5-2" |        |       |
| TEMPERATURE OF WATER AND AGG, T, °F |                                  |        |        |        |       |
| WEIGHT<br>IN<br>GRAMS               | TARE + SATURATED SURFACE-DRY AGG |        | 5578.6 | 6015.2 |       |
|                                     | TARE                             |        | 338.4  | 735.7  |       |
|                                     | SATURATED SURFACE-DRY AGG        | B      | 5240.2 | 5279.5 |       |
|                                     | (WIRE BASKET + AGG.) IN WATER    |        | 4739.0 | 4766.2 |       |
|                                     | WIRE BASKET IN WATER             |        | 1453.5 | 1455.8 |       |
|                                     | SATURATED AGG. IN WATER          | C      | 3285.5 | 3310.4 |       |
|                                     | TARE + DRY AGG.                  |        | 5551.4 | 5986.5 |       |
|                                     | TARE                             |        | 338.4  | 735.7  |       |
|                                     | DRY AGG. IN AIR                  | A      | 5213.0 | 5250.8 |       |
|                                     | APPARENT S.G. (A/(A-C))          |        | 2.705  | 2.706  | 2.706 |
| BULK S.G. (A/(B-C))                 |                                  |        | 2.667  | 2.667  | 2.667 |
| BULK S.S.D., S.G. (B/(B-C))         |                                  |        | 2.681  | 2.681  | 2.681 |
| ABSORPTION (((B-A)/A)X100)          |                                  |        | 0.52   | 0.55   | 0.54  |

REMARKS: \_\_\_\_\_

TEST PERFORMED BY: \_\_\_\_\_

SUBJECT Rock Quality ScoringPROJECT NO. 8152.1RM PAGECLIENT Bathfinder MinesDATE 5-17-01BY JPMPROJECT Lucky McMine Reclamation

CHECKED

BY

|                              | Results | Score | Weight | Score x       | Max Score  |
|------------------------------|---------|-------|--------|---------------|------------|
| Apparent SG;                 |         |       |        |               |            |
| Bulk SSD; SG;                |         |       |        |               |            |
| Bulk SG;                     | 2.663   | 8.26  | 12     | 99.12         | 120        |
| Absorption;                  | .515    | 7.91  | 13     | 102.83        | 130        |
| NaSO <sub>4</sub> Soundness; | 47.89   | 10    | 4      | 40            | 40         |
| LA Abrasion;                 | 5.4     | 7.76  | 1      | 7.76          | 10         |
|                              |         |       |        | <u>249.71</u> | <u>300</u> |

SAMPLE 30249.71  
30083.2%



# SPECIFIC GRAVITY OF COARSE AGGREGATE

ASTM C127

CLIENT: Pathfinder  
 PROJECT: Lucky McMine  
 SAMPLE DESCRIPTION: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

JOB NO.: 8152 RM  
 DATE: \_\_\_\_\_  
 TEST NO.: 30

|                                     |                                  |          |               |               |  |              |
|-------------------------------------|----------------------------------|----------|---------------|---------------|--|--------------|
| TEST NO.                            |                                  |          | <u>B</u>      | <u>7</u>      |  |              |
| TEMPERATURE OF WATER AND AGG, T, °F |                                  |          |               |               |  |              |
| WEIGHT                              | TARE + SATURATED SURFACE-DRY AGG |          | <u>5006.2</u> | <u>6072.3</u> |  |              |
|                                     | TARE                             |          | <u>326.8</u>  | <u>747.5</u>  |  |              |
|                                     | SATURATED SURFACE-DRY AGG        | <u>B</u> | <u>4679.4</u> | <u>5324.8</u> |  |              |
|                                     | (WIRE BASKET + AGG.) IN WATER    |          | <u>4387.2</u> | <u>4790.9</u> |  |              |
|                                     | WIRE BASKET IN WATER             |          | <u>1455.8</u> | <u>1455.7</u> |  |              |
|                                     | SATURATED AGG. IN WATER          | <u>C</u> | <u>2931.4</u> | <u>3335.2</u> |  |              |
| GRAMS                               | TARE + DRY AGG.                  |          | <u>4982.9</u> | <u>6043.9</u> |  |              |
|                                     | TARE                             |          | <u>326.8</u>  | <u>747.5</u>  |  |              |
|                                     | DRY AGG. IN AIR                  | <u>A</u> | <u>4656.1</u> | <u>5296.4</u> |  |              |
| APPARENT S.G. (A/(A-C))             |                                  |          | <u>2.70</u>   | <u>2.701</u>  |  |              |
| BULK S.G. (A/(B-C))                 |                                  |          | <u>2.664</u>  | <u>2.662</u>  |  | <u>2.663</u> |
| BULK S.S.D., S.G. (B/(B-C))         |                                  |          | <u>2.677</u>  | <u>2.676</u>  |  |              |
| ABSORPTION [((B-A)/A)X100]          |                                  |          | <u>0.50</u>   | <u>0.53</u>   |  | <u>.515</u>  |

REMARKS: \_\_\_\_\_

TEST PERFORMED BY: \_\_\_\_\_

BERG-MILLER ENGINEERS

RIVERTON, WYOMING

03/23/95

# AGGREGATE TESTS LOS ANGELES ABRASION/SULFATE SOUNDNESS

ASTM C535, ASTM C131, ASTM C88

|                             |                         |
|-----------------------------|-------------------------|
| CLIENT <u>Pathfinder</u>    | JOB NO.: <u>8152 RM</u> |
| SAMPLE DESCRIPTION          | DATE:                   |
| PRODUCER                    | TEST NO.: <u>30</u>     |
| PROJECT <u>Lucky McMine</u> |                         |

## LOS ANGELES ABRASION

☐ ASTM C131, GRADING  
☒ ASTM C535, GRADING 1  
pan 02 INITIAL DRY WT., W1 9931.1 g  
 FINAL DRY WT., W2 9398.5 g  
 WT. LOSS (W1-W2)= 532.6 g

CHECK GRADATION OF SAMPLE BEFORE  
SELECTING GRADING,

% LOSS =  $\frac{\text{WT. LOSS}}{W1} \times 100 = \underline{5.36}$

## SULFATE SOUNDNESS

ASTM C88 ☒

SODIUM ☒ 5 CYCLES

MAGNESIUM ☐

| SIEVE SIZE |         |          | 1<br>INITIAL WT<br>OF<br>SAMPLE<br>(GRAMS) | 2<br>FINAL WT.<br>OF SAMPLE<br>AFTER TEST<br>(GRAMS) | 3<br>ACTUAL<br>%<br>LOSS | 4<br>GRADING OF<br>ORIGINAL<br>SAMPLE<br>% RETAINED | 5<br>CORRECTED<br>%<br>LOSS |
|------------|---------|----------|--|--|--------------------------|---|-----------------------------|
| PAN        | PASSING | RETAINED |  |  |                          |   |                             |
| G          | 3       | 2 1/2    | 6378.8                                     | 6370.4   | .13                      | 24 4  | .03 .005                    |
| E          | 2 1/2   | 2        | 3067.9                                     | 3010.0   | .26                      | 40 32   | .1 .083                     |
| C          | 2       | 1 1/2    | 1995.5                                     | 1982.9   | .63                      | 32 40   | .2 0.252                    |
| 105 P      | 1 1/2   | 1        | 996.3                                      | 973.7  | 2.27                     | 4 24  | .09 0.546                   |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  |                          |   |                             |
|            |         |          |  |  | % LOSS =                 |   |                             |
|            |         |          |  |  | <u>.42 0.885</u>         |   |                             |

3 =  $((1 - 2) / 1) \times 100$

5 =  $(4 / 100) \times 3$

TEST BY \_\_\_\_\_



## HYDRO - ENGINEERING, LLC

4685 SOUTH MAGNOLIA  
CASPER, WYOMING 82604  
Ph (307) 266-6597  
Fax (307) 237-8565  
E-mail hydro@trib.com

June 16, 1999

Tom Hardgrove  
Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501

### **RE: Rock Durability Testing**

Dear Tom:

Concerning the durability testing for the limestone at Lucky Mc Mine, I've gone through a summary analysis of the test results. The attached table presents a summary of the rock testing results and the calculated scoring based on the NRC rock scoring method for limestone. The scoring was done both by Inberg-Miller Engineers and Hydro-Engineering, and the slight discrepancies between the two scorings result from minor differences in rounding and interpolation techniques. A third rock scoring was also developed using the saturated surface dry (SSD) specific gravity rather than the bulk specific gravity. Before discussing the results of the rock durability testing, it is worthwhile to review the sampling procedure and the implications of this procedure on the durability testing. The durability samples were taken from 1.63" D50 rock mulch product. This is verified in a letter by Glen Bobnick of Inberg-Miller Engineers dated January 16, 1999. As discussed in the Inberg-Miller letter, this was done for three reasons. The primary reasons for using this particular rock product were that the size of the product fit the limitations of test equipment, and the 1.63" D50 product represented the largest quantity of rock. A third reason for using this product was that a crushing operation tends to concentrate the more easily crushed (i.e. lesser durability) rock in the smaller products. Only a comparatively small quantity of smaller (1.0" D50) rock mulch was produced, so the 1.63" D50 rock represents the smallest rock product practical for durability testing. This results in a conservative sampling procedure that will bias the durability test results to the low side. Hence, the overall durability of the rock is likely to be better than indicated by the testing, and in particular, the durability of the larger rock products is likely to be significantly better than indicated by testing.

The attached summary table indicates that the durability results for the limestone were reasonably consistent and that most of the samples scored at 80% or above. Both the Hydro-Engineering and Inberg-Miller scoring calculations indicated that seven samples



## HYDRO - ENGINEERING, LLC

did not meet the 80% minimum score for no oversizing. When the SSD specific gravity is used in the scoring, only one sample out of twenty three did not meet the 80% score. Using the Hydro-Engineering scoring calculation, only two of the seven sample scores below 80% are considered significant. The remaining five scores fall between 78.7% and 80%, and thus the required oversizing for the 1.63" D50 product ranges up to 0.02 inch for these five samples. This minute oversizing is beyond measurement resolution, and has undoubtedly been met by most if not all of the 1.63" D50 product simply by meeting the gradation specifications. Two other factors also lead to the observation that there is inherent oversizing in the rock that negates the concern for relatively small oversizing requirements. The assumed specific weight of the limestone rock in the design process was 160 lb/cu. ft., which corresponds to a specific gravity of 2.564. The average measured bulk specific gravity of the samples is 2.66 and the average measured SSD specific gravity is 2.67. The limestone has a significantly greater specific weight than anticipated in the design process, and therefore has inherent oversizing that is proportional to the ratio of actual specific gravity to design specific gravity. In this particular case, that ratio gives a universal built-in oversizing for the limestone of approximately 1.3% when the conversion from weight to diameter is made. In addition to this, it is important to note that the breaks in the rock size categories were made by grouping similarly sized rock designs, and then assigning the largest size in the group to the entire group. Hence, there is substantial oversizing built into all but a small area for each rock category. Therefore, concern over these very small oversizing requirements is unwarranted.

The remaining two scores below 80% required slightly more oversizing than those discussed in the preceding paragraph. The score of 75.7% (Hydro-Engineering scoring) for test #15 requires a total oversizing of 4.3%, or 3% beyond the built-in oversizing of 1.3%. This gives an oversizing of 0.05 inch for the 1.63" D50 rock, which is probably close to a realistic measurement resolution for this rock. According to Inberg-Miller, the only non-rejected gradation sample for this rock during the same time period yielded a measured oversizing of 1.2%. This leaves an oversizing shortfall of 1.8% or 0.03 inch. In light of the substantial oversizing for most of the rock in each size category as described in the preceding paragraph, a shortfall of 0.03 inch doesn't warrant any concern. The lowest calculated rock score in the summary table is 70.2% for test #12 (Hydro-Engineering scoring). This particular sample indicates that an oversizing of 9.8% is required for rock produced during this period. According to Inberg-Miller records, the only accepted rock produced during this period was large rock mulch with a 2.44" D50. The minimum D50 for this rock is 2.17", so there was a 12.4% oversizing which exceeds that required by the durability scoring deficit.



HYDRO - ENGINEERING, LLC

Pathfinder Mines Corporation (PMC) personnel and Inberg-Miller personnel have indicated that the reason for the more severe deficiencies in durability scores was the presence of some sandstone in the quarry area that was inadvertently introduced to the crusher stream. These same observers have indicated that the quantity of sandstone was very small and was virtually undetectable in the product or stockpiles. Based on the general consistency of the durability results, it is apparent that contamination of the product with measurable quantities of sandstone was very infrequent and represented only a very small fraction of the product stream. Stockpiles were examined and there were no areas where the sandstone was detected. The very small standard deviation in the scoring supports the contention that the two significant deficiencies in durability scores resulted from minor contamination of the sample or product. However the percentage of the poor quality sandstone in the sample(s) was obviously very small, because the reduction in durability score was minor. The few sandstone rocks that may be present in stockpiles represent only a tiny fraction of a percent and should not be detrimental to the performance of the rock.

In summary, the deficiencies in the rock scoring are compensated for by measured and inherent oversizing. The quarrying operation produced a consistent and durable rock product, and the significant deficiencies in rock durability scoring were rare, anomalous, and will not adversely affect the rock performance. I hope this information is useful. Please don't hesitate to call if you have questions or comments.

Sincerely,

Thomas G. Michel  
Hydrologist

Cc: Jack Wadsworth

# ROCK DURABILITY TESTING SUMMARY

| Durability Test                   | Test #1<br>3/5/98 | Test #2<br>4/14/98 | Test #3<br>5/6/98 | Test #4<br>5/6/98 | Test #5<br>5/6/98 | Test #6 | Test #7 | Test #8 | Test #9 | Test #10 | Test #11 | Test #12 |
|-----------------------------------|-------------------|--------------------|-------------------|-------------------|-------------------|---------|---------|---------|---------|----------|----------|----------|
| Apparent Specific Gravity         | 2.698             | 2.695              | 2.686             | 2.698             | 2.703             | 2.711   | 2.702   | 2.706   | 2.706   | 2.717    | 2.679    | 2.708    |
| SSD Specific Gravity              | 2.677             | 2.679              | 2.662             | 2.674             | 2.678             | 2.683   | 2.676   | 2.678   | 2.683   | 2.686    | 2.647    | 2.67     |
| Bulk Specific Gravity             | 2.67              | 2.67               | 2.649             | 2.659             | 2.664             | 2.666   | 2.661   | 2.662   | 2.67    | 2.672    | 2.66     | 2.649    |
| Absorption (%)                    | 0.49              | 0.34               | 0.52              | 0.55              | 0.55              | 0.61    | 0.57    | 0.61    | 0.51    | 0.62     | 0.55     | 0.82     |
| Sodium Sulfate Soundness (% Loss) | 2.87              | 2.15               | 0.7               | 0.34              | 0.34              | 0.91    | 0.43    | 0.31    | 0.31    | 1        | 1.68     | 6.6      |
| L.A. Abrasion                     | 4.8               | 4.7                | 4.8               | 5                 | 6.1               | 5.1     | 5.7     | 2.5     | 2.5     | 4.9      | 2.6      | 5.2      |
| NRC Score (Inberg-Miller)         | 83.1              | 87                 | 82.2              | 82.2              | 82.4              | 80.8    | 81.6    | 82.2    | 84.3    | 81.4     | 82.2     | 70.6     |
| NRC Score (Hydro-Engineering)     | 83.3              | 87                 | 82.1              | 82.1              | 82.3              | 81.1    | 81.6    | 81.2    | 84.4    | 81.4     | 82.1     | 70.2     |
| NRC Score (SSD Spec. Grav.)       | 83.8              | 87.7               | 83.2              | 83.3              | 83.4              | 82.5    | 82.8    | 82.5    | 85.5    | 82.5     | 81.1     | 71.9     |

| Durability Test                   | Test #13 | Test #14 | Test #15 | Test #16 | Test #17 | Test #18 | Test #19 | Test #20 | Test #21 | Test #22 | Test #23 |
|-----------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Apparent Specific Gravity         | 2.684    | 2.708    | 2.701    | 2.7      | 2.701    | 2.699    | 2.686    | 2.693    | 2.702    | 2.691    | 2.698    |
| SSD Specific Gravity              | 2.661    | 2.681    | 2.705    | 2.67     | 2.671    | 2.671    | 2.672    | 2.666    | 2.675    | 2.667    | 2.674    |
| Bulk Specific Gravity             | 2.648    | 2.665    | 2.651    | 2.653    | 2.664    | 2.654    | 2.656    | 2.651    | 2.659    | 2.652    | 2.66     |
| Absorption (%)                    | 0.49     | 0.6      | 0.71     | 0.65     | 0.52     | 0.63     | 0.63     | 0.59     | 0.59     | 0.55     | 0.53     |
| Sodium Sulfate Soundness (% Loss) | 1.15     | 2.7      | 3.4      | 1.5      | 1.4      | 1.2      | 0.67     | 2.5      | 1.4      | 4        | 0.8      |
| L.A. Abrasion                     | 4.7      | 4.7      | 5.1      | 5.2      | 4.6      | 4.8      | 4.4      | 4.9      | 5.2      | 4.1      | 4.8      |
| NRC Score (Inberg-Miller)         | 83       | 80.3     | 75.8     | 78.9     | 83.2     | 79.5     | 79.7     | 79.6     | 81       | 79.5     | 82.6     |
| NRC Score (Hydro-Engineering)     | 82.7     | 80.2     | 75.7     | 78.7     | 83.1     | 79.6     | 79.9     | 79.5     | 80.8     | 79.7     | 82.7     |
| NRC Score (SSD Spec. Grav.)       | 83.7     | 81.5     | 80       | 80.1     | 83.6     | 80.9     | 81.2     | 80.7     | 82.1     | 80.9     | 83.9     |

Average NRC Score (Inberg-Miller) 81.00  
Standard Deviation 3.16

Average NRC Score (Hydro-Eng) 80.93  
Standard Deviation 3.21

Average NRC Score (SSD Sp. Gr.) 82.12  
Standard Deviation 2.85

**SOUTH PASS  
IRON MINE ROCK  
DURABILITY TESTS**

# Pathfinder Rock Scoring

Sample Name - South Pass Rock

Sample Date - Jan. '02

Report Date-

Comments -

| Test                      | Lab result | NRC<br>Score | Igneous<br>NRC<br>Weight | NRC<br>Score x<br>Weight |
|---------------------------|------------|--------------|--------------------------|--------------------------|
| Specific Gravity<br>(SSD) | 2.996      | 10           | 9                        | 90                       |
| Absorption                | 0.058      | 10           | 2                        | 20                       |
| Sodium Sulfate            | 0.37       | 10           | 11                       | 110                      |
| L.A. Abrasion             | 2.5        | 9.25         | 1                        | 9.25                     |

Sum of Score x Weight 229.25

Maximum Sum of Score x Weight 230

Percentage Score 99.7 %



# AGGREGATE TESTS LOS ANGELES ABRASION/SULFATE SOUNDNESS

ASTM C535, ASTM C131, ASTM C88

|                                 |                               |
|---------------------------------|-------------------------------|
| CLIENT <u>PMC</u>               | JOB NO.: <u>8152.1 Rm</u>     |
| SAMPLE DESCRIPTION              | DATE: <u>2-5-02</u>           |
| PRODUCER                        | TEST NO.: <u>1 Durability</u> |
| PROJECT <u>Mine Reclamation</u> |                               |

## LOS ANGELES ABRASION

☐ ASTM C131, GRADING 1  
☐ ASTM C535, GRADING 1

Retained on 2 1/2 2485.5  
2 2489.5  
1 1/2 4952.0

INITIAL DRY WT., W1 9927.0 g  
 FINAL DRY WT., W2 9681.2 g  
 WT. LOSS (W1-W2)= 248.8 g

CHECK GRADATION OF SAMPLE BEFORE  
SELECTING GRADING,

$\% \text{ LOSS} = \frac{\text{WT. LOSS}}{\text{W1}} \times 100 = \frac{248.8}{9927.0} \times 100 = 2.5\%$

100 Rev.

## SULFATE SOUNDNESS

ASTM C88 ☒

SODIUM ☐

MAGNESIUM ☐

5 CYCLES

| SIEVE SIZE |              |              | 1<br>INITIAL WT<br>OF<br>SAMPLE<br>(GRAMS) | 2<br>FINAL WT.<br>OF SAMPLE<br>AFTER TEST<br>(GRAMS) | 3<br>ACTUAL<br>%<br>LOSS | 4<br>GRADING OF<br>ORIGINAL<br>SAMPLE<br>% RETAINED | 5<br>CORRECTED<br>%<br>LOSS |
|------------|--------------|--------------|--|--|--------------------------|---|-----------------------------|
| PAN        | PASSING      | RETAINED     |  |  |                          |   |                             |
| <u>G</u>   | <u>3</u>     | <u>2 1/2</u> | <u>6690.5</u>                              | <u>6686.2</u>  | <u>.06</u>               |   |                             |
| <u>C</u>   | <u>2 1/2</u> | <u>2</u>     | <u>2912.7</u>                              | <u>2910.7</u>  | <u>.07</u>               |   |                             |
| <u>13</u>  | <u>2</u>     | <u>1 1/2</u> | <u>2015.0</u>                              | <u>2010.2</u>  | <u>.24</u>               |   |                             |
|            |              |              |  |  |                          |   |                             |
|            |              |              |  |  |                          |   |                             |
|            |              |              |  |  |                          |   |                             |
|            |              |              |  |  |                          |   |                             |
|            |              |              |  |  |                          |   |                             |
|            |              |              |  |  |                          |   |                             |
|            |              |              |  |  |                          |   |                             |
|            |              |              |  |  |                          |   |                             |
|            |              |              |  |  | % LOSS = <u>0.37%</u>    |   |                             |

$3 = ((1 - 2) / 1) \times 100$

$5 = (4 / 100) \times 3$

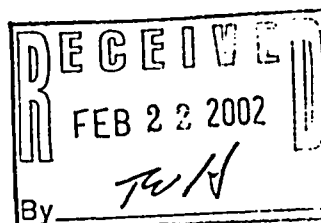
TEST BY GLM

INBERG-MILLER ENGINEERS

29.6 rev/min

RIVERTON, WYOMING

03/23/95



~~ASTM D-2726~~

JOB NO.: 8152.1RM SOURCE: \_\_\_\_\_  
DATE: 2-4-02 SAMPLED BY: \_\_\_\_\_  
TECH.: \_\_\_\_\_

## Absorption

RECEIVED  
FEB 22 2002  
By *TWH*

# Pathfinder Rock Scoring

Sample Name - South Pass Rock  
Sample Date - November, 2002  
Report Date - 3-Dec-02

| Test             | Lab Result | NRC<br>Score | Igneous<br>NRC<br>Weight | NRC<br>Score x<br>Weight |
|------------------|------------|--------------|--------------------------|--------------------------|
| Specific Gravity | 3.033      | 10           | 9                        | 90                       |
| Absorption       | 0.47       | 8            | 2                        | 16                       |
| Sodium Sulfate   | 0.11       | 10           | 11                       | 110                      |
| L.A. Abrasion    | 2.51       | 9            | 1                        | 9                        |

Sum of Score x Weight 225

Max. Sum of Score x Weight 230

Percentage Score 97.80%

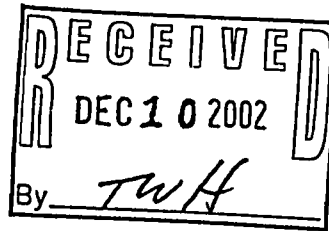
# INBERG-MILLER ENGINEERS

124 EAST MAIN STREET

RIVERTON, WYOMING 82501-4397

307-856-8136

December 3, 2002



8152.1-RM

Mr. Tom Hardgrove  
Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, WY 82501



RE: ROCK DURABILITY TEST RESULTS  
SOUTH PASS ROCK SAMPLE  
LUCKY MC MINE PROJECT  
GAS HILLS, WYOMING

Dear Mr. Hardgrove;

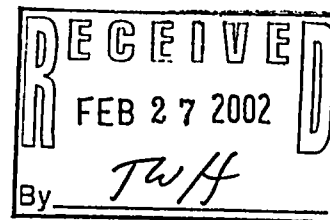
This letter summarizes the results of rock durability testing that we performed on a rock sample that you submitted to our Riverton, Wyoming laboratory. We understand that you requested the following tests be performed:

Specific Gravity and Absorption – ASTM C127  
Los Angeles Abrasion (100 revolutions) – ASTM C535  
Sodium Sulfate Soundness – ASTM C88

The results of testing are tabulated below.

| Laboratory Test                                  | Result |
|--|--------|
| Apparent Specific Gravity ASTM C127              | 3.033  |
| Saturated Surface Dry Specific Gravity ASTM C127 | 3.005  |
| Bulk Specific Gravity ASTM C127                  | 2.990  |
| Absorption, % ASTM C127                          | 0.47   |
| Sodium Sulfate Soundness, % Loss ASTM C88        | *0.11  |
| L.A. Abrasion, % Loss ASTM C535                  | 2.51   |

\*Note: The result presented for sodium sulfate soundness is the average loss for 4 size intervals that were tested between 1 inch and 3 inch diameter.



REVIEW OF CHANNEL RIP RAP MATERIAL  
FOR THE LUCKY Mc MINE, FREMONT COUNTY, WYOMING.

As requested by Mr. Tom Hardgrove, I have reviewed and researched several rock samples of the material intended as design channel rip rap (D 50 = .8' ) to be utilized at the Pathfinder - Lucky Mc Uranium Mine, Gas Hills District, Wyoming.

The material is from a quarry that was originally part of the Atlantic City Iron Mine operated by U.S. Steel Corporation from 1962 to 1983 in the South Pass Mineral District, and is located in Sec. 26, T.30 N., R.100 W., Fremont County, Wyoming. The quarry is presently controlled by Rice Enterprises. Mr. Jim Rice of Dubois, Wyoming is owner and operator. The rock material is excavated and sold in the region for such projects as the Lucky Mc site. The State of Wyoming Department of Environmental Quality has utilized this same material as channel rip rap on several Abandoned Mine Lands (A.M.L.) projects in the Gas Hills area.

In my research for the proper rock description and durability of the material in question; I have reviewed several articles written on the geology of the South Pass Mining district including:

- ◆ *FIELD GUIDE TO THE GEOLOGY & MINERALIZATION OF THE SOUTH PASS REGION, WIND RIVER RANGE, WYOMING*; W.D. Hausel & J.D. Love; 1991; W.G.A. Guidebook "Mineral Resources of Wyoming".
- ◆ *METAL DEPOSITS OF WYOMING - A REVIEW*; W.D. Hausel & P. J. Graff; 1991; W.G.A. Guidebook "Mineral Resources of Wyoming".
- ◆ *SUMMARY OF LARAMIDE DEPOSITIONAL & TECTONIC EVENTS, EAST FORK AREA, NORTHWESTERN WIND RIVER BASIN*; G. F. Winterfeld; 1990; W.G.A. Guidebook "Wyoming Sedimentation & Tectonics".

as well as the "Igneous & Metamorphic Rock" sections of *DANA'S MANUAL OF MINERALOGY*; 1963; 17<sup>TH</sup> Edition; P. 512 - 530. I have also held telephone conversations with Mr. Jim Rice and Mr. Paul Graff to discuss their knowledge of the use and geology of the sample material,

Laramide tectonics have exposed an Archean age Greenstone Belt in the Wind River Mountain Range of central Wyoming. The rip rap material in question is part of the regional host rock that develops the iron deposits within this Greenstone belt at Atlantic City, Wyoming.

My observation of the material has been limited to four rock samples collected by Tom Hardgrove of Pathfinder Mines, and Tom Miles of Hydro-Engineering in Casper Wyoming. I did not go to the quarry site to observe the material in-place. The four rock samples (Fig 1.) each weighing approx. 5 to 10 lbs. appear to be dense, angular, fine-grained, irregularly broken chunks of what was the host metamorphic rock for the iron deposits at South Pass.

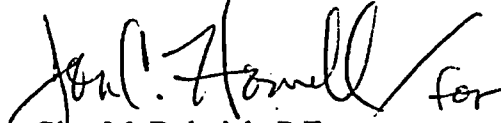
Tom Hardgrove  
Pathfinder Mines Corporation  
December 3, 2002  
Page 2

8152.1-RM

Please feel free to call if you have any questions or require further information.


Sincerely,

INBERG-MILLER ENGINEERS

  
Glen M. Bobnick, P.E.  
Geotechnical Engineer

GMB:ksp:\8152:\8152.1 South Pass Rock

The most probable rock classification based on my observation of the samples, review of the reference data and discussions with others (and without further thin-section investigation) appears to be as a high grade amphibolite gneiss, part of the Banded Ironstone Formation (BIF) and is a metamorphic rock of volcanic andesitic and/or dioritic origin. Typically gneiss would fall within the Mohs Hardness Scale in a range of from 5 to 7 (Diamond being 10) and would most typically average near 5. The material is massive, with no visible fractures or observable preferred cleavage pattern. As such it should be very resistant to weathering processes such as water or wind erosion, and exfoliation, and should make good rip rap material for its intended use at Lucky Mc.

  
Tom Nicholson W.P.G. No. 69





Consulting Engineers &amp; Environmental Scientists

605 N. Warehouse Road  
P. O. Box 2599 (82602)  
Casper, WY 82601Telephone: (307) 234-2126  
Fax: (307) 266-5143

October 10, 2001

Mr. Jim Rice  
Rice Enterprises, Inc.  
P.O. Box 1548  
Dubois, Wyoming 82513-1548

OCT 11 2001

Subject: Transmittal of Laboratory Test Results  
Maxim Project No. 1519896

Dear Mr. Rice:

Transmitted with this letter are the laboratory test results for the bulk aggregate sample submitted to our office on October 8, 2001. The material was identified as proposed riprap material from the Atlantic City Quarry.

As requested, the sample was tested for determination of the specific gravity and absorption (ASTM C127) and durability index (AASHTO T-210). The laboratory test results are as follows:

|                          |       |
|--------------------------|-------|
| Specific Gravity (Bulk): | 2.973 |
| Absorption (%):          | 0.35  |
| Durability Index:        | 96    |

If you have any questions or if we can be of further service, please call.

Sincerely,

MAXIM TECHNOLOGIES, INC.®

  
Mark Peloquin  
Construction Services Manager

Attachment

n:\doc\wme\rice1-2.wpd



**RECYCLED  
GRANITE  
DURABILITY TESTS**

**INBERG-MILLER ENGINEERS**

124 EAST MAIN STREET

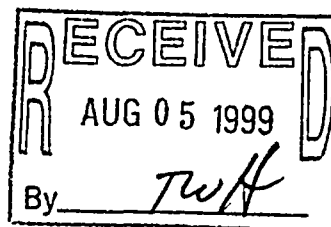
RIVERTON, WYOMING 82501-4397

307-856-8136

August 3, 1999

8152-RM

Pathfinder Mines Corporation  
P.O. Box 831  
Riverton, Wyoming 82501



ATTENTION: TOM HARDGROVE

RE: SODIUM SULFATE SOUNDNESS TEST RESULTS  
RECYCLED GRANITE  
LUCKY MC MINE RECLAMATION PROJECT  
GAS HILLS, WY

Dear Sir:

This letter transmits the results of sodium sulfate soundness testing that we performed on six (6) granite samples that were submitted to our Riverton, Wyoming laboratory. We understand that the granite is being recycled as erosion control material from previous use at the project site.

The samples consisted of 6 individual rocks. The rock identification and initial oven-dry weight for each is listed below:

| <u>Identification</u> | <u>Oven Dry Weight (lb.)</u> |
|-----------------------|------------------------------|
| GR-1                  | 28.25                        |
| GR-2                  | 15.70                        |
| GR-3                  | 16.20                        |
| GR-4                  | 68.80                        |
| G-1                   | 57.55                        |
| G-2                   | 66.45                        |

The rocks were tested following the procedures of ASTM C88 "Standard Test Method for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate". In summary, the results indicated that after 5 cycles of submersion and drying, over 48 hours of rinsing, and drying until no further loss in weight, the samples gained between 0.2 and 0.6 percent of their original weight. The sodium sulfate solution used in the test appeared relatively clear at completion of the testing, and we observed no disintegrated rock in the solution indicating loss of the original sample during the test.

Pathfinder Mines Corporation  
ATTENTION: TOM HARDGROVE  
August 3, 1999  
Page Two

8152-RM

In our opinion, the reason for the weight gain is likely due to sodium sulfate that was absorbed and trapped in the specimen pores, and could not be washed out with rinsing. The tested samples have a very small surface area to weight ratio as compared to smaller-diameter samples. It is our opinion that the loss is partly a function of specimen surface area. As such, loss is correspondingly significantly smaller for a given sample weight of a single, relatively large diameter particle as opposed to a sample of the same weight comprised of several smaller diameter particles

We conclude that the weight of sodium sulfate retained by the specimen apparently exceeds the weight loss, if any, which resulted from the test, and the actual loss is practically 0% as measured per ASTM C88.

Please call if you have any questions.

Sincerely,

INBERG-MILLER ENGINEERS

A handwritten signature in black ink, appearing to read "Glen M. Bobnick". The signature is stylized with a large, sweeping initial "G" and "M".

Glen M. Bobnick, P.E  
Geotechnical Engineer

GMB:jlw:client ltrs\8152granite

## ADDITIONAL GRANITE DURABILITY TESTING SUMMARY

| Granite<br>Sample Designation | Bulk Specific<br>Gravity | Absorption<br>(%) | Sodium Sulfate<br>Soundness<br>(%) | NRC<br>Score |
|-------------------------------|--------------------------|-------------------|------------------------------------|--------------|
| GR-1                          | 2.616                    | 0.35              | 0                                  | 87.9         |
| GR-2                          | 2.617                    | 0.32              | 0                                  | 88.1         |
| GR-3                          | 2.634                    | 0.62              | 0                                  | 88.4         |
| GR-4                          | 2.611                    | 0.15              | 0                                  | 88.4         |
| G-1                           | 2.652                    | 0.26              | 0                                  | 91.3         |
| G-2                           | 2.605                    | 0.3               | 0                                  | 87.2         |

Stage I, No. 4. Dam Addition  
Pathfinder Mines Corp.  
Riverton, Wyoming

Table 6.

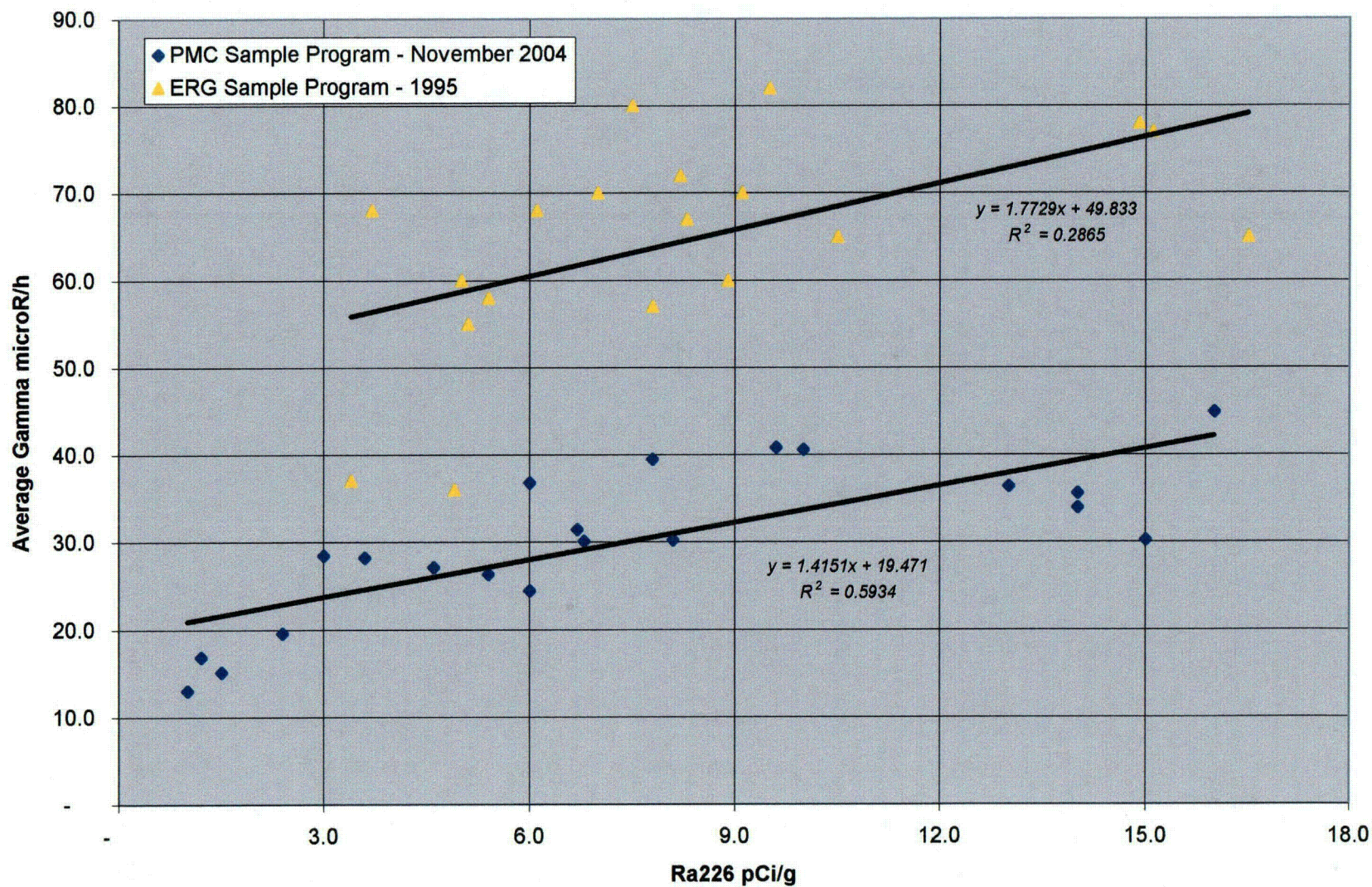
RIPRAP TEST RESULTS  
(Granite Boulders and Cobbles)

|   | <u>Test<br/>Result</u>         | <u>Specification</u> |                                  |
|---|--------------------------------|----------------------|----------------------------------|
| Soundness (Sodium Sulfate)<br>(ASTM - C88, 5 cycle) | 0.3%                           | 10% Maximum          |                                  |
| Abrasion Resistance<br>(ASTM - C535)                | 9.9%                           | 35% Maximum          |                                  |
|   | <u>% Lighter<br/>By Weight</u> | <u>Stone Weight</u>  | <u>Limit of<br/>Stone Weight</u> |
| Gradation   | 100 %                          | 400 lbs.             | 175-400 lbs.                     |
|   | 50 %                           | 90 lbs.              | 60-130 lbs.                      |
|   | 15 %                           | 20 lbs.              | 20-45 lbs.                       |

# APPENDIX

## I

# Gamma - Ra<sub>226</sub> Correlation





| PMC Sample Program - November 2004 |            |            |            |            |            |            |            |            |            |                              |              |                |            |                            | ERG Sample Program - 1995   |                |                   |
|------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------------------------|--------------|----------------|------------|----------------------------|-----------------------------|----------------|-------------------|
| Site                               | Gamma<br>1 | Gamma<br>2 | Gamma<br>3 | Gamma<br>4 | Gamma<br>5 | Gamma<br>6 | Gamma<br>7 | Gamma<br>8 | Gamma<br>9 | Average<br>Gamma<br>microR/h | Max<br>Gamma | Ra226<br>pCi/g | U<br>mg/kg | Th <sub>230</sub><br>pCi/g | Sample<br>ID                | Ra226<br>pCi/g | Gamma<br>microR/h |
| LMSS04 #1                          | 26         | 27         | 28         | 28         | 28         | 28         | 38         | 27         | 26         | 28.4                         | 38.0         | 3.0            |            |                            | 1a                          | 7.8            | 57                |
| LMSS04 #2                          | 26         | 28         | 26         | 25         | 28         | 26         | 26         | 26         | 26         | 26.3                         | 28.0         | 5.4            |            |                            | 5a                          | 4.9            | 36                |
| LMSS04 #3                          | 19         | 20         | 19         | 22         | 19         | 20         | 17         | 20         | 20         | 19.6                         | 22.0         | 2.4            |            |                            | 5b                          | 3.4            | 37                |
| LMSS04 #4                          | 15         | 15         | 16         | 16         | 15         | 15         | 15         | 15         | 14         | 15.1                         | 16.0         | 1.5            |            |                            | 9a                          | 5              | 60                |
| LMSS04 #5                          | 35         | 36         | 36         | 38         | 38         | 39         | 38         | 38         | 33         | 36.8                         | 39.0         | 6.0            |            |                            | 9b                          | 8.9            | 60                |
| LMSS04 #6                          | 28         | 30         | 30         | 26         | 28         | 26         | 24         | 26         | 26         | 27.1                         | 30.0         | 4.6            |            |                            | 13a                         | 5.4            | 58                |
| LMSS04 #7                          | 25         | 42         | 25         | 36         | 25         | 25         | 36         | 25         | 32         | 30.1                         | 42.0         | 6.8            |            |                            | 13b                         | 5.1            | 55                |
| LMSS04 #8                          | 15         | 18         | 15         | 17         | 18         | 15         | 18         | 18         | 17         | 16.8                         | 18.0         | 1.2            |            |                            | 17a                         | 15.1           | 77                |
| LMSS04 #9                          | 28         | 30         | 26         | 25         | 30         | 28         | 27         | 28         | 32         | 28.2                         | 32.0         | 3.6            |            |                            | 17b                         | 9.5            | 82                |
| LMSS04 #10                         | 28         | 42         | 30         | 30         | 31         | 32         | 30         | 30         | 30         | 31.4                         | 42.0         | 6.7            |            |                            | 17c                         | 7.5            | 80                |
| LMSS04 #11                         | 25         | 26         | 20         | 25         | 25         | 22         | 24         | 28         | 25         | 24.4                         | 28.0         | 6.0            |            |                            | 19a                         | 10.5           | 65                |
| LMSS04 #12                         | 34         | 35         | 34         | 26         | 25         | 26         | 32         | 30         | 30         | 30.2                         | 35.0         | 15.0           |            |                            | 19b                         | 16.5           | 65                |
| LMSS04 #13                         | 32         | 30         | 30         | 38         | 25         | 25         | 26         | 32         | 34         | 30.2                         | 38.0         | 8.1            |            |                            | 21a                         | 8.2            | 72                |
| LMSS04 #14                         | 30         | 58         | 42         | 28         | 28         | 37         | 30         | 22         | 30         | 33.9                         | 58.0         | 14.0           | 28.4       | 201                        | 21c                         | 3.7            | 68                |
| LMSS04 #15                         | 40         | 40         | 38         | 30         | 40         | 28         | 26         | 38         | 40         | 35.6                         | 40.0         | 14.0           | 59.2       | 357                        | 21d                         | 9.1            | 70                |
| LMSS04 #16                         | 37         | 34         | 35         | 36         | 36         | 35         | 38         | 38         | 38         | 36.3                         | 38.0         | 13.0           |            |                            | 22a                         | 6.1            | 68                |
| LMSS04 #17                         | 13         | 14         | 12         | 13         | 12         | 13         | 14         | 13         | 13         | 13.0                         | 14.0         | 1.0            |            |                            | 22b                         | 7              | 70                |
| LMSS04 #18                         | 40         | 42         | 34         | 37         | 46         | 40         | 38         | 40         | 38         | 39.4                         | 46.0         | 7.8            |            |                            | 22c                         | 14.9           | 78                |
| LMSS04 #19                         | 35         | 60         | 34         | 42         | 40         | 40         | 40         | 38         | 38         | 40.8                         | 60.0         | 9.6            | 33.5       | 21                         | 22d                         | 8.3            | 67                |
| LMSS04 #20                         | 65         | 38         | 34         | 35         | 35         | 32         | 55         | 36         | 35         | 40.6                         | 65.0         | 10.0           | 10.6       | 12                         |                             |                |                   |
| LMSS04 #21                         | 40         | 48         | 65         | 42         | 35         | 48         | 42         | 38         | 46         | 44.9                         | 65.0         | 16.0           | 66.4       | 15                         | 21b                         | 31.8           | 91                |
| Average                            | 30         | 34         | 30         | 29         | 29         | 29         | 30         | 29         | 30         |                              |              |                |            |                            | Note: 21b excluded on chart |                |                   |
| Max                                | 65         | 60         | 65         | 42         | 46         | 48         | 55         | 40         | 46         |                              |              |                |            |                            |                             |                |                   |





### LABORATORY ANALYTICAL REPORT

Client: Pathfinder Mines Corp  
Project: Lucky Mc Mine

Lab Order: C04120902  
Report Date: 01/14/05

Lab ID: C04120902-001  
Client Sample ID: LMSS04 #1  
Matrix: SOIL

Collection Date: 11/19/04  
Date Received: 12/21/04

| Analyses                     | Result | Units     | Qual | MCL/ |     | Method | Analysis Date / By  |
|------------------------------|--------|-----------|------|------|-----|--------|---------------------|
|                              |        |           |      | RL   | QCL |        |                     |
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |      |     |        |                     |
| Radium 226                   | 3.0    | pCi/g-dry |      | 0.2  |     | E903.0 | 12/30/04 08:30 / df |
| Radium 226 precision (±)     | 1.0    | pCi/g-dry |      |      |     | E903.0 | 12/30/04 08:30 / df |

Lab ID: C04120902-002  
Client Sample ID: LMSS04 #2  
Matrix: SOIL

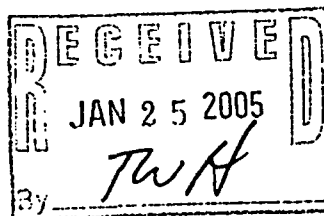
Collection Date: 11/19/04  
Date Received: 12/21/04

| Analyses                     | Result | Units     | Qual | MCL/ |     | Method | Analysis Date / By  |
|------------------------------|--------|-----------|------|------|-----|--------|---------------------|
|                              |        |           |      | RL   | QCL |        |                     |
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |      |     |        |                     |
| Radium 226                   | 5.4    | pCi/g-dry |      | 0.2  |     | E903.0 | 12/30/04 08:30 / df |
| Radium 226 precision (±)     | 1.3    | pCi/g-dry |      |      |     | E903.0 | 12/30/04 08:30 / df |

Lab ID: C04120902-003  
Client Sample ID: LMSS04 #3  
Matrix: SOIL

Collection Date: 11/19/04  
Date Received: 12/21/04

| Analyses                     | Result | Units     | Qual | MCL/ |     | Method | Analysis Date / By  |
|------------------------------|--------|-----------|------|------|-----|--------|---------------------|
|                              |        |           |      | RL   | QCL |        |                     |
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |      |     |        |                     |
| Radium 226                   | 2.4    | pCi/g-dry |      | 0.2  |     | E903.0 | 12/30/04 08:30 / df |
| Radium 226 precision (±)     | 0.9    | pCi/g-dry |      |      |     | E903.0 | 12/30/04 08:30 / df |



Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



### LABORATORY ANALYTICAL REPORT

Client: Pathfinder Mines Corp  
Project: Lucky Mc Mine

Lab Order: C04120902  
Report Date: 01/14/05

Lab ID: C04120902-004

Collection Date: 11/19/04

Client Sample ID: LMSS04 #4

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses                     | Result | Units     | Qual | RL  | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|-----|-----|--------|----------------------|
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |     |     |        |                      |
| Radium 226                   | 1.5    | pCi/g-dry |      | 0.2 |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 1.0    | pCi/g-dry |      |     |     | E903.0 | 01/03/05 11:00 / trs |

Lab ID: C04120902-005

Collection Date: 11/19/04

Client Sample ID: LMSS04 #5

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses                     | Result | Units     | Qual | RL  | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|-----|-----|--------|----------------------|
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |     |     |        |                      |
| Radium 226                   | 6.0    | pCi/g-dry |      | 0.2 |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 1.3    | pCi/g-dry |      |     |     | E903.0 | 01/03/05 11:00 / trs |

Lab ID: C04120902-006

Collection Date: 11/19/04

Client Sample ID: LMSS04 #6

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses                     | Result | Units     | Qual | RL  | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|-----|-----|--------|----------------------|
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |     |     |        |                      |
| Radium 226                   | 4.6    | pCi/g-dry |      | 0.2 |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 1.2    | pCi/g-dry |      |     |     | E903.0 | 01/03/05 11:00 / trs |

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



### LABORATORY ANALYTICAL REPORT

Client: Pathfinder Mines Corp  
Project: Lucky Mc Mine

Lab Order: C04120902  
Report Date: 01/14/05

| Lab ID: C04120902-007       |        |           |      | Collection Date: 11/19/04 |     |        |                      |
|-----------------------------|--------|-----------|------|---------------------------|-----|--------|----------------------|
| Client Sample ID: LMSS04 #7 |        |           |      | Date Received: 12/21/04   |     |        |                      |
| Matrix: SOIL                |        |           |      | MCL/                      |     |        |                      |
| Analyses                    | Result | Units     | Qual | RL                        | QCL | Method | Analysis Date / By   |
| RADIONUCLIDES - TOTAL       |        |           |      |                           |     |        |                      |
| Radium 226                  | 6.8    | pCi/g-dry |      | 0.2                       |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)    | 1.4    | pCi/g-dry |      |                           |     | E903.0 | 01/03/05 11:00 / trs |

| Lab ID: C04120902-008       |        |           |      | Collection Date: 11/19/04 |     |        |                      |
|-----------------------------|--------|-----------|------|---------------------------|-----|--------|----------------------|
| Client Sample ID: LMSS04 #8 |        |           |      | Date Received: 12/21/04   |     |        |                      |
| Matrix: SOIL                |        |           |      | MCL/                      |     |        |                      |
| Analyses                    | Result | Units     | Qual | RL                        | QCL | Method | Analysis Date / By   |
| RADIONUCLIDES - TOTAL       |        |           |      |                           |     |        |                      |
| Radium 226                  | 1.2    | pCi/g-dry |      | 0.2                       |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)    | 0.8    | pCi/g-dry |      |                           |     | E903.0 | 01/03/05 11:00 / trs |

| Lab ID: C04120902-009       |        |           |      | Collection Date: 11/19/04 |     |        |                      |
|-----------------------------|--------|-----------|------|---------------------------|-----|--------|----------------------|
| Client Sample ID: LMSS04 #9 |        |           |      | Date Received: 12/21/04   |     |        |                      |
| Matrix: SOIL                |        |           |      | MCL/                      |     |        |                      |
| Analyses                    | Result | Units     | Qual | RL                        | QCL | Method | Analysis Date / By   |
| RADIONUCLIDES - TOTAL       |        |           |      |                           |     |        |                      |
| Radium 226                  | 3.6    | pCi/g-dry |      | 0.2                       |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)    | 1.1    | pCi/g-dry |      |                           |     | E903.0 | 01/03/05 11:00 / trs |

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



### LABORATORY ANALYTICAL REPORT

Client: Pathfinder Mines Corp  
Project: Lucky Mc Mine

Lab Order: C04120902  
Report Date: 01/14/05

Lab ID: C04120902-010

Collection Date: 11/19/04

Client Sample ID: LMSS04 #10

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses | Result | Units | Qual | RL | QCL | Method | Analysis Date / By |
|----------|--------|-------|------|----|-----|--------|--------------------|
|----------|--------|-------|------|----|-----|--------|--------------------|

**RADIONUCLIDES - TOTAL**

|                          |     |           |  |     |  |        |                      |
|--------------------------|-----|-----------|--|-----|--|--------|----------------------|
| Radium 226               | 6.7 | pCi/g-dry |  | 0.2 |  | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±) | 1.4 | pCi/g-dry |  |     |  | E903.0 | 01/03/05 11:00 / trs |

Lab ID: C04120902-011

Collection Date: 11/22/04

Client Sample ID: LMSS04 #11

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses | Result | Units | Qual | RL | QCL | Method | Analysis Date / By |
|----------|--------|-------|------|----|-----|--------|--------------------|
|----------|--------|-------|------|----|-----|--------|--------------------|

**RADIONUCLIDES - TOTAL**

|                          |     |           |  |     |  |        |                      |
|--------------------------|-----|-----------|--|-----|--|--------|----------------------|
| Radium 226               | 6.0 | pCi/g-dry |  | 0.2 |  | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±) | 1.3 | pCi/g-dry |  |     |  | E903.0 | 01/03/05 11:00 / trs |

Lab ID: C04120902-012

Collection Date: 11/22/04

Client Sample ID: LMSS04 #12

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses | Result | Units | Qual | RL | QCL | Method | Analysis Date / By |
|----------|--------|-------|------|----|-----|--------|--------------------|
|----------|--------|-------|------|----|-----|--------|--------------------|

**RADIONUCLIDES - TOTAL**

|                          |     |           |  |     |  |        |                      |
|--------------------------|-----|-----------|--|-----|--|--------|----------------------|
| Radium 226               | 15  | pCi/g-dry |  | 0.2 |  | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±) | 2.0 | pCi/g-dry |  |     |  | E903.0 | 01/03/05 11:00 / trs |

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Pathfinder Mines Corp  
Project: Lucky Mc Mine

Lab Order: C04120902  
Report Date: 01/14/05

|                              |                           |           |      |     |     |        |                      |
|------------------------------|---------------------------|-----------|------|-----|-----|--------|----------------------|
| Lab ID: C04120902-013        | Collection Date: 11/22/04 |           |      |     |     |        |                      |
| Client Sample ID: LMSS04 #13 | DateReceived: 12/21/04    |           |      |     |     |        |                      |
| Matrix: SOIL                 | MCL/                      |           |      |     |     |        |                      |
| Analyses                     | Result                    | Units     | Qual | RL  | QCL | Method | Analysis Date / By   |
| RADIONUCLIDES - TOTAL        |                           |           |      |     |     |        |                      |
| Radium 226                   | 8.1                       | pCi/g-dry |      | 0.2 |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 1.5                       | pCi/g-dry |      |     |     | E903.0 | 01/03/05 11:00 / trs |

| Lab ID: C04120902-014        | Collection Date: 11/22/04 |           |      |      |     |        |                      |
|------------------------------|---------------------------|-----------|------|------|-----|--------|----------------------|
| Client Sample ID: LMSS04 #14 | DateReceived: 12/21/04    |           |      |      |     |        |                      |
| Matrix: SOIL                 | MCL/                      |           |      |      |     |        |                      |
| Analyses                     | Result                    | Units     | Qual | RL   | QCL | Method | Analysis Date / By   |
| METALS - TOTAL               |                           |           |      |      |     |        |                      |
| Uranium                      | 28.4                      | mg/kg-dry | D    | 0.03 |     | SW6020 | 01/05/05 21:26 / sml |
| RADIONUCLIDES - TOTAL        |                           |           |      |      |     |        |                      |
| Radium 226                   | 14                        | pCi/g-dry |      | 0.2  |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 1.9                       | pCi/g-dry |      |      |     | E903.0 | 01/03/05 11:00 / trs |
| Thorium 230                  | 201                       | pCi/g-dry |      | 0.2  |     | E907.0 | 01/05/05 10:30 / ph  |
| Thorium 230 precision (±)    | 8.0                       | pCi/g-dry |      |      |     | E907.0 | 01/05/05 10:30 / ph  |

|                              |                           |           |      |      |     |        |                      |
|------------------------------|---------------------------|-----------|------|------|-----|--------|----------------------|
| Lab ID: C04120902-015        | Collection Date: 11/22/04 |           |      |      |     |        |                      |
| Client Sample ID: LMSS04 #15 | DateReceived: 12/21/04    |           |      |      |     |        |                      |
| Matrix: SOIL                 | MCL/                      |           |      |      |     |        |                      |
| Analyses                     | Result                    | Units     | Qual | RL   | QCL | Method | Analysis Date / By   |
| METALS - TOTAL               |                           |           |      |      |     |        |                      |
| Uranium                      | 59.2                      | mg/kg-dry | D    | 0.03 |     | SW6020 | 01/05/05 21:30 / sml |
| RADIONUCLIDES - TOTAL        |                           |           |      |      |     |        |                      |
| Radium 226                   | 14                        | pCi/g-dry |      | 0.2  |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 2.0                       | pCi/g-dry |      |      |     | E903.0 | 01/03/05 11:00 / trs |
| Thorium 230                  | 357                       | pCi/g-dry |      | 0.2  |     | E907.0 | 01/05/05 10:30 / ph  |
| Thorium 230 precision (±)    | 12                        | pCi/g-dry |      |      |     | E907.0 | 01/05/05 10:30 / ph  |

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Pathfinder Mines Corp  
Project: Lucky Mc Mine

Lab Order: C04120902  
Report Date: 01/14/05

Lab ID: C04120902-016

Collection Date: 11/22/04

Client Sample ID: LMSS04 #16

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses                     | Result | Units     | Qual | RL  | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|-----|-----|--------|----------------------|
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |     |     |        |                      |
| Radium 226                   | 13     | pCi/g-dry |      | 0.2 |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 1.8    | pCi/g-dry |      |     |     | E903.0 | 01/03/05 11:00 / trs |

Lab ID: C04120902-017

Collection Date: 11/22/04

Client Sample ID: LMSS04 #17

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses                     | Result | Units     | Qual | RL  | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|-----|-----|--------|----------------------|
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |     |     |        |                      |
| Radium 226                   | 1.0    | pCi/g-dry |      | 0.2 |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 0.8    | pCi/g-dry |      |     |     | E903.0 | 01/03/05 11:00 / trs |

Lab ID: C04120902-018

Collection Date: 11/22/04

Client Sample ID: LMSS04 #18

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses                     | Result | Units     | Qual | RL  | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|-----|-----|--------|----------------------|
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |     |     |        |                      |
| Radium 226                   | 7.8    | pCi/g-dry |      | 0.2 |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 1.5    | pCi/g-dry |      |     |     | E903.0 | 01/03/05 11:00 / trs |

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



### LABORATORY ANALYTICAL REPORT

Client: Pathfinder Mines Corp  
Project: Lucky Mc Mine

Lab Order: C04120902  
Report Date: 01/14/05

Lab ID: C04120902-019

Collection Date: 11/22/04

Client Sample ID: LMSS04 #19

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses                     | Result | Units     | Qual | RL   | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|------|-----|--------|----------------------|
| <b>METALS - TOTAL</b>        |        |           |      |      |     |        |                      |
| Uranium                      | 33.5   | mg/kg-dry | D    | 0.03 |     | SW6020 | 01/05/05 21:35 / sml |
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |      |     |        |                      |
| Radium 226                   | 9.6    | pCi/g-dry |      | 0.2  |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 1.6    | pCi/g-dry |      |      |     | E903.0 | 01/03/05 11:00 / trs |
| Thorium 230                  | 21     | pCi/g-dry |      | 0.2  |     | E907.0 | 01/05/05 10:30 / ph  |
| Thorium 230 precision (±)    | 2.9    | pCi/g-dry |      |      |     | E907.0 | 01/05/05 10:30 / ph  |

Lab ID: C04120902-020

Collection Date: 11/22/04

Client Sample ID: LMSS04 #20

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses                     | Result | Units     | Qual | RL   | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|------|-----|--------|----------------------|
| <b>METALS - TOTAL</b>        |        |           |      |      |     |        |                      |
| Uranium                      | 10.6   | mg/kg-dry | D    | 0.03 |     | SW6020 | 01/05/05 21:44 / sml |
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |      |     |        |                      |
| Radium 226                   | 10     | pCi/g-dry |      | 0.2  |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 1.7    | pCi/g-dry |      |      |     | E903.0 | 01/03/05 11:00 / trs |
| Thorium 230                  | 12     | pCi/g-dry |      | 0.2  |     | E907.0 | 01/05/05 10:30 / ph  |
| Thorium 230 precision (±)    | 2.1    | pCi/g-dry |      |      |     | E907.0 | 01/05/05 10:30 / ph  |

Report Definitions: RL - Analyte reporting limit.

MCL - Maximum contaminant level.

QCL - Quality control limit.

ND - Not detected at the reporting limit.

D - RL increased due to sample matrix interference.



### LABORATORY ANALYTICAL REPORT

Client: Pathfinder Mines Corp  
Project: Lucky Mc Mine

Lab Order: C04120902  
Report Date: 01/14/05

Lab ID: C04120902-021

Collection Date: 11/22/04

Client Sample ID: LMSS04 #21

Date Received: 12/21/04

Matrix: SOIL

MCL/

| Analyses                     | Result | Units     | Qual | RL   | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|------|-----|--------|----------------------|
| <b>METALS - TOTAL</b>        |        |           |      |      |     |        |                      |
| Uranium                      | 66.4   | mg/kg-dry | D    | 0.03 |     | SW6020 | 01/05/05 21:48 / sml |
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |      |     |        |                      |
| Radium 226                   | 16     | pCi/g-dry |      | 0.2  |     | E903.0 | 01/03/05 11:00 / trs |
| Radium 226 precision (±)     | 2.0    | pCi/g-dry |      |      |     | E903.0 | 01/03/05 11:00 / trs |
| Thorium 230                  | 15     | pCi/g-dry |      | 0.2  |     | E907.0 | 01/05/05 10:30 / ph  |
| Thorium 230 precision (±)    | 2.3    | pCi/g-dry |      |      |     | E907.0 | 01/05/05 10:30 / ph  |

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.





### LABORATORY ANALYTICAL REPORT

Client: Pathfinder Mines Corp  
Project: Lucky Mc Mine

Lab Order: C05020126  
Report Date: 03/01/05

Lab ID: C05020126-001      Collection Date: 02/02/05 11:30  
Client Sample ID: LMSS05 - #12      Date Received: 02/02/05  
Matrix: SOIL      MCL/

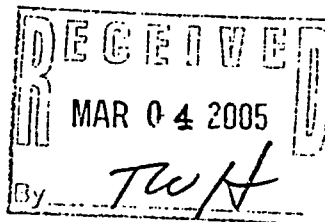
| Analyses                     | Result | Units     | Qual | RL  | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|-----|-----|--------|----------------------|
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |     |     |        |                      |
| Radium 226                   | 2.6    | pCi/g-dry |      | 0.2 |     | E903.0 | 02/18/05 11:15 / trs |
| Radium 226 precision (±)     | 1.0    | pCi/g-dry |      |     |     | E903.0 | 02/18/05 11:15 / trs |

Lab ID: C05020126-002      Collection Date: 02/02/05 11:45  
Client Sample ID: LMSS05 - #14      Date Received: 02/02/05  
Matrix: SOIL      MCL/

| Analyses                     | Result | Units     | Qual | RL  | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|-----|-----|--------|----------------------|
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |     |     |        |                      |
| Radium 226                   | 2.4    | pCi/g-dry |      | 0.2 |     | E903.0 | 02/18/05 11:15 / trs |
| Radium 226 precision (±)     | 1.0    | pCi/g-dry |      |     |     | E903.0 | 02/18/05 11:15 / trs |

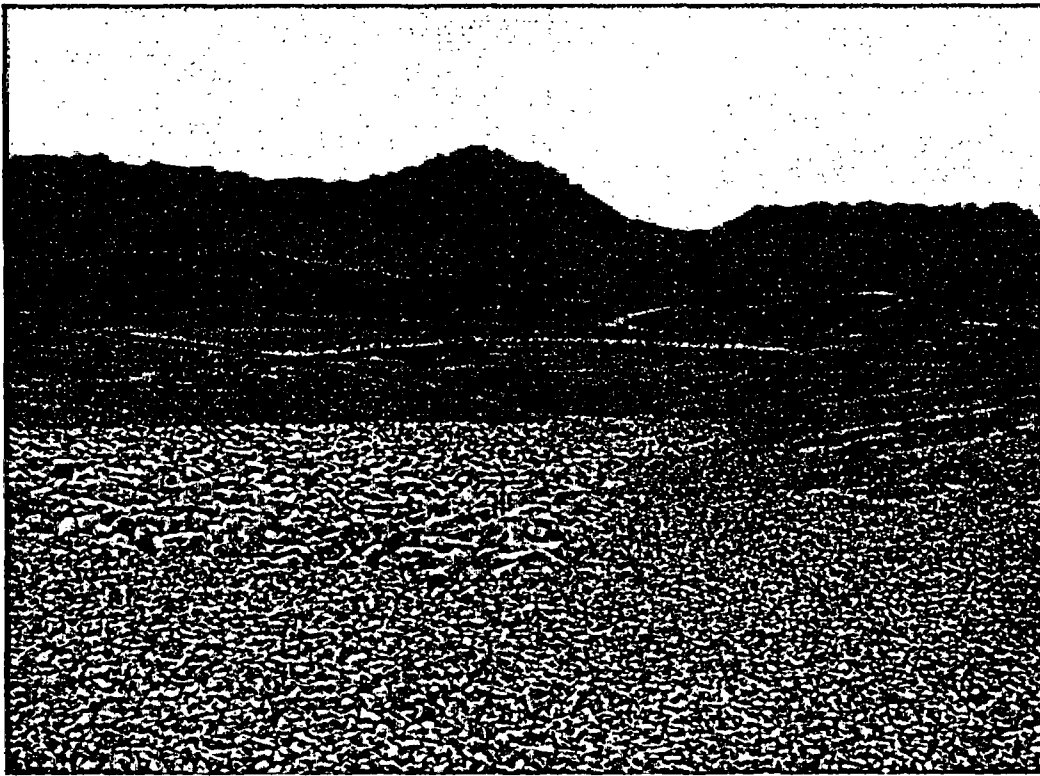
Lab ID: C05020126-003      Collection Date: 02/02/05 12:00  
Client Sample ID: LMSS05 - #16      Date Received: 02/02/05  
Matrix: SOIL      MCL/

| Analyses                     | Result | Units     | Qual | RL  | QCL | Method | Analysis Date / By   |
|------------------------------|--------|-----------|------|-----|-----|--------|----------------------|
| <b>RADIONUCLIDES - TOTAL</b> |        |           |      |     |     |        |                      |
| Radium 226                   | ND     | pCi/g-dry |      | 0.2 |     | E903.0 | 02/18/05 11:15 / trs |

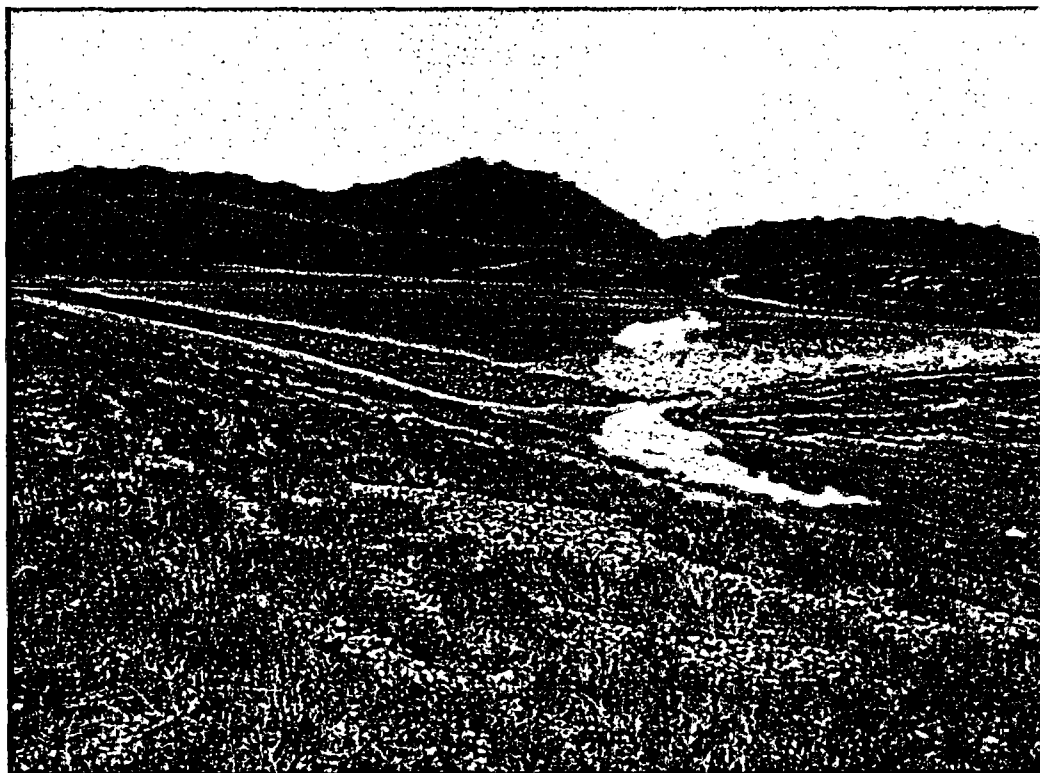


Report      RL - Analyte reporting limit.  
Definitions:      QCL - Quality control limit.

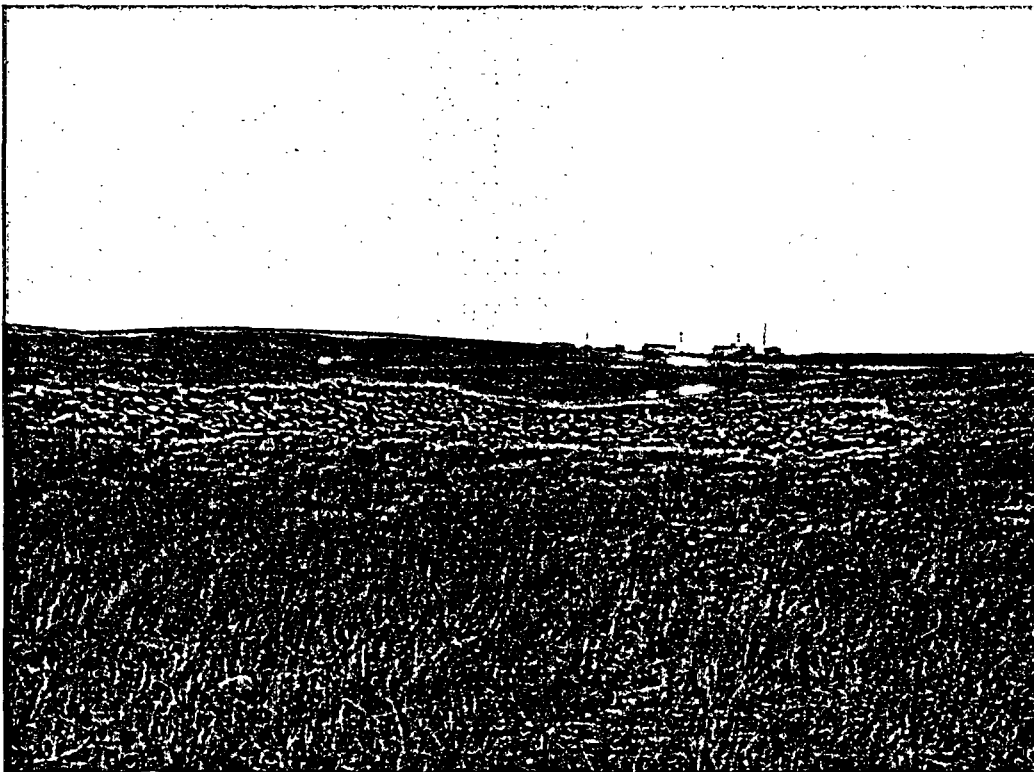
MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



Channel CH100 - Looking Downgradient



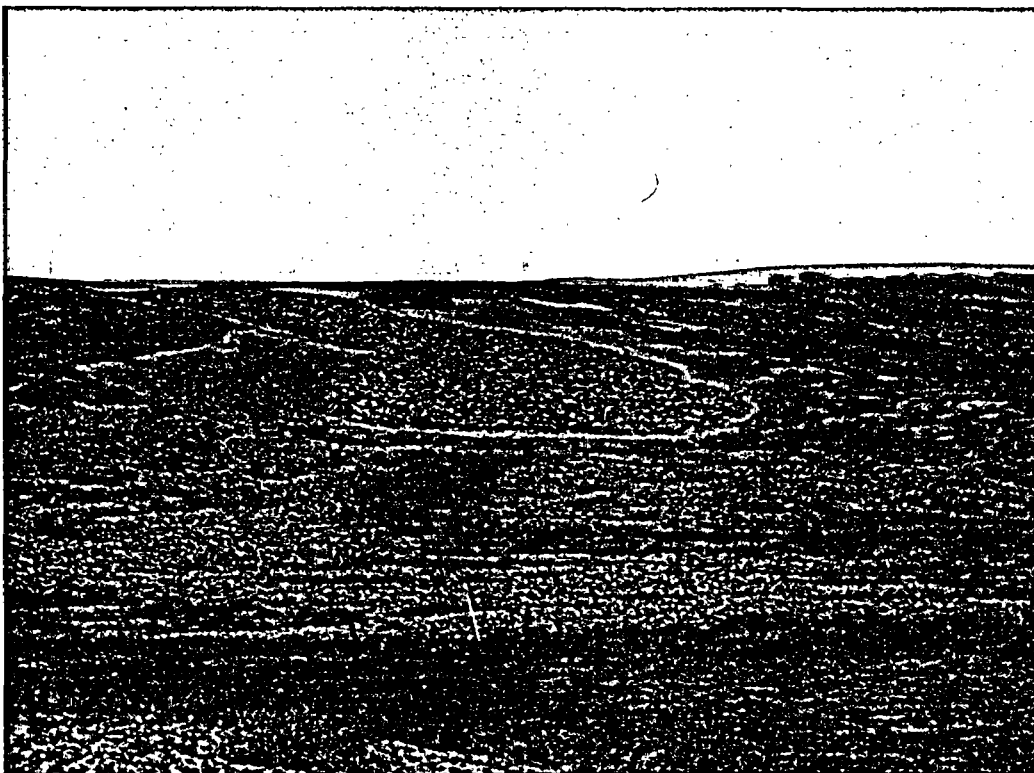
Intersection of Channel CH100 and Channel CH103  
Looking Downgradient



Channel CH100 - Discharge End  
Looking Upgradient



Channel CH108 - Control Structure  
Looking Upgradient



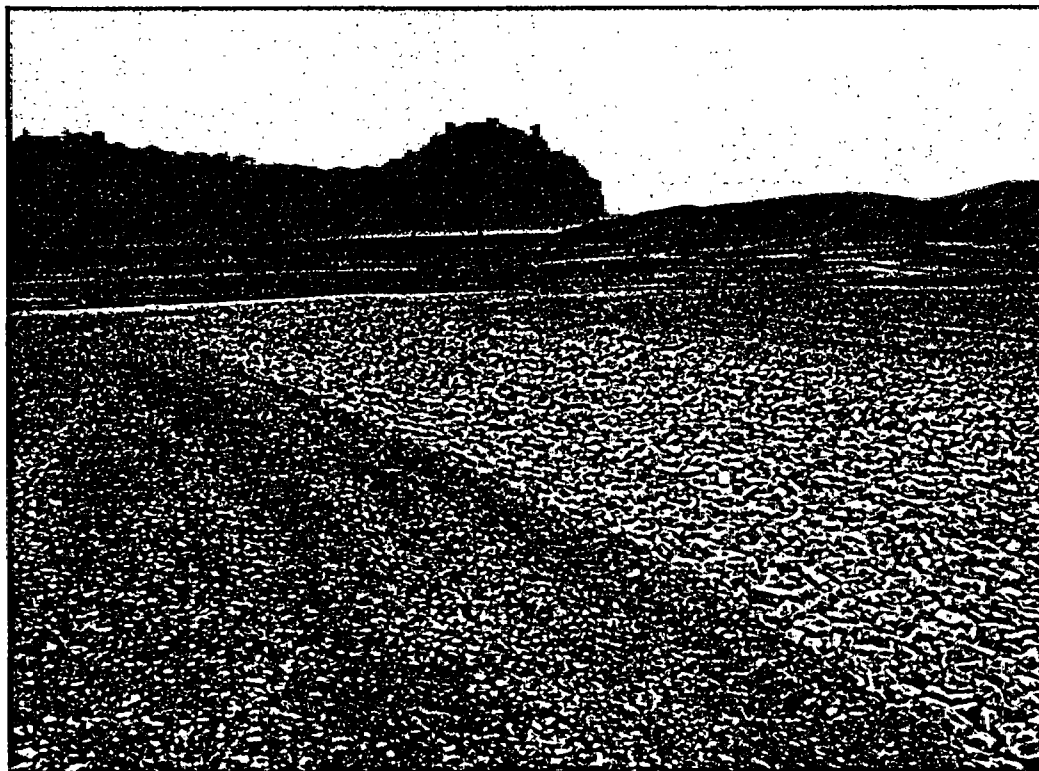
Channel CH105 - Looking Upgradient



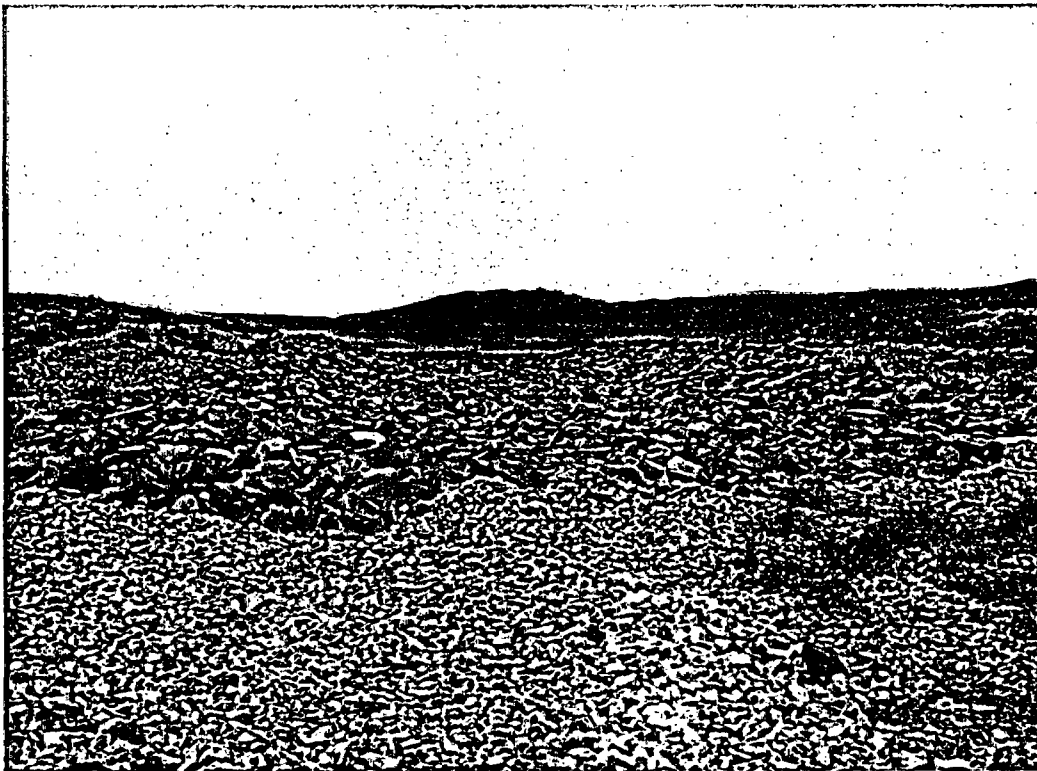
Channel 4PE - Looking Downgradient



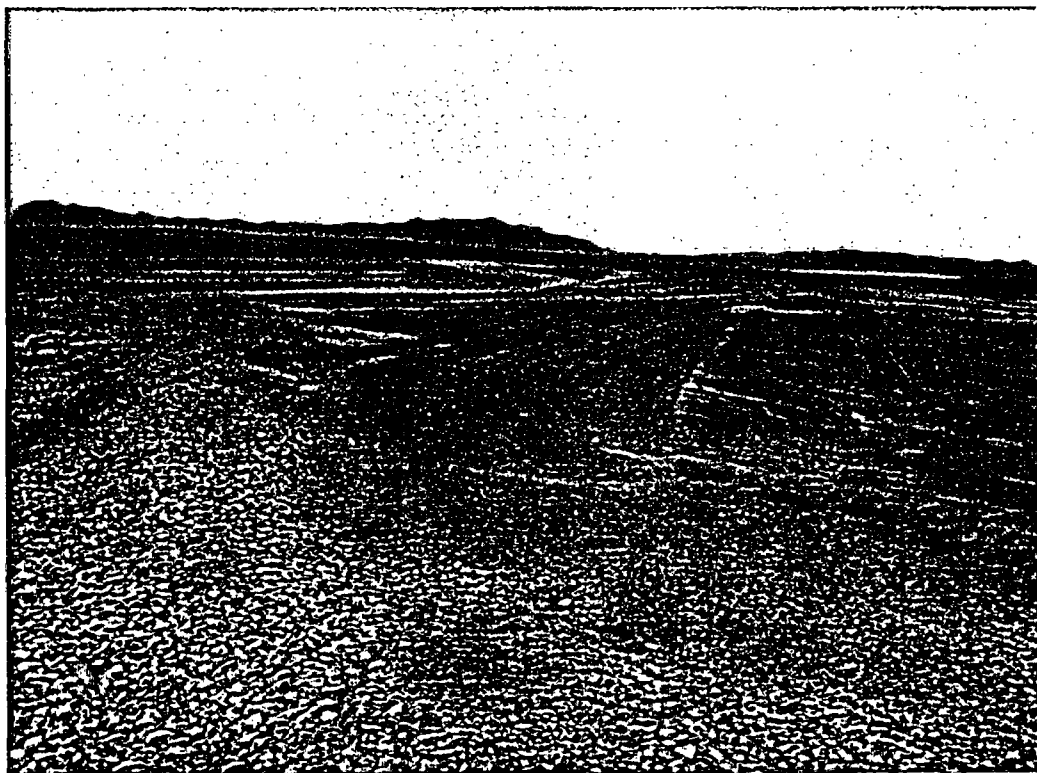
Channel CH4PC - Looking Upgradient Towards  
Reclaimed Evaporation Pond



Channel CH4PC - Looking Downgradient



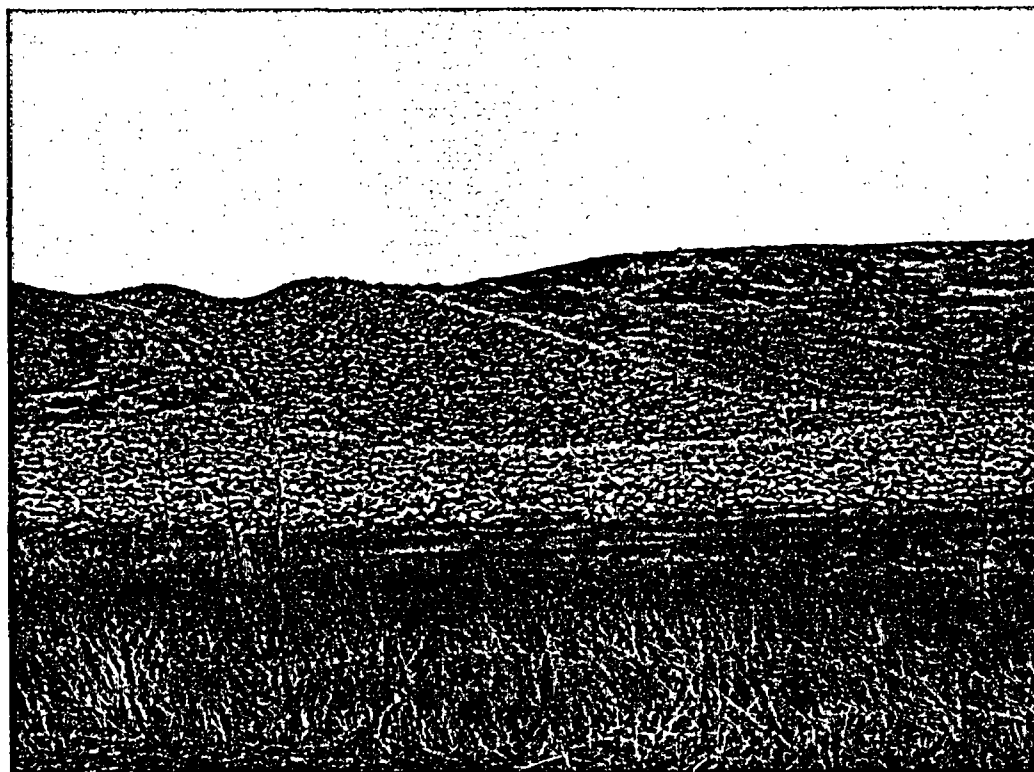
Channel CH117 - Control Structure  
Looking Downgradient



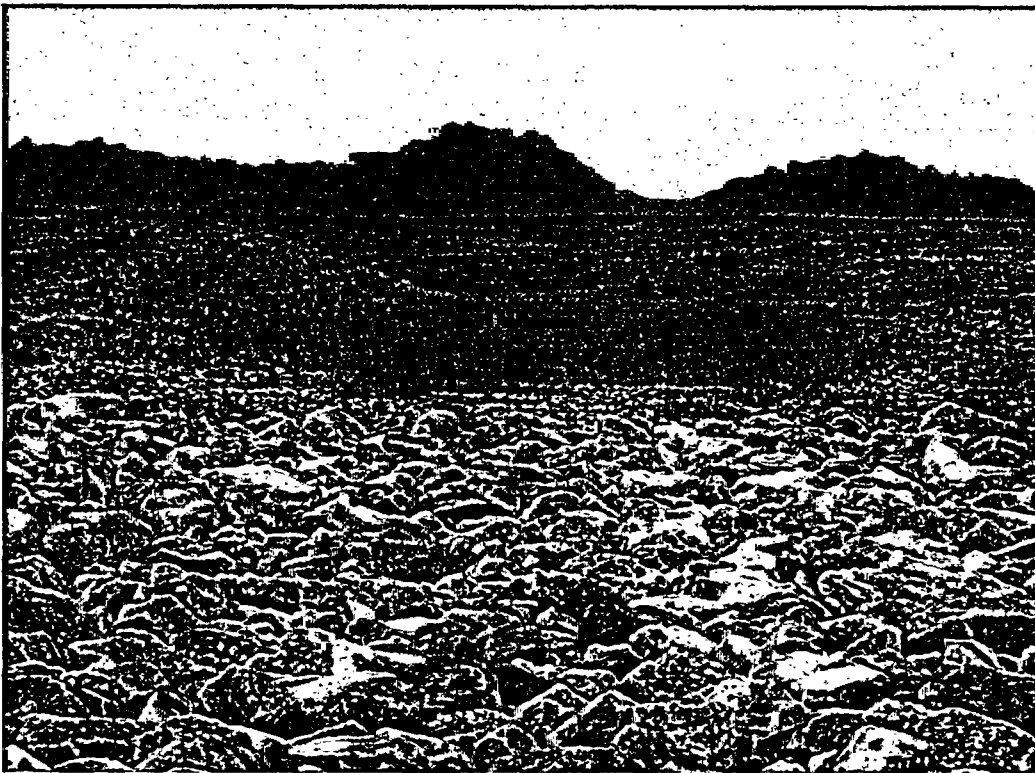
Auxiliary Berm Adjacent to Channel CH1116



Channel CH116 - Looking Upgradient



Channel CH114 - Looking Upgradient



Channel CH114B - Looking Upgradient



Channel CH114A - Control Structure  
Looking Downgradient





Channel CH111 - Looking Upgradient



End Protection Installation - CH100 - August, 2002



End Protection Installation - CH108 - September, 2002



End Protection Installation - CH114A - August, 2002



End Protection Installation - CH114B - May, 2002



End Protection Installation - CH4PN - July, 2002