

**CROW BUTTE RESOURCES, INC.**

**86 Crow Butte Road  
P.O. Box 169  
Crawford, Nebraska 69339-0169**



**(308) 665-2215  
(308) 665-2341 – FAX**

October 19, 2000

Mr. Philip Ting, Chief  
Fuel Cycle Licensing Branch, FCSS  
c/o Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

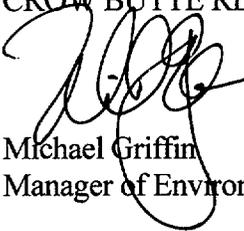
Re: Source Materials License SUA-1534  
Docket No. 40-8943  
Evaporation Pond 3 Liner Leak

Dear Mr. Ting:

On August 24, 2000 during routine evaporation pond monitoring of Crow Butte Resources, Inc. (CBR) Evaporation Pond 3, conductivity readings from the middle south underdrain indicated a potential pond liner leak. CBR has completed repairs to the primary liner on Pond 3 and has flushed the underdrains to ensure that any future liner leaks can be detected. Attached is a report describing the mitigative actions taken by CBR. Based upon the results of these actions, CBR believes that the leaks have been repaired and that Pond 3 may be returned to normal operational status.

If you have any questions or require any further information, please do not hesitate to call me at (308) 665-2215.

Sincerely,  
CROW BUTTE RESOURCES, INC.



Michael Griffin  
Manager of Environmental and Regulatory Affairs

Attachments: As Stated

cc: Mr. Steve Collings - CBR, Denver, Colorado  
Mr. Mike Layton – USNRC, Uranium Recovery Branch

*Nim SSOI Public*



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**Crow Butte Mine**  
**Evaporation Pond 3**  
**Liner Leak Final Report**



## Introduction

On August 24, 2000 during routine evaporation pond monitoring of Crow Butte Resources, Inc. (CBR) Evaporation Pond 3, conductivity readings from the middle south underdrain indicated a potential pond liner leak. The potential liner leak was indicated by an increase in the conductivity readings from a previous reading of 2,484  $\mu\text{mho/cm}$  to 32,500  $\mu\text{mho/cm}$ . There was no increase in the water level in the underdrain. Although the conductivity reading did not indicate that the water was degraded beyond the action level of 50 percent of the pond contents conductivity (101,200  $\mu\text{mho/cm}$ ), CBR collected and analyzed a sample of the underdrain contents for chloride, alkalinity, conductivity, sodium, and sulfate. The results of this sample indicated that the concentrations of the indicator parameters in the underdrain had increased significantly but had not reached the action level.

Based upon these analytical results, it was determined that a liner leak potentially existed in the south middle section of Pond 3. A visual inspection of the liner was performed on August 24 and 25. Two liner punctures were located near the top of the south embankment, well above the water level in the pond. In addition, a long scratch that had been patched with a weld bead was located near the middle underdrain. The welded repair had questionable integrity. Based upon this, CBR determined that a liner leak had been verified and that reporting was required in accordance with License Condition 11.4.

As required by License Condition 12.3, a 30-day report was submitted on September 22, 2000 that discussed analytical data, immediate mitigative actions, and the results of those actions. This report provides the final results of actions taken by CBR that indicate that the leak in the pond liner has been repaired and the underdrain is returned to a condition that will allow the detection of any future liner leaks.

## Liner Repairs

Upon confirmation of the liner leak on August 25, CBR performed a complete inspection of the liner on the south embankment of the pond with an emphasis on the water line in the pond. The inspection did not locate any additional visual indication of potential sources of leakage. Several areas where the liner had indications of abrasion were vacuum tested, but did not indicate liner failure. The water level on August 25 (8 feet 10 inches) was well below the suspected source of the leak. CBR believes that the higher level in the pond during July 2000 (approximately 9 feet 6 inches) and wave action due to strong winds was the probable cause of the elevated reading in the south middle underdrain. In addition, a conductivity sample taken after pumping the south middle underdrain on August 24 was 21,500  $\mu\text{mho/cm}$ , indicating the leak was not introducing pond water into the underdrain at that time. Based upon these results, CBR did not lower the water level in Pond 3 any further by transferring the contents to another pond.

CBR personnel repaired the liner leaks on September 6 and 8, 2000. Patches of 60-mil high-density polyethylene (HDPE) were welded over the two small punctures located on the top of the south embankment. A large patch of similar material was welded over the long scratch that had previously been repaired with weld bead. Flushing and pumping of the south middle underdrain was begun after



repairs were completed.

## **Pond Monitoring**

Upon confirmation of the liner leak, CBR began weekly sampling of the south middle underdrain with analysis for alkalinity, chloride, sodium, conductivity, and sulfate. Attachment 1 contains copies of the Weekly Evaporation Pond Underdrain Analysis forms and the analytical results from the CBR laboratory. Samples were obtained September 27 and October 4, 11, and 18, 2000. (Results from August 30 and September 6 through 20 weekly sampling were previously submitted in the 30-Day Report). A chart is also included for the south middle underdrain that plots the trends of the weekly analysis for the five indicator parameters from August 30 through October 18, 2000.

In addition to weekly analysis for the underdrain, CBR obtained non-routine samples from pond monitor wells CPM-1 and CPM-2. CPM-1 and CPM-2 are completed in the first aquifer and are located downgradient of Pond 3 at the fenced restricted area boundary. The samples were obtained on August 28 and September 27 and were analyzed for the indicator parameters to ensure that there was no indication of leakage in the secondary liner. Analytical results were consistent with historical sampling results and are contained in Attachment 2.

As required in the CBR Evaporation Pond Onsite Inspection Program (CBR, February 1996), the measurement frequency of the water levels in the south middle underdrain was increased to daily. Attachment 3 contains copies of the Commercial Pond Inspection Forms for the period of September 16 through October 14, 2000. Pumping immediately following the discovery of the leak lowered the water level in the underdrain. The underdrain level has remained constant since that time.

## **Results of Mitigative Actions**

Based upon the monitoring data, CBR believes that the apparent liner leaks that were detected in the south middle underdrain have been successfully repaired. CBR performed the repairs on September 6 and 8, 2000. The ponds have been inspected several times to ensure there are no other sources of leaks that were not previously identified.

CBR has flushed and pumped the south middle underdrain since repairs were completed to ensure that the conductivity is low enough to allow CBR to detect any future liner leaks. Attachment 4 contains a chart for the south middle underdrain that compares pond level with underdrain level and conductivity. The chart covers the period from January 6 through October 18, 2000 and clearly shows the affect of the liner leaks on the underdrain and that the efforts to flush the underdrain have been successful. The conductivity in the south middle underdrain on October 18 was 8,240  $\mu\text{mho/cm}$ . In contrast, the conductivity of the Pond 3 contents on the same date was 105,700  $\mu\text{mho/cm}$ . With an action level set at a conductivity of 50 percent of the pond contents, CBR can reliably detect an increase from the current conductivity levels in the south middle underdrain should a liner leak develop in the future.



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Based upon these results, CBR believes that the liner leak in Pond 3 has been successfully repaired and the underdrain returned to operational status. Weekly monitoring has been performed a minimum of 14 days following liner repairs as required in License Condition 11.4. Therefore, CBR is returning Pond 3 to routine operational status and will discontinue the weekly underdrain sampling and analysis.

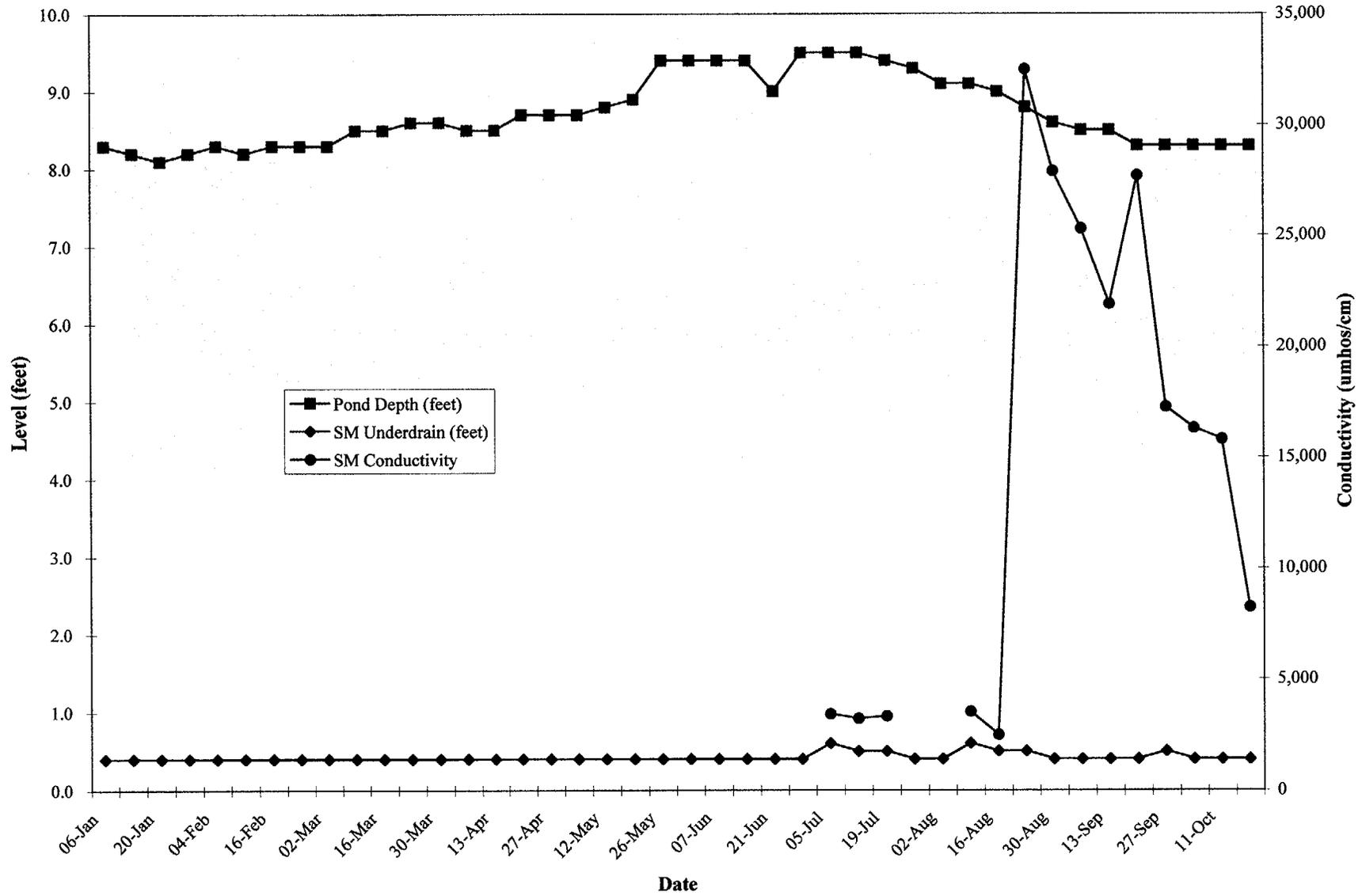


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**Attachment 1**

**Pond 3 Underdrain Analysis**

### Pond 3 South Middle Underdrain Monitoring Data



**CROW BUTTE PROJECT  
WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS**

| COMMERCIAL PONDS |                 | UNDERDRAIN WATER DEPTH-INCHES | INSTRUMENT READING | TEMPERATURE °C | TEMPERATURE CORRECTION | CONDUCTIVITY umhos/cm                    | LAB MEASUREMENT |
|------------------|-----------------|-------------------------------|--------------------|----------------|------------------------|--|-----------------|
| NORTH POND 1     | POND CONTENTS   | 8'5"                          |                    |                |                        |  | 76,500          |
|                  | N.E. UNDERDRAIN | 1"                            |                    |                |                        |  |                 |
|                  | N.M. UNDERDRAIN | 1"                            |                    |                |                        |  |                 |
|                  | N.W. UNDERDRAIN | 3"                            |                    |                |                        |  |                 |
|                  | S.E. UNDERDRAIN | 0"                            |                    |                |                        |  |                 |
|                  | S.M. UNDERDRAIN | 0"                            |                    |                |                        |  |                 |
|                  | S.W. UNDERDRAIN | 3"                            | 8000               | 17°            | 1.18                   | 9440                                     |                 |
| SOUTH POND 3     | POND CONTENTS   | 8'3"                          |                    |                |                        |  | 104,200         |
|                  | N.E. UNDERDRAIN | 7"                            | 500                | 17°            | 1.18                   | 590                                      |                 |
|                  | N.M. UNDERDRAIN | 9"                            | 700                | 16°            | 1.21                   | 847                                      |                 |
|                  | N.W. UNDERDRAIN | 3"                            |                    |                |                        |  |                 |
|                  | S.E. UNDERDRAIN | 1"                            |                    |                |                        |  |                 |
|                  | S.M. UNDERDRAIN | 6"                            | 8000               | 15°            | 1.24                   | <del>17350</del><br><del>9920</del> 9920 | 17,250          |
|                  | S.W. UNDERDRAIN | 9"                            | 700                | 23°            | 1.04                   | 728                                      |                 |
| POND NUMBER 4    | POND CONTENTS   | 4'8"                          |                    |                |                        |  | 137,500         |
|                  | N.E. UNDERDRAIN | 8"                            | 1300               | 15°            | 1.24                   | 1612                                     |                 |
|                  | N.M. UNDERDRAIN | 14"                           | 2000               | 17°            | 1.18                   | 2360                                     |                 |
|                  | N.W. UNDERDRAIN | 9"                            | 15000              | 16°            | 1.21                   | 18150                                    |                 |
|                  | S.E. UNDERDRAIN | 15"                           | 12000              | 14°            | 1.27                   | 15240                                    |                 |
|                  | S.M. UNDERDRAIN | 9"                            | 1900               | 15°            | 1.24                   | 2356                                     |                 |
|                  | S.W. UNDERDRAIN | 4"                            |                    |                |                        |  |                 |

DATE: 9/27/00

ACTION LIMIT EXCEEDED? \_\_\_\_\_

SAMPLER/ANALYST: Mat/BL

REMARKS: Pumped Underdrains Pond # 3-SM  
and Pond #4-SM

20-Sep-00  
SM/LG

|  | <u>Alk</u> | <u>Cl</u> | <u>Cond</u> | <u>SO<sub>4</sub></u> | <u>Na</u> |
|--|------------|-----------|-------------|-----------------------|-----------|
|  | mg/L       | mg/L      | μmhos       | mg/L                  | mg/L      |
| <b>Pond #3</b><br><b>SM Underdrain</b> | 485        | 5,139     | 17,250      | 804                   | 3,430     |

**CROW BUTTE PROJECT  
WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS**

| COMMERCIAL PONDS      |                 | UNDERDRAIN WATER DEPTH-INCHES | INSTRUMENT READING | TEMPERATURE °C | TEMPERATURE CORRECTION | CONDUCTIVITY umhos/cm | LAB MEASUREMENT |
|-----------------------|-----------------|-------------------------------|--------------------|----------------|------------------------|-----------------------|-----------------|
| N O R T H P O N D 1   | POND CONTENTS   | 8'5"                          |                    |                |                        |                       |                 |
|                       | N.E. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|                       | N.M. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|                       | N.W. UNDERDRAIN | 4"                            |                    |                |                        |                       |                 |
| S O U T H P O N D 3   | S.E. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|                       | S.M. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|                       | S.W. UNDERDRAIN | 4"                            |                    |                |                        |                       |                 |
|                       | POND CONTENTS   | 8'4"                          |                    |                |                        |                       |                 |
| P O N D N U M B E R 4 | N.E. UNDERDRAIN | 5"                            |                    |                |                        |                       |                 |
|                       | N.M. UNDERDRAIN | 15"                           |                    |                |                        |                       |                 |
|                       | N.W. UNDERDRAIN | 9"                            |                    |                |                        |                       |                 |
|                       | S.E. UNDERDRAIN | 16"                           |                    |                |                        |                       |                 |
| P O N D N U M B E R 3 | S.M. UNDERDRAIN | 8"                            |                    |                |                        |                       |                 |
|                       | S.W. UNDERDRAIN | 4"                            |                    |                |                        |                       |                 |
|                       | POND CONTENTS   | 4'8"                          |                    |                |                        |                       |                 |
|                       | N.E. UNDERDRAIN | 5"                            |                    |                |                        |                       |                 |
| P O N D N U M B E R 2 | N.M. UNDERDRAIN | 15"                           |                    |                |                        |                       |                 |
|                       | N.W. UNDERDRAIN | 9"                            |                    |                |                        |                       |                 |
|                       | S.E. UNDERDRAIN | 16"                           |                    |                |                        |                       |                 |
|                       | S.M. UNDERDRAIN | 8"                            |                    |                |                        |                       |                 |
| P O N D N U M B E R 1 | S.W. UNDERDRAIN | 4"                            |                    |                |                        |                       |                 |
|                       | POND CONTENTS   | 4'8"                          |                    |                |                        |                       |                 |
|                       | N.E. UNDERDRAIN | 5"                            |                    |                |                        |                       |                 |
|                       | N.M. UNDERDRAIN | 15"                           |                    |                |                        |                       |                 |
| P O N D N U M B E R 4 | N.W. UNDERDRAIN | 9"                            |                    |                |                        |                       |                 |
|                       | S.E. UNDERDRAIN | 16"                           |                    |                |                        |                       |                 |
|                       | S.M. UNDERDRAIN | 8"                            |                    |                |                        |                       |                 |
|                       | S.W. UNDERDRAIN | 4"                            |                    |                |                        |                       |                 |

DATE: 10/14/00

REMARKS:

ACTION LIMIT EXCEEDED? \_\_\_\_\_

SAMPLER/ANALYST: MAT 104

04-Oct-00  
SM/LG

|                      | <u>Alk</u> | <u>Cl</u> | <u>Cond</u> | <u>SO<sub>4</sub></u> | <u>Na</u> |
|----------------------|------------|-----------|-------------|-----------------------|-----------|
|                      | mg/L       | mg/L      | µmhos       | mg/L                  | mg/L      |
| <b>Pond #3</b>       | 470        | 5,657     | 16,300      | 782                   | 3,213     |
| <b>SM Underdrain</b> |            |           |             |                       |           |

**CROW BUTTE PROJECT  
WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS**

| COMMERCIAL PONDS  |                 | UNDERDRAIN WATER DEPTH-INCHES | INSTRUMENT READING | TEMPERATURE °C | TEMPERATURE CORRECTION | CONDUCTIVITY umhos/cm | LAB MEASUREMENT |
|---|-----------------|-------------------------------|--------------------|----------------|------------------------|-----------------------|-----------------|
| N<br>O<br>R<br>T<br>H<br><br>P<br>O<br>N<br>D<br><br>1      | POND CONTENTS   | 8'6"                          |                    |                |                        |                       | 91,500          |
|   | N.E. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|   | N.M. UNDERDRAIN | 1"                            |                    |                |                        |                       |                 |
|   | N.W. UNDERDRAIN | 3"                            |                    |                |                        |                       |                 |
|   | S.E. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|   | S.M. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|   | S.W. UNDERDRAIN | 3"                            |                    |                |                        |                       |                 |
| S<br>O<br>U<br>T<br>H<br><br>P<br>O<br>N<br>D<br><br>3      | POND CONTENTS   | 8'4"                          |                    |                |                        |                       | 105,800         |
|   | N.E. UNDERDRAIN | 6"                            | 500                | 17°            | 1.18                   | 590                   |                 |
|   | N.M. UNDERDRAIN | 9"                            | 700                | 13°            | 1.30                   | 910                   |                 |
|   | N.W. UNDERDRAIN | 3"                            |                    |                |                        |                       |                 |
|   | S.E. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|   | S.M. UNDERDRAIN | 5"                            | 7000               | 15°            | 1.24                   | 8680                  | 15,810.         |
|   | S.W. UNDERDRAIN | 9"                            | 500                | 18°            | 1.15                   | 575                   |                 |
| P<br>O<br>N<br>D<br><br>N<br>U<br>M<br>B<br>E<br>R<br><br>4 | POND CONTENTS   | 4'8"                          |                    |                |                        |                       | 139,300         |
|   | N.E. UNDERDRAIN | 9"                            | 2000               | 12°            | 1.33                   | 2660                  |                 |
|   | N.M. UNDERDRAIN | 14"                           | 2000               | 14°            | 1.27                   | 2540                  |                 |
|   | N.W. UNDERDRAIN | 9"                            | 14000              | 13°            | 1.30                   | 18200                 |                 |
|   | S.E. UNDERDRAIN | 16"                           | 11000              | 11°            | 1.37                   | 15070                 |                 |
|   | S.M. UNDERDRAIN | 7"                            | 1500               | 13°            | 1.3                    | 1950                  |                 |
|   | S.W. UNDERDRAIN | 4"                            |                    |                |                        |                       |                 |

DATE: 10/11/00

REMARKS:

ACTION LIMIT EXCEEDED? \_\_\_\_\_

SAMPLER/ANALYST: MAT

11-Oct-00  
SM/LG

|  | <u>Alk</u> | <u>Cl</u> | <u>Cond</u> | <u>SO<sub>4</sub></u> | <u>Na</u> |
|--|------------|-----------|-------------|-----------------------|-----------|
|  | mg/L       | mg/L      | μmhos       | mg/L                  | mg/L      |
| <b>Pond #3</b><br><b>SM Underdrain</b> | 450        | 4,677     | 15,810      | 794                   | 3,129     |

**CROW BUTTE PROJECT  
WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS**

| COMMERCIAL PONDS  |                 | UNDERDRAIN WATER DEPTH-INCHES | INSTRUMENT READING | TEMPERATURE °C | TEMPERATURE CORRECTION | CONDUCTIVITY umhos/cm | LAB MEASUREMENT |
|---|-----------------|-------------------------------|--------------------|----------------|------------------------|-----------------------|-----------------|
| N<br>O<br>R<br>T<br>H<br><br>P<br>O<br>N<br>D<br><br>1      | POND CONTENTS   | 8'7"                          |                    |                |                        |                       | 80,900          |
|   | N.E. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|   | N.M. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|   | N.W. UNDERDRAIN | 3"                            |                    |                |                        |                       |                 |
|   | S.E. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|   | S.M. UNDERDRAIN | 0"                            |                    |                |                        |                       |                 |
|   | S.W. UNDERDRAIN | 4"                            |                    |                |                        |                       |                 |
| S<br>O<br>U<br>T<br>H<br><br>P<br>O<br>N<br>D<br><br>3      | POND CONTENTS   | 8'4"                          |                    |                |                        |                       | 105,700         |
|   | N.E. UNDERDRAIN | 6"                            | 400                | 18°            | 1.15                   | 460                   |                 |
|   | N.M. UNDERDRAIN | 8"                            | 600                | 16°            | 1.21                   | <del>720</del>        |                 |
|   | N.W. UNDERDRAIN | 3"                            |                    |                |                        |                       |                 |
|   | S.E. UNDERDRAIN | 0"                            | <del>3000</del>    |                |                        |                       |                 |
|   | S.M. UNDERDRAIN | 5"                            | 3000               | 12°            | 1.33                   | 3990                  | 8,240           |
|   | S.W. UNDERDRAIN | 9"                            | 500                | 17°            | 1.18                   | 590                   |                 |
| P<br>O<br>N<br>D<br><br>N<br>U<br>M<br>B<br>E<br>R<br><br>4 | POND CONTENTS   | 4'7"                          |                    |                |                        |                       | 139,700         |
|   | N.E. UNDERDRAIN | 9"                            | 2000               | 16°            | 1.21                   | 2420                  |                 |
|   | N.M. UNDERDRAIN | 13"                           | 1900               | 13°            | 1.30                   | 2470                  |                 |
|   | N.W. UNDERDRAIN | 9"                            | 14000              | 13°            | 1.30                   | 18200                 |                 |
|   | S.E. UNDERDRAIN | 15"                           | 11000              | 13°            | 1.13                   | 12430                 |                 |
|   | S.M. UNDERDRAIN | 7"                            | 1200               | 20°            | 1.11                   | 1332                  |                 |
|   | S.W. UNDERDRAIN | 4"                            |                    |                |                        |                       |                 |

DATE: 10/18  
 ACTION LIMIT EXCEEDED? \_\_\_\_\_  
 SAMPLER/ANALYST: Mat

REMARKS:

18-Oct-00  
SM/LG

|  | <u>Alk</u> | <u>Cl</u> | <u>Cond</u> | <u>SO<sub>4</sub></u> | <u>Na</u> |
|--|------------|-----------|-------------|-----------------------|-----------|
|  | mg/L       | mg/L      | μmhos       | mg/L                  | mg/L      |
| <b>Pond #3</b><br><b>SM Underdrain</b> | 365        | 2,413     | 8,240       | 377                   | 1,562     |



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**Attachment 2**

**Pond Monitor Well CPM-1 and CPM-2 Analysis**

27-Sep-00  
SM/LG

|                                       | <u>Alk</u> | <u>Cl</u> | <u>Cond</u> | <u>SO<sub>4</sub></u> | <u>Na</u> |
|---------------------------------------|------------|-----------|-------------|-----------------------|-----------|
|                                       | mg/L       | mg/L      | umhos       | mg/L                  | mg/L      |
| <b>Commercial Pond<br/>Monitor #1</b> | 200        | 2.1       | 426         | 12                    | 14        |
| <b>Commercial Pond<br/>Monitor #2</b> | 190        | 3.6       | 418         | 12                    | 14        |



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**Attachment 3**

**Commercial Pond Inspection Forms**

CROW BUTTE MINE

COMMERCIAL POND INSPECTION FORM

For The Week OF 9-17-02 through 9-23-02

CHECK ACCORDINGLY: | = OK X = NEEDS ATTENTION OR REPAIRS

| LOCATION                    | FREQUENCY | SUN  | MON  | TUE  | WED                  | THU  | FRI  | SAT  |
|-----------------------------|-----------|------|------|------|----------------------|------|------|------|
| POND 1-DEPTH                | Daily     | 8'1" | 8'1" | 8'1" | 8'2"                 | 8'2" | 8'2" | 8'2" |
| EMBANKMENTS                 | Daily     | ✓    | ✓    | ✓    | ✓                    | ✓    | ✓    | ✓    |
| N.E. UNDERDRAIN             | Weekly    |      |      |      | 0"                   |      |      |      |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 1"                   |      |      |      |
| N.W. UNDERDRAIN             | Weekly    |      |      |      | 3"                   |      |      |      |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 1"                   |      |      |      |
| S.M. UNDERDRAIN             | Weekly    |      |      |      | 0"                   |      |      |      |
| S.W. UNDERDRAIN             | Weekly    | 4"   | 4"   | 3"   | 3"                   | 3"   | 3"   | 3"   |
| POND 3-DEPTH                | Daily     | 8'2" | 8'2" | 8'2" | 8'4"                 | 8'4" | 8'3" | 8'3" |
| EMBANKMENTS                 | Daily     | ✓    | ✓    | ✓    | ✓                    | ✓    | ✓    | ✓    |
| N.E. UNDERDRAIN             | Weekly    |      |      |      | 6"                   |      |      |      |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 8"                   |      |      |      |
| N.W. UNDERDRAIN             | Weekly    |      |      |      | 3"                   |      |      |      |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 0"                   |      |      |      |
| S.M. UNDERDRAIN             | Weekly    | 5"   | 5"   | 5"   | 5"                   | 5    | 6"   | 6"   |
| S.W. UNDERDRAIN             | Weekly    |      |      |      | 9"                   |      |      |      |
| POND 4-DEPTH                | Daily     | 4'7" | 4'9" | 4'9" | <del>4'5"</del> 4'5" |      | 4'7" | 4'9" |
| EMBANKMENTS                 | Daily     | ✓    | ✓    | ✓    | ✓                    | ✓    | ✓    | ✓    |
| N.E. UNDERDRAIN             | Weekly    | 7"   | 7"   | 8"   | 8"                   | 8"   | 10"  | 10"  |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 14"                  |      |      |      |
| N.W. UNDERDRAIN             | Weekly    | 7"   | 8"   | 8"   | 8"                   | 8"   | 10"  | 10"  |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 16"                  |      |      |      |
| S.M. UNDERDRAIN             | Weekly    |      |      |      | 9"                   |      |      |      |
| S.W. UNDERDRAIN             | Weekly    |      |      |      | 5"                   |      |      |      |
| INSPECTED INLET PIPING      | Weekly    |      |      |      | ✓                    |      |      |      |
| PERIMETER FENCE             | Weekly    |      |      |      | ✓                    |      |      |      |
| INSPECTED LINERS            | Weekly    |      |      |      |                      |      |      |      |
| INSPECTED DIVERSION DITCHES | Monthly   |      |      |      |                      |      |      |      |
| INSPECTED WASTE PIPELINE    | Monthly   |      |      |      |                      |      |      |      |
| OTHER (EXPLAIN BELOW)       |           |      |      |      |                      |      |      |      |
| INSPECTOR INITIAL HERE ▶    |           | JC   | Q    | Q    | MAT                  | Q    | MAT  | JC   |

COMMENTS: Pumped Pond #3 South Middle underdrain out Friday

CROW BUTTE MINE

COMMERCIAL POND INSPECTION FORM

For The Week OF 9-24-00 through 9-30-00

CHECK ACCORDINGLY: =OK =NEEDS ATTENTION OR REPAIRS

| LOCATION                    | FREQUENCY | SUN  | MON  | TUE  | WED  | THU  | FRI  | SAT  |
|-----------------------------|-----------|------|------|------|------|------|------|------|
| POND 1-DEPTH                | Daily     | 8'2" | 8'2" | 8'2" | 8'5" | 8'5" | 8'5" | 8'5" |
| EMBANKMENTS                 | Daily     | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    |
| N.E. UNDERDRAIN             | Weekly    |      |      |      | 1"   |      | ✓    |      |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 1"   |      |      |      |
| N.W. UNDERDRAIN             | Weekly    |      |      |      | 3"   |      |      |      |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 0"   |      |      |      |
| S.M. UNDERDRAIN             | Weekly    |      |      |      | 0"   |      |      |      |
| S.W. UNDERDRAIN             | Weekly    | 3"   |      |      | 3"   |      |      |      |
| POND 3-DEPTH                | Daily     | 8'3" | 8'3" | 8'4" | 8'3" | 8'3" | 8'3" | 8'3" |
| EMBANKMENTS                 | Daily     | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    |
| N.E. UNDERDRAIN             | Weekly    |      |      |      | 7"   |      |      |      |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| N.W. UNDERDRAIN             | Weekly    |      |      |      | 3"   |      |      |      |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 1"   |      |      |      |
| S.M. UNDERDRAIN             | Weekly    | 6"   | 6"   | 7"   | 6"   | 6"   | 6"   | 6"   |
| S.W. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| POND 4-DEPTH                | Daily     | 4'7" | 4'7" | 4'8" | 4'8" | 4'8" | 4'8" | 4'8" |
| EMBANKMENTS                 | Daily     | ✓    |      | ✓    | ✓    | ✓    | ✓    | ✓    |
| N.E. UNDERDRAIN             | Weekly    | 10"  |      |      | 8"   |      |      |      |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 14"  |      |      |      |
| N.W. UNDERDRAIN             | Weekly    | 10"  |      |      | 9"   |      |      |      |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 15"  |      |      |      |
| S.M. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| S.W. UNDERDRAIN             | Weekly    |      |      |      | 4"   |      |      |      |
| INSPECTED INLET PIPING      | Weekly    |      |      |      | ✓    |      |      |      |
| PERIMETER FENCE             | Weekly    |      |      |      | ✓    |      |      |      |
| INSPECTED LINERS            | Weekly    |      |      |      | ✓    |      |      |      |
| INSPECTED DIVERSION DITCHES | Monthly   |      |      |      | ✓    |      |      |      |
| INSPECTED WASTE PIPELINE    | Monthly   |      |      |      | ✓    |      |      |      |
| OTHER (EXPLAIN BELOW)       |           |      |      |      |      |      |      |      |
| INSPECTOR INITIAL HERE ▶    |           | PC   | Bl   | Bl   | Mat  | Bl   | Bl   | PC   |

COMMENTS: Discontinue Daily Depth on Pond # 1 SW & Pond # 4 NE-NW They have returned to Weekly Inspections as per M.G.  
 -Pumped underdrains on Pond #4-SM and #3-SM.

CROW BUTTE MINE

COMMERCIAL POND INSPECTION FORM

For The Week OF 10-1-00 through 10-7-00

CHECK ACCORDINGLY: 1=OK X=NEEDS ATTENTION OR REPAIRS

| LOCATION                    | FREQUENCY | SUN  | MON  | TUE  | WED  | THU  | FRI  | SAT  |
|-----------------------------|-----------|------|------|------|------|------|------|------|
| POND 1-DEPTH                | Daily     | 8'5" | 8'5" | 8'5" | 8'5" | 8'5" | 8'5" | 8'6" |
| EMBANKMENTS                 | Daily     | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    |
| N.E. UNDERDRAIN             | Weekly    |      |      |      | 0    |      |      |      |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 0    |      |      |      |
| N.W. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 0    |      |      |      |
| S.M. UNDERDRAIN             | Weekly    |      |      |      | 0    |      |      |      |
| S.W. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| POND 3-DEPTH                | Daily     | 8'3" | 8'3" | 8'3" | 8'4" | 8'3" | 8'3" | 8'2" |
| EMBANKMENTS                 | Daily     | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    |
| N.E. UNDERDRAIN             | Weekly    |      |      |      | 5"   |      |      |      |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| N.W. UNDERDRAIN             | Weekly    |      |      |      | 3'   |      |      |      |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 1"   |      |      |      |
| S.M. UNDERDRAIN             | Weekly    | 6"   | 6"   | 6"   | 6"   | 6"   | 6"   | 6"   |
| S.W. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| POND 4-DEPTH                | Daily     | 4'8" | 4'8" | 4'8" | 4'8" | 4'8" | 4'8" | 4'8" |
| EMBANKMENTS                 | Daily     | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    |
| N.E. UNDERDRAIN             | Weekly    |      |      |      | 8"   |      |      |      |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 15"  |      |      |      |
| N.W. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 16"  |      |      |      |
| S.M. UNDERDRAIN             | Weekly    |      |      |      | 8"   |      |      |      |
| S.W. UNDERDRAIN             | Weekly    |      |      |      | 4"   |      |      |      |
| INSPECTED INLET PIPING      | Weekly    |      |      |      | ✓    |      |      |      |
| PERIMETER FENCE             | Weekly    |      |      |      | ✓    |      |      |      |
| INSPECTED LINERS            | Weekly    |      |      |      | ✓    |      |      |      |
| INSPECTED DIVERSION DITCHES | Monthly   |      |      |      |      |      |      |      |
| INSPECTED WASTE PIPELINE    | Monthly   |      |      |      |      |      |      |      |
| OTHER (EXPLAIN BELOW)       |           |      |      |      |      |      |      |      |
| INSPECTOR INITIAL HERE ▶    |           | TC   | BL   | BL   | Mat  | Mat  | BL   | van  |

COMMENTS:

CROW BUTTE MINE

COMMERCIAL POND INSPECTION FORM

For The Week Of 8 Oct '00 through 14 Oct '00

CHECK ACCORDINGLY: | = OK X = NEEDS ATTENTION OR REPAIRS

| LOCATION                    | FREQUENCY | SUN  | MON  | TUE  | WED  | THU  | FRI  | SAT  |
|-----------------------------|-----------|------|------|------|------|------|------|------|
| POND 1-DEPTH                | Daily     | 8'6" | 8'4" | 8'5" | 8'6" | 8'6" | 8'6" | 8'6" |
| EMBANKMENTS                 | Daily     | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    |
| N.E. UNDERDRAIN             | Weekly    |      |      |      | 0"   |      |      |      |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 1"   |      |      |      |
| N.W. UNDERDRAIN             | Weekly    |      |      |      | 3"   |      |      |      |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 0"   |      |      |      |
| S.M. UNDERDRAIN             | Weekly    |      |      |      | 0"   |      |      |      |
| S.W. UNDERDRAIN             | Weekly    |      |      |      | 3"   |      |      |      |
| POND 3-DEPTH                | Daily     | 8'2" | 8'2" | 8'2" | 8'4" | 8'4" | 8'4" | 8'2" |
| EMBANKMENTS                 | Daily     | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    |
| N.E. UNDERDRAIN             | Weekly    |      |      |      | 6"   |      |      |      |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| N.W. UNDERDRAIN             | Weekly    |      |      |      | 3"   |      |      |      |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 0"   |      |      |      |
| S.M. UNDERDRAIN             | Weekly    | 6"   | 6"   | 6"   | 5"   | 6"   | 6"   | 6"   |
| S.W. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| POND 4-DEPTH                | Daily     | 4'8" | 4'7" | 4'7" | 4'8" | 4'8" | 4'8" | 4'8" |
| EMBANKMENTS                 | Daily     | ✓    | ✓    | ✓    | ✓    | ✓    |      | ✓    |
| N.E. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| N.M. UNDERDRAIN             | Weekly    |      |      |      | 14"  |      |      |      |
| N.W. UNDERDRAIN             | Weekly    |      |      |      | 9"   |      |      |      |
| S.E. UNDERDRAIN             | Weekly    |      |      |      | 16"  |      |      |      |
| S.M. UNDERDRAIN             | Weekly    |      |      |      | 7"   |      |      |      |
| S.W. UNDERDRAIN             | Weekly    |      |      |      | 4"   |      |      |      |
| INSPECTED INLET PIPING      | Weekly    |      |      |      | ✓    |      |      |      |
| PERIMETER FENCE             | Weekly    |      |      |      | ✓    |      |      |      |
| INSPECTED LINERS            | Weekly    |      |      |      | ✓    |      |      |      |
| INSPECTED DIVERSION DITCHES | Monthly   |      |      |      |      |      |      |      |
| INSPECTED WASTE PIPELINE    | Monthly   |      |      |      |      |      |      |      |
| OTHER (EXPLAIN BELOW)       |           |      |      |      |      |      |      |      |
| INSPECTOR INITIAL HERE ▶    |           | JE   | MAT  | BL   | MAT  | MAT  | EL   | um   |

COMMENTS: Flushed & Pumped Pond #3 SM Underdrain on Thursday 10/12



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**Attachment 4**

**Pond 3 South Middle Underdrain  
Monitoring Data Chart**

### Pond 3 South Middle Underdrain Analytical Results

