

**CROW BUTTE RESOURCES, INC.**

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



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October 23, 2003

Mr. Gary Janosko  
Branch Chief  
Fuel Cycle Licensing Branch  
Division of Fuel Cycle Safety and Safeguards  
c/o Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington D.C. 20555

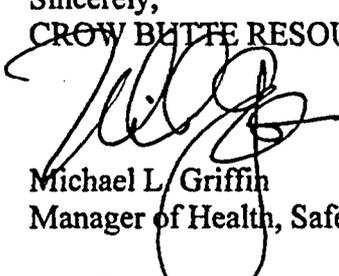
Subject: 2003 Annual Pond Inspection Report  
Source Materials License SUA-1534  
Docket Number 40-8943

Dear Mr. Janosko:

Enclosed please find an original certified copy of the Crow Butte Mine 2003 Annual Pond Inspection Report. This report is required under License Condition 11.4 of Source Materials License SUA-1534 in accordance with the latest revision of the Evaporation Pond Inspection Program dated February 5, 1996. Mr. David Coe, an independent contractor and a registered Professional Engineer in the State of Nebraska, performed the pond inspection and the technical evaluation, and wrote the final report. Civil surveys were performed by Pine Ridge Land Surveys of Chadron, Nebraska.

If you have any questions, please feel free to contact me at (308) 665-2215.

Sincerely,  
CROW BUTTE RESOURCES, INC.

  
Michael L. Griffin  
Manager of Health, Safety, and Environmental Affairs

Attachments: As Stated

NIMSS01

**CROW BUTTE RESOURCES, INC.**

**86 Crow Butte Road  
P.O. Box 169  
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cc: U.S. Nuclear Regulatory Commission  
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Fuel Cycle Licensing Branch  
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Mr. David Miesbach  
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Mr. Steve Magnuson – CBR, Denver

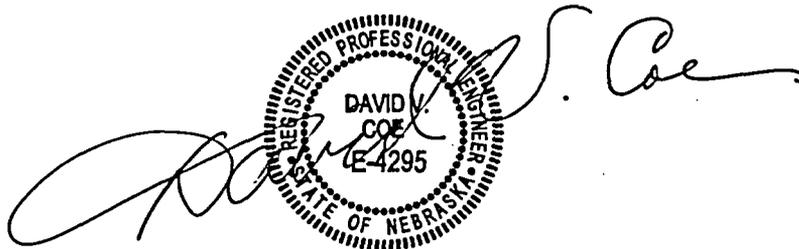
**CROW BUTTE RESOURCES, INC.**

**CROW BUTTE MINE  
DAWES COUNTY, NEBRASKA**

**2003 POND INSPECTION REPORT**

**By: David V. Coe, PE  
Nebraska Registration No. E - 4295**

October 20, 2003


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## **1.0 GENERAL:**

An annual inspection of the Crow Butte ISL Mine pond system is required by the Evaporation Pond Onsite Inspection Program dated December 1992 (Revised February 26, 1993, August 30, 1993 and February 5, 1996) and by reference under license condition number 11.4 of SUA-1534. The inspection program provides for systematic inspections and an annual technical evaluation and inspection report which compares field inspection data with engineering design reports to assess structural stability and hydraulic and hydrologic capacities.

The 2003 annual report covers the time period of November 2, 2002 through November 1, 2003. During that period five evaporation ponds were in use, two R&D ponds (Cells 1 & 2) and three commercial ponds (Ponds 1, 3 and 4).

The R&D pond design report was prepared by Klohn Leonoff Consulting Engineers in 1983 and construction of R&D cells 1 and 2 was completed in 1985. The R&D ponds have two horizontal to one vertical interior and exterior embankment slopes with a 34 mil interior hypalon liner placed on top of six inches of sand. The underdrain leak detection system piping is located beneath the pond liner and reports to two six inch monitor stand pipes. The overall depth of the R&D ponds is 15 feet and the maximum operating level is 12 feet. This provides three feet of freeboard.

The commercial evaporation pond design report was prepared by Western Water Consultants, Inc. in 1988. Construction of ponds 3 and 4 was completed in 1990 and construction of pond 1 was completed in 1992. The exterior slopes of these ponds are 2.5 horizontal to 1 vertical. The interior slopes are 2:1. Ponds 3 and 4 have a 20 mil PVC bottom liner, an intermediate geonet and a 60 mil high density polyethylene(HDPE) top liner. In pond 1, a 30 mil very low density polyethylene(VLDPE) bottom liner was installed with an intermediate geonet and 60 mil HDPE top liner. Each pond has a leak detection system consisting of six separate perforated four inch pipes which report to leak detection standpipes located on the interior slopes.

The overall depth of Pond 1 is 17 feet from crest to pond bottom and the maximum operating level is 12 feet. The 12 feet provides five feet of freeboard. The overall depth of Ponds 3 and 4 is 17.5 feet with a maximum operating level of 12.5 feet which equates to a five foot freeboard.

## **2.0 REVIEW OF INSPECTION DATA:**

The Evaporation Pond Onsite Inspection Program dated December 1992 as amended calls for systematic inspections on a daily, weekly, monthly and quarterly basis. Data from the inspection reports are shown on Charts 1 through 4 including pond depths and underdrain measurements. Zero pond depths are shown on the charts as a result of frozen pond conditions.

Two groundwater monitor wells are installed in the uppermost aquifer (Brule) in the commercial pond area and one groundwater monitor well in the R&D pond area. The wells are sampled quarterly for indications of leaks in the ponds. The wells provide backup leak detection for the underdrain leak detection system. The analysis of the quarterly samples tracks alkalinity, chloride, sulfate, sodium and conductivity. The concentration of the above chemicals is compared to baseline data established in 1990 and 1991. A review of the quarterly analysis reports for 2003 indicates all parameters have not substantially deviated from the baseline parameters.

An elevated underdrain conductivity level was detected on the northwest monitoring tube of Pond 1 in May, 2003. The cause of the leak was a small hole in the liner caused by the apparent abrasion on the liner from the spray system. The spray system must have rubbed against the liner during windy weather. A repair of the pond liner was accomplished in June and the conductivity level reduced to an acceptable level. The monitoring tube was flushed with fresh water a couple of times after the liner was repaired. Nebraska DEQ was notified of the liner leak. The records indicate the pond liner was repaired in June, 2003.

This is the second year in a row that a leak has been detected in pond #1 and the leaks have occurred in the same vicinity (northwest corner of pond). The aeration system has been blamed for the principle cause of the leaks.

### **3.0 TECHNICAL EVALUATION**

The technical evaluation of the Crow Butte Mine ponds utilizes data from the systematic inspection reports, results of the annual survey and a visual inspection of the ponds to assess the hydraulic capacities and structural stability of the ponds.

Diary notes of the annual inspection are attached to this report as Attachment 1. The notes cover the visual inspection of the five ponds and the review of the reports and records for the review period of November, 2002 through September, 2003.

The annual survey was done in September and compared with previous annual survey data. No problems were indicated from a review of the survey information. Results of the annual survey are included in Attachment 2 and 3.

Pictures of the ponds have been taken for the last seven years. There has been significant improvement in the vegetative cover of the pond embankment slopes over the course of those years. The gravel surfacing of the embankment berms has improved the stability of the dam embankments. The gravel surfacing of the top of the berms prevents erosion and provides additional stability of the berm when vehicles travel on the berm during inclement weather. There are remaining sections of the pond's berms that could be surfaced with limestone base course.

No problems in the existing embankment alignment or sloughing were detected during the visual inspection of the ponds, diversion ditches and embankments. There were no signs of seepage in the embankments or at the toe of the embankment slopes.

A review of the weekly, monthly and quarterly inspection reports indicate there were no significant shortfalls of the pond operations during the year of 2003. All the required inspections, reports and record keeping were accomplished during 2003. The monitoring well analysis reports were taken on a quarterly basis. No significant deviation from baseline data was reported.

Calculations of diversion ditches were not included in this report, but are referenced in the previous annual reports. There have been no changes in the capacity of the diversion ditches over the last eight years. The existing ditch calculation of ditch flow can be found in Attachment 2 of the 2001 annual inspection report. These ditch calculations are also permanent records on file in the office of Crow Butte Mine. The installed ditches are capable of containing the design storm (USBR one-hour thunderstorm, zone 3) with an adequate freeboard.

The ponds have been operated at a lower level than the levels operated during 2001. The capability of transferring one pond's storage into another pond without overfilling was maintained during the 2003 year. As of October 9, 2003 the pond system contained about 65 acre-feet (AF) of stored water. The allowable storage capacity of the five ponds is 122.4 AF which provides for transfer of any one pond's storage to another pond in the system in the event of an emergency.

#### **4.0 CONCLUSIONS:**

The visual inspection of the five evaporation ponds and diversion ditches along with the review of the available inspection reports and data indicate the ponds are operating in the constraints of the engineering design.

There has been a liner leak in pond #1 the last two years. The leak has occurred in the northwest corner of the pond and the aeration system seems to be the cause of the line damage. An aeration system with a more secure anchor system may prevent future liner damage. High wind activity on this pond must cause the aeration system to drift to the northwest corner of the pond.

There was no slope instability noted during the visual inspection of the pond embankments and surrounding pond areas. Vegetation was in good shape and has improved during the last year.

The pond system is operating within its designed storage capacity. Adequate freeboard existed in each pond throughout the year and reserve capacity was available in the system to transfer the contents of any one pond to the pond system.

Diversion ditches were in good shape and are capable of containing the design flood.

The addition of gravel surfacing on the top of the embankment berms helps stabilize the embankments. Continuation of this practice would enhance the areas without gravel surfacing. Gopher and rodent maintenance should be reviewed and control of these varmints should be accomplished if dirt mounds continue to appear along the embankment slopes. A program working with the USDA animal damage control officer related to the muskrat burrows and their likely presence should be pursued.

Commercial Pond 1 - 2003 Report Period

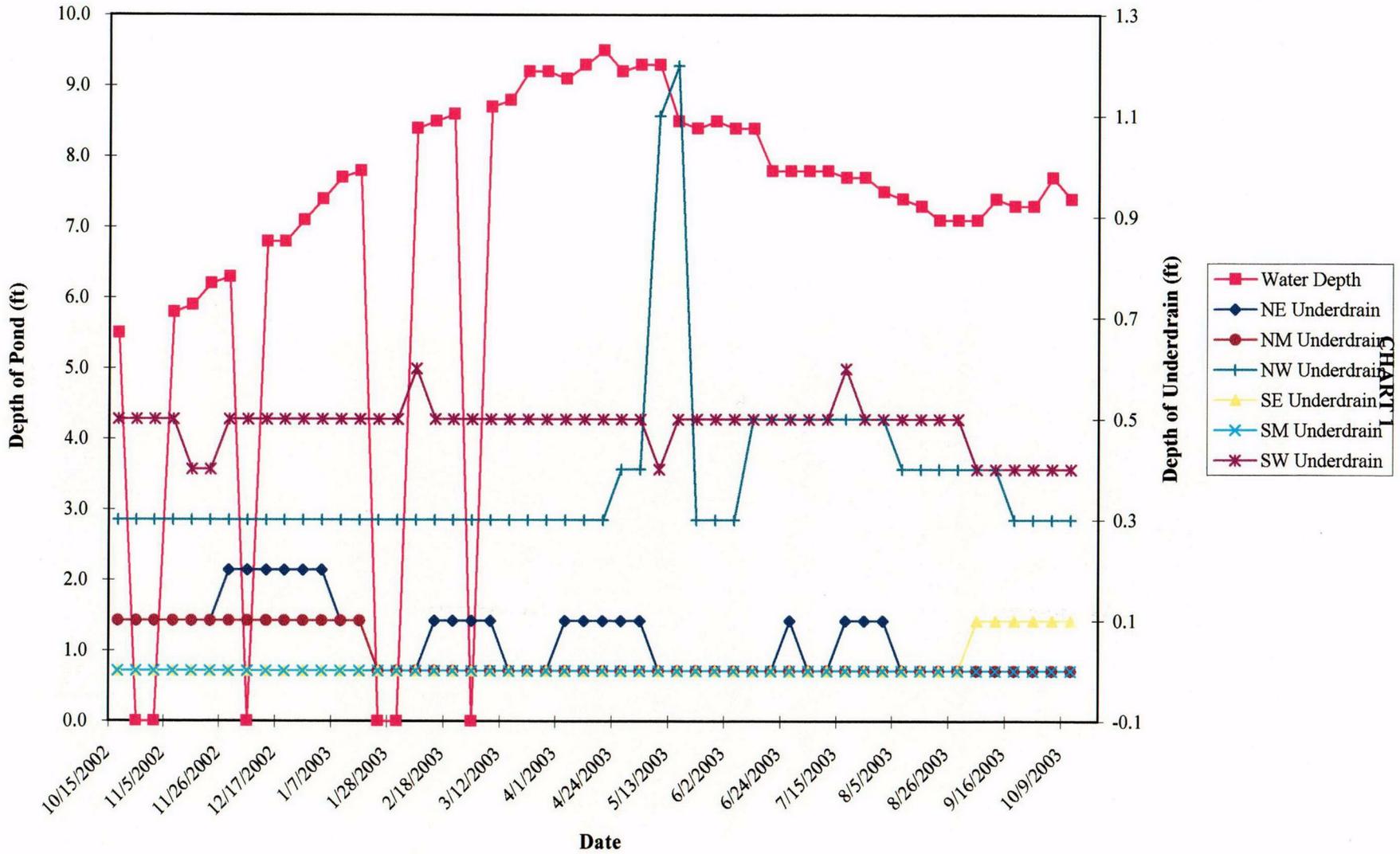


CHART 1

CHART 1

001

Commercial Pond 3 - 2003 Report Period

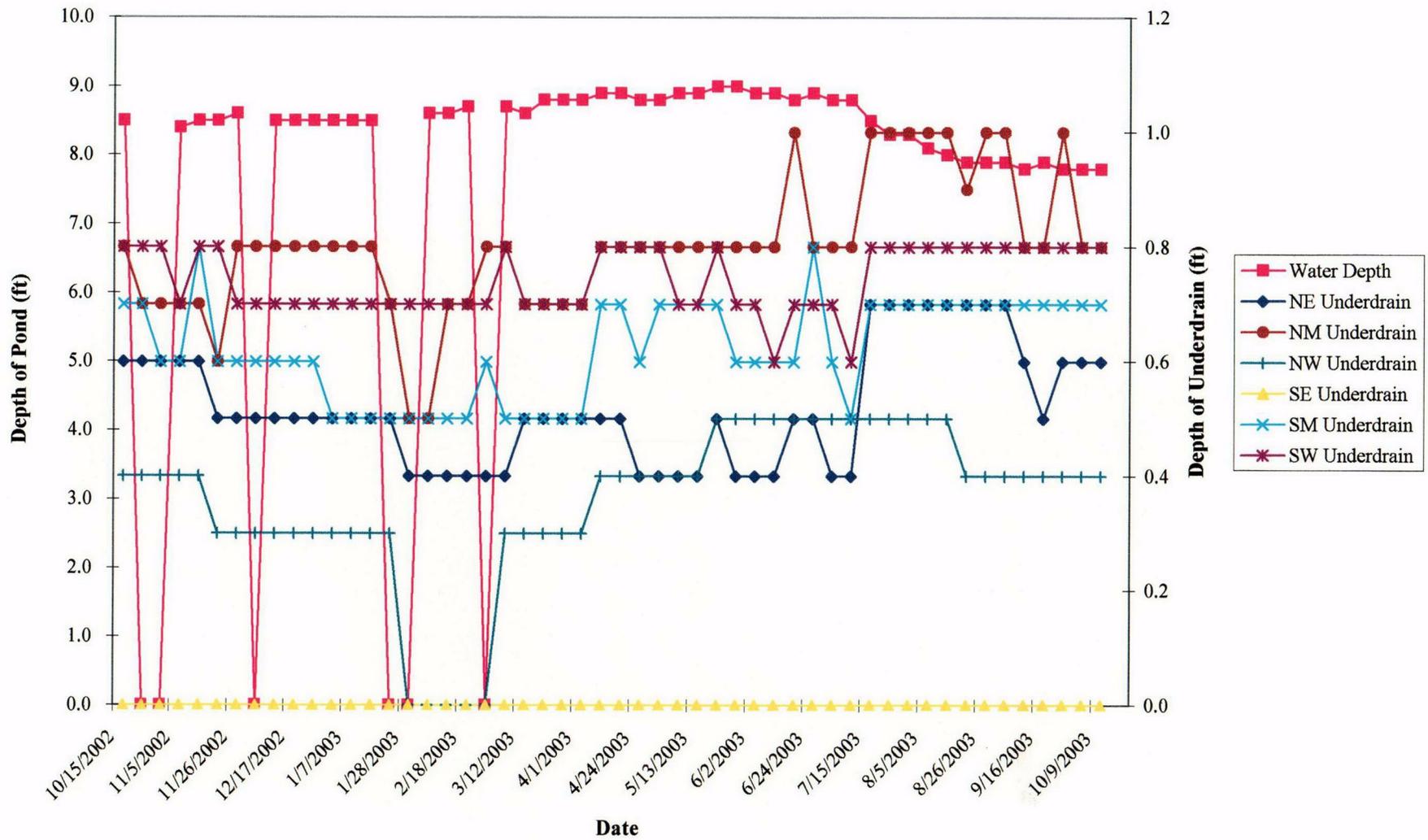


CHART 2

Commercial Pond 4 - 2003 Report Period

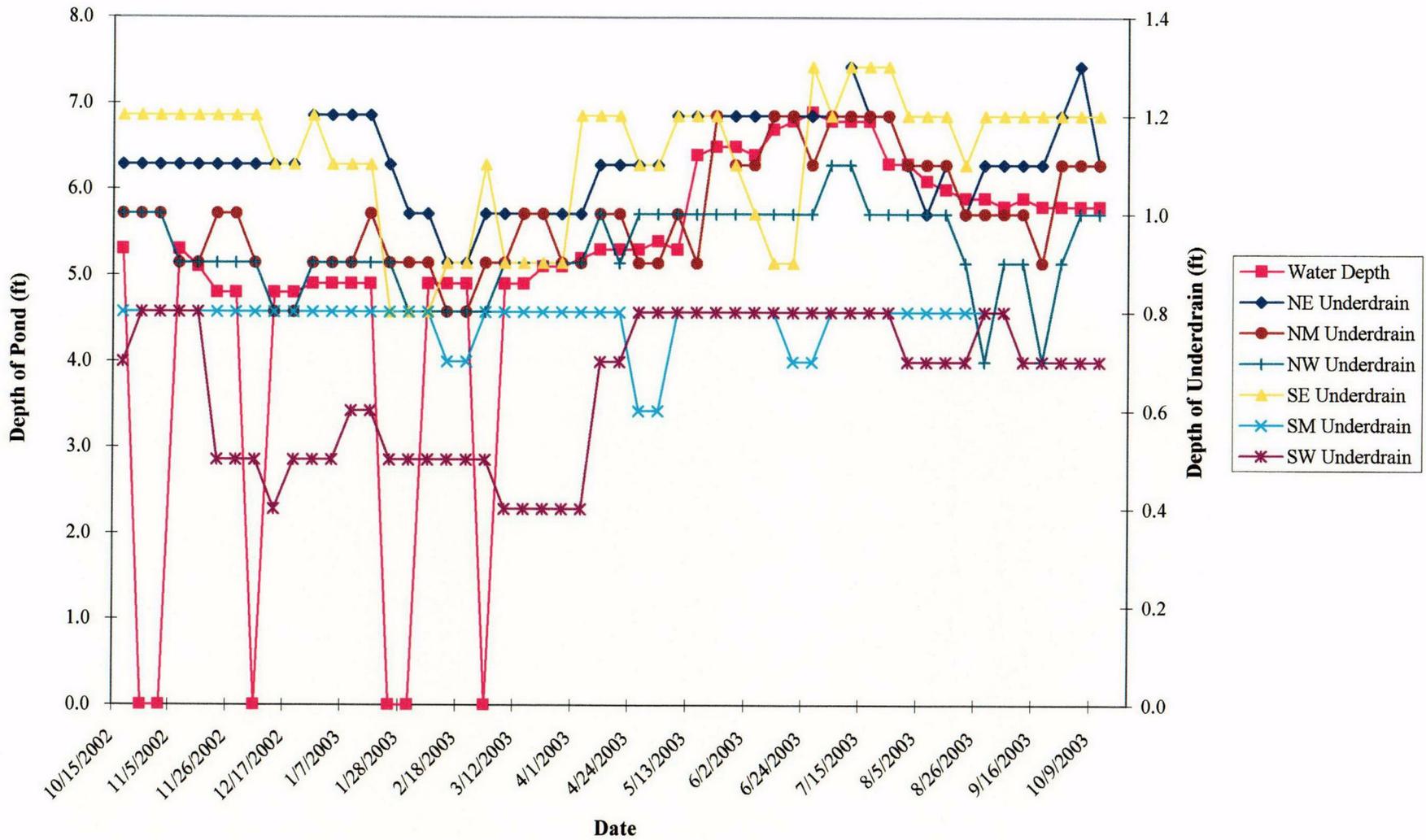


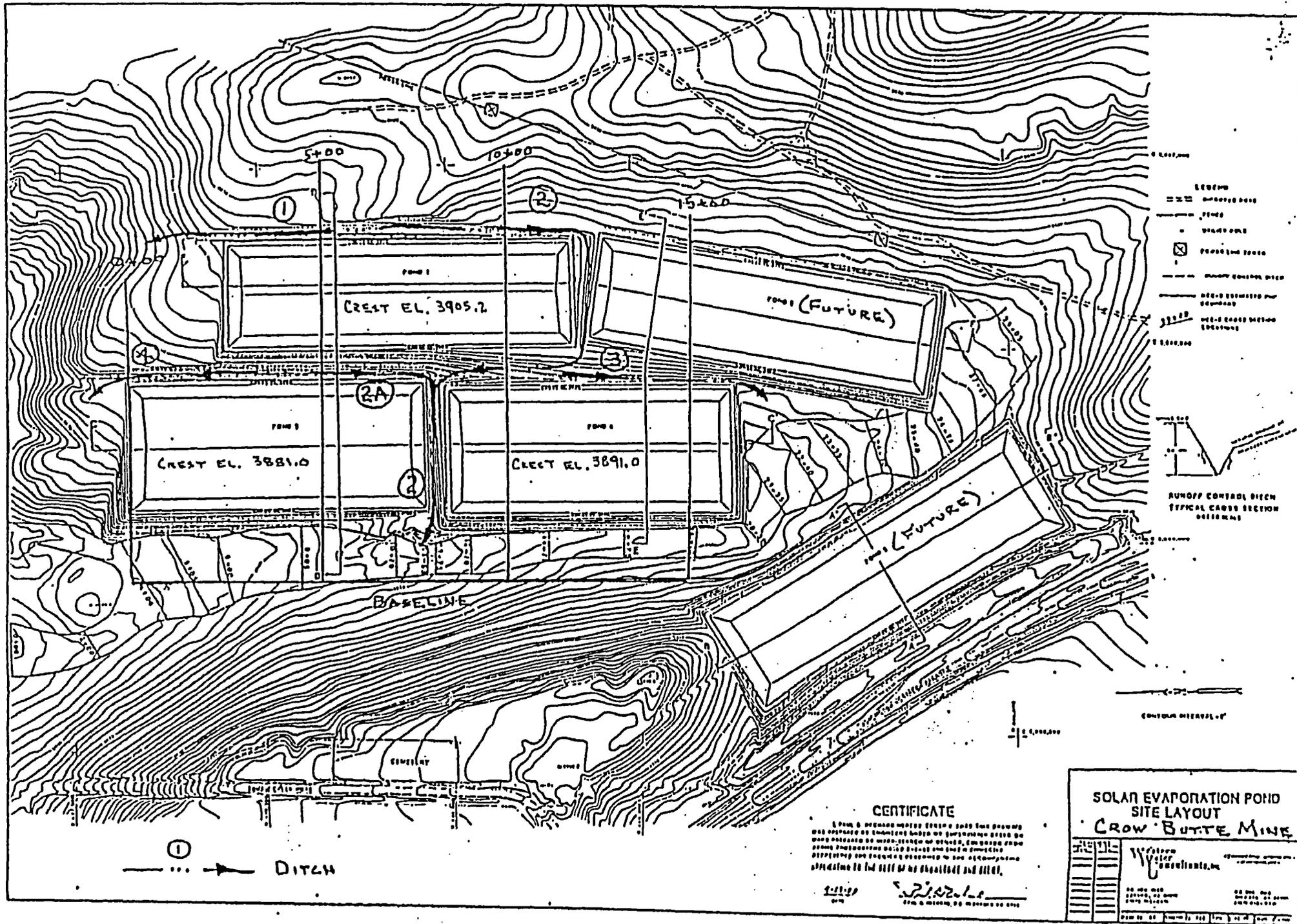
CHART 3

R & D Pond Levels - 2003 Report Period



CHART 4

Figure 1 Commerical Pond Layout





Diary notes:

October 9, 2003

By: D.V. Coe

I was contacted by Crow Butte Resources to perform an annual visual inspection of their evaporation ponds and diversion ditches. The annual inspection was to be performed by a registered professional engineer. I arrived at the site about 10:00 a.m. Mike Griffin had me sign the registration book for visitors. Mike then discussed the safety precautions required for work on Crow Butte Resources site. Mike had recently made a quarterly inspection of the five evaporation holding ponds; therefore, I made the visual inspection of the ponds by myself.

The visual inspection of the three commercial evaporation waste ponds was performed on the 9<sup>th</sup> of October, 2003. There are three commercial ponds, each having a capacity of approximately 44 acre feet of storage. Pond number 3 is located on the northwest part of the fenced in area of the commercial ponds. The liners on all three ponds appeared to be in good shape. I did not notice any significant deterioration of the liners. The liners seem to be more brittle than the liner material on the R & D ponds.

Pine Ridge Surveying had recently completed (September 25, 2003) an annual site survey of the pond areas. The survey uses the same reference points as a base line. They take off-set stations and elevation readings off the base line at 500 foot increments. I reviewed the survey notes. The present ground elevations have not changed significantly over the last five years. Plots of survey cross sections are enclosed in Attachment 3.

I stopped at the fence enclosure of the commercial evaporation ponds. The wildlife fence was hog wire, about 6 gage on 3 inch centers. The fence was six feet high. There were restrictive signs and radioactive caution signs on the fence. The signs were clearly displayed. The vehicle gate was locked with a padlock.

There were three ponds fenced inside the commercial evaporation pond area. The ponds were numbered as one, three and four. Pond number two has never been constructed, but planned for future construction if needed. Pond 1 is at the highest elevation of the site and is located on the Middle East part of the fenced area. The ponds were lined with a high density polyethylene type material.

I walked around pond number one first. The vegetation was good on the north back slope. There was a large diversion ditch on the east side of pond #1. There were signs of vehicle traffic on the bottom of the trapezoidal diversion ditch. The top of the east berm of pond 1 had limestone gravel base on the north 2/3rds of the east side and the entire north berm. The gravel surface has been added about three years ago. The depth of the gravel surfacing was nominally six inches. Each pond had three PVC tubes on each north and south interior slopes of the dam. The PVC tubes were on the underside of the HDPE liner. The purpose of the tubes was to provide for leak detection of the pond liner. The interior 1/2" tube had coaxial wires inside them to check for the conductivity of the moisture at the bottom of the inspection tubes. The inspection format also determines the depth of any moisture at the bottom of the pond between the top and bottom liner. If the depth of any moisture in the inspection tube is greater than six inches, conductivity tests are taken and recorded. The 1/2" tube with coaxial wires is moved up and down inside the four inch PVC pipe to determine the depth of the moisture at the bottom of the inspection tube.

The four inch PVC inspection tubes had caps on the top and most caps were locked.

As I walked to the south along the berm of pond 1, I noticed several <sup>burrows</sup> <sup>holes</sup> <sup>in</sup> <sup>the</sup> <sup>soil</sup> <sup>which</sup> <sup>I</sup> <sup>would</sup> <sup>assume</sup> <sup>were</sup> <sup>muskrats</sup> <sup>or</sup> <sup>gophers</sup>. I did not notice any damage of the HDPE liner resulting from rodents chewing on the liner. I did not observe any tremmie tubes attached to the influent line.

There are pumps and piping available to transfer stored water from one pond to another.

The diversion ditch flows along the east side of pond 1, then along the south side of pond 1 embankment to the west. The ditch bottom near the southwest corner had limestone rip rap to dissipate the energy of any runoff water. There was about an 8 foot drop in elevation from the diversion ditch bottom to the adjacent diversion ditch along the east side of pond 4. There has not been any appreciable erosion along the ditch bottom at the southwest corner of pond 1 since last year's inspection...

The west slope of pond #1 embankment has a good growth of vegetation.

The diversion ditch slopes to the north between ponds #1 & #4.

I walked around the other two ponds, both on the berm tops and along the toe of the fill slopes. I did not notice any signs of significant erosion, sloughing or leaking along the toe of the fills. The vegetation along the slopes of all the embankment fills was in good shape.

The diversion ditch flows between ponds 3 & 4. The ditch is heavily rip rapped on the west side of the two ponds. There is about a 10 foot drop in elevation from the toe of the slope of the two ponds and the natural drainage channel on the west side of the ponds. The natural drainage channel flows to the north along the west side of pond 3. There are existing natural erosion escarpments on the east side of the natural drainage channel; the top of these escarpments forms the toe of the slope for the embankment of pond 3. There has not been any erosion of the rip rap or drainage channels during the last year.

I noticed a dead muskrat or other type of rodent floating on the northwest water line of pond #1.

The northwest and southwest corner of pond #4 had dead vegetation accumulating at the water surface level. The vegetation along the embankments was in good condition. There has been some improvement in the vegetation during the last year. I did not notice any leaks along the toe of the embankment areas of pond number 4. The current water depth appeared to be about 5'-9". The depth markers on the north embankments were difficult for me to read.

Pond number 3 had several muskrat boring holes near the pond liners. Pond number 3 had burrow holes on the east and west embankments. The vegetation on the west embankment slope was in excellent condition. I noticed the vegetation along the embankments had been mowed this summer or fall. The primary runoff drainage channel runs along the west embankment of pond number 3. I did not notice any seepage areas along the west and north embankments at the toe of the slopes. On the northeast drainage diversion channel of pond number 3 I noticed minor surface erosion. The erosion did not appear to be from recent rain storms. There were a few areas with head cuts of about one foot in depth. The vegetation on the north embankment of pond number 3 is in good shape.

I noticed a wet area at the toe of the embankment of pond number 3. This was in the bottom of the diversion ditch between ponds 3 & 4. The wet area was in the north vehicle track. The wet area showed no signs of flowing water. I concluded the wet area was the result of a recent rain storm. The diversion ditch of the R & D ponds also had wet areas in the bottom of the channels.

There were no signs of leakage around the toe of the embankment sections.

After completing the visual inspection of the three commercial ponds; I made a visual inspection of the two Research & Development ponds. These ponds were small in comparison to the commercial evaporation ponds. The R & D ponds have a hypalon polyethylene liner which is different than the commercial pond liners. The liner seemed to be more pliable and form fitting than the liners on the commercial ponds. There were two ponds, one called east cell and one called west cell. The depth of the R & D ponds was about 12 feet. The reservoir of water in the ponds was rain water. These ponds had vertical wells adjacent to the ponds for leak detection monitoring of the pond liner. The four inch PVC casing was inside a 10" diameter steel casing with a locked cover. The vegetation over the entire fenced in area was excellent. There had been some native gravel placed on top of the berm. Vegetation had grown through the gravel surfacing, probably the result of very little activity along the surface.

The two cells of the ponds are about 150 feet square at the top. The current water depth of the east cell was 5.5 feet. The west cell had about 4.5 feet of storage water.

The diversion ditch was "V" shaped and along the southeast side of the two ponds. The R & D ponds were constructed near the top of a small ridge. There was very little drainage area draining into the fenced area of the ponds. Vegetation was growing along the bottom of the diversion ditch. The diversion ditch was lined with a PVC liner. There has been about 12 inches of sediment in the bottom of the diversion ditch for at least six years. I do not believe there is any chance of much flow being diverted around these two ponds. I did not notice any sloughing or erosion of the pond embankments.

I spent the rest of the afternoon reviewing the daily, weekly and quarterly inspection reports and records.

The first set of files I reviewed was the waste water inspection reports for commercial ponds. The reports covered the period from December 29, 2002 to September 27, 2003. The report covers the six inspection ports for each pond, the embankment areas, inlet piping, pond liners, pond storage depth and the perimeter fence. The weather is also recorded. December 27, 2002, the ponds depths were: pond 1 - 7.4 feet, pond 3 - 8.6 feet and pond 4 - 4.83 feet. By the 1<sup>st</sup> of April, the depths of pond 1 - 9.0 feet, pond 3 - 8.75 feet, pond 4 - 5.17 feet. In May there was a noticeable increase in the water depth between the pond liners of pond #1(northwest underdrain). A patch repair of pond number 1 liner was completed the first part of June. The repair corrected the leak in the liner.

The pond depths seemed to vary between five and nine feet in depth. The total depth of the ponds was 17 feet. There was sufficient free board to address draining ponds into other ponds without approaching the minimum free board of three feet.

The embankment areas were mowed the last part of August.

After 1999, tests for Radium and Uranium on the monitoring wells were not performed. This was a change in the testing requirements. The quarterly tests tracked the excursion chemicals present in the monitoring well waters. The reports also tested the conductivity of the water samples. The chemicals monitored were chloride, alkalinity, sulfate and sodium. There have not been any significant changes in the concentration of the monitored chemicals for the last 11 years. The conductivity has remained fairly constant during this the course of the monitoring.

Samples of the monitoring well reports for wells 1 & 2 and R&D well are shown below:

<u>DATE</u>	<u>Well No.</u>	<u>Alk</u>	<u>Cl</u>	<u>Conductivity</u>	<u>SO4</u>	<u>Na</u>
10/31/02	Com-1	200	1.6	430	12	15
	Com-2	190	3.3	420	12	14
	R&D	180	<1	400	7.3	15
01/15/03	Com-1	200	3.1	430	11	16
	Com-2	170	3.9	420	11	15
	R&D	175	2.7	400	11	16
05/20/03	Com-1	200	2.5	430	12	15
	Com-2	190	4.7	420	12	14
	R&D	170	1.1	400	7.1	16
07/29/03	Com-1	190	2.5	430	12	16
	Com-2	190	5.1	420	12	14
	R&D	160	2.2	390	8.6	16
02/07/91	Base-1	201	2.90	435	20.43	17.67
02/07/91	Base-2	190	3.47	440	11.33	13.37
01/15/91	Base-R&D	175	1.7	409	10.8	14.5

My opinion of the evaporation ponds is they are being administered in a safe and prudent manner. The monitoring for leaks and serious pond erosion is in compliance with the approved monitoring plan. Records of monitoring reports are in being maintained in compliance with the monitoring plan.

Photos of my inspection follow on the next five pages of this report.



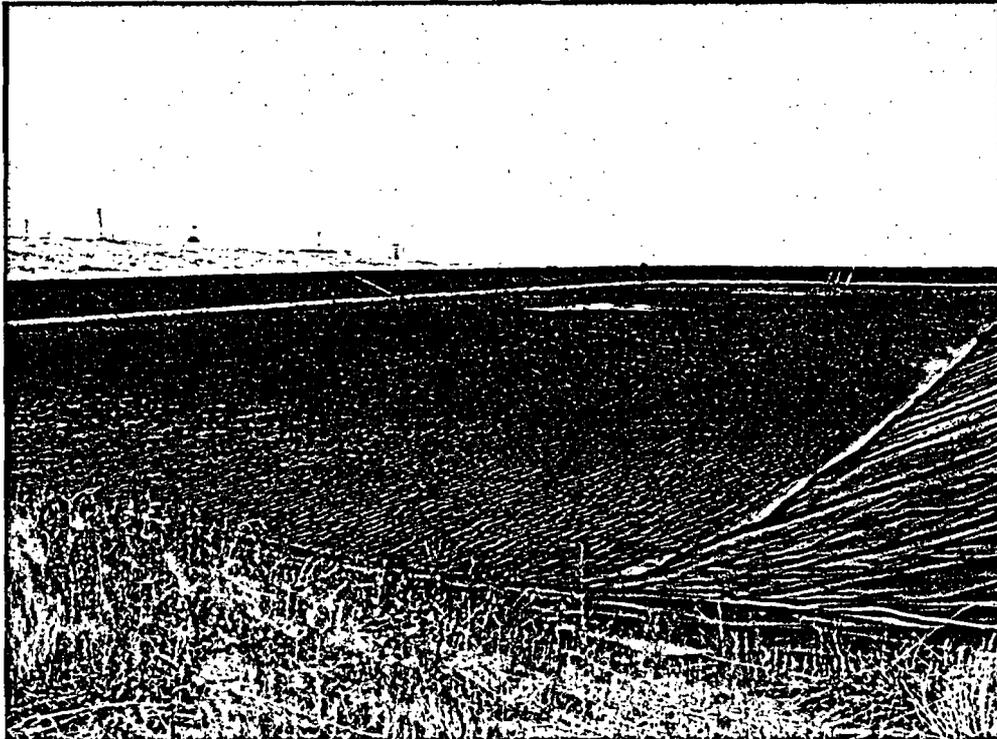
David V. Coe, PE  
Nebraska Registration # 4295



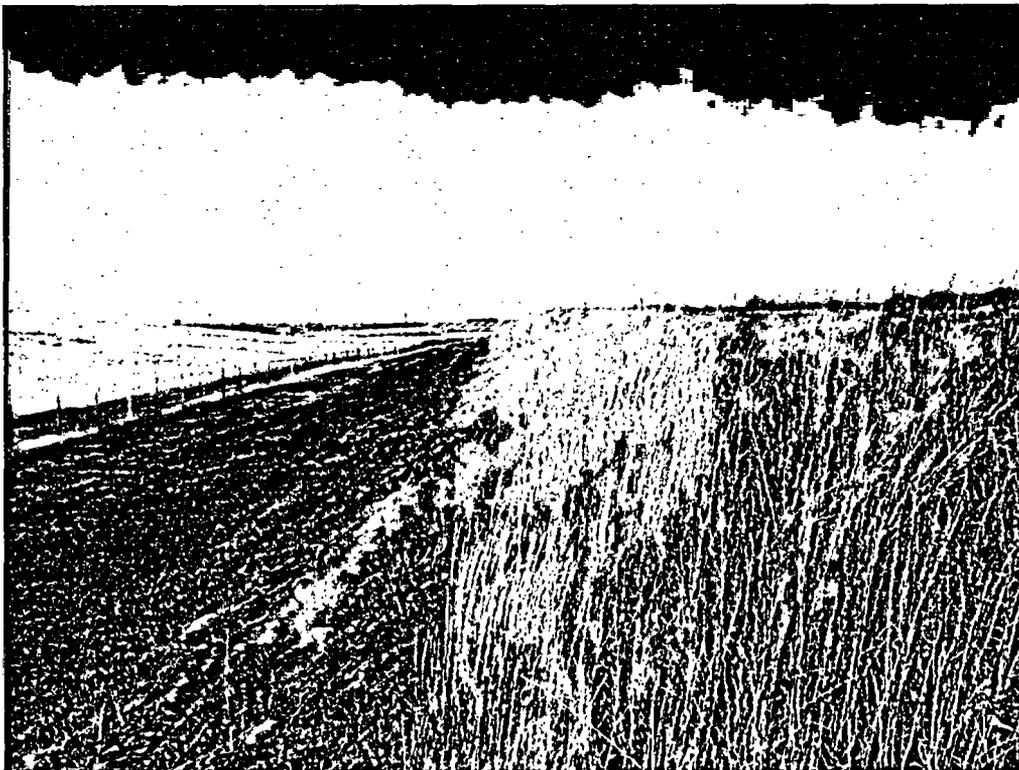
**Northwest view of evaporation pond #1, date: 10/09/03**



**Northwest corner of pond #1, dead muskrat at water edge. Date: 10/09/03**



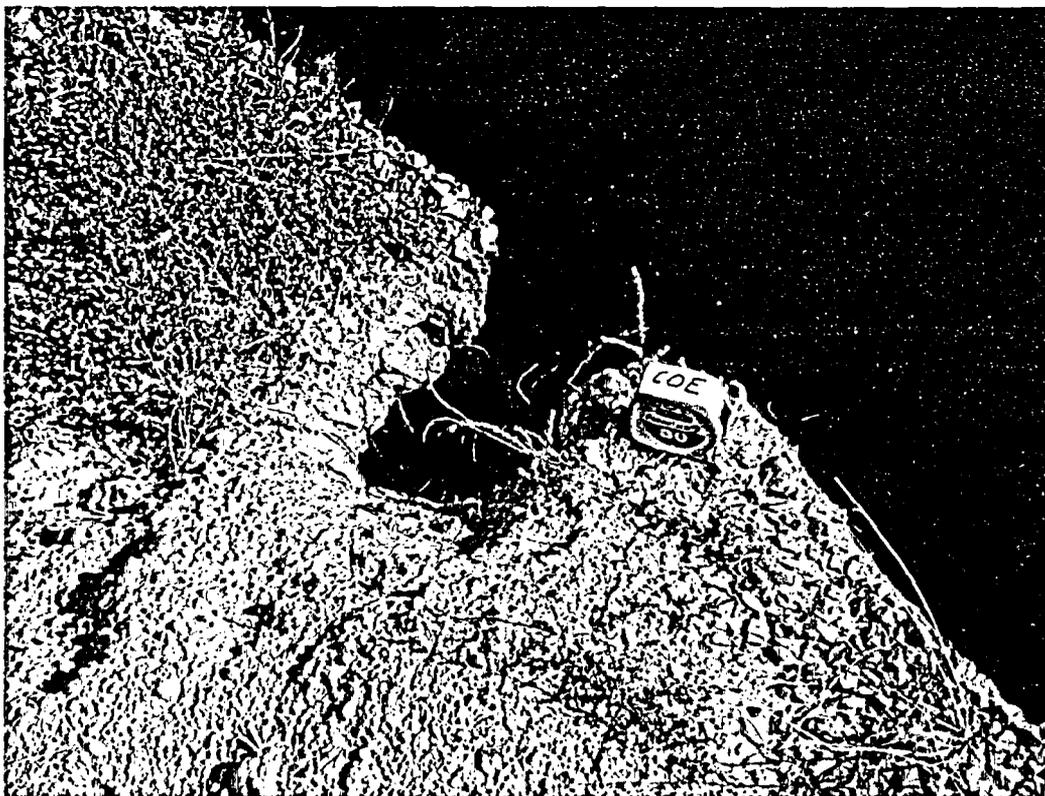
**Northwest view of pond #3. Date: 10/09/03**



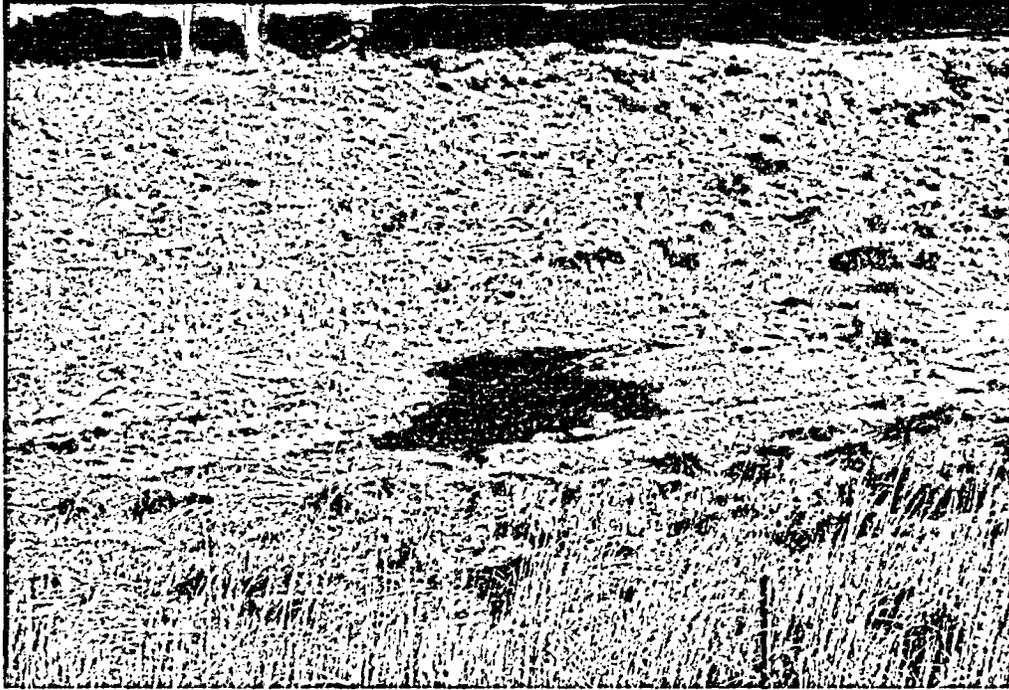
**North view of west embankment of pond #3. Date: 10/09/03**



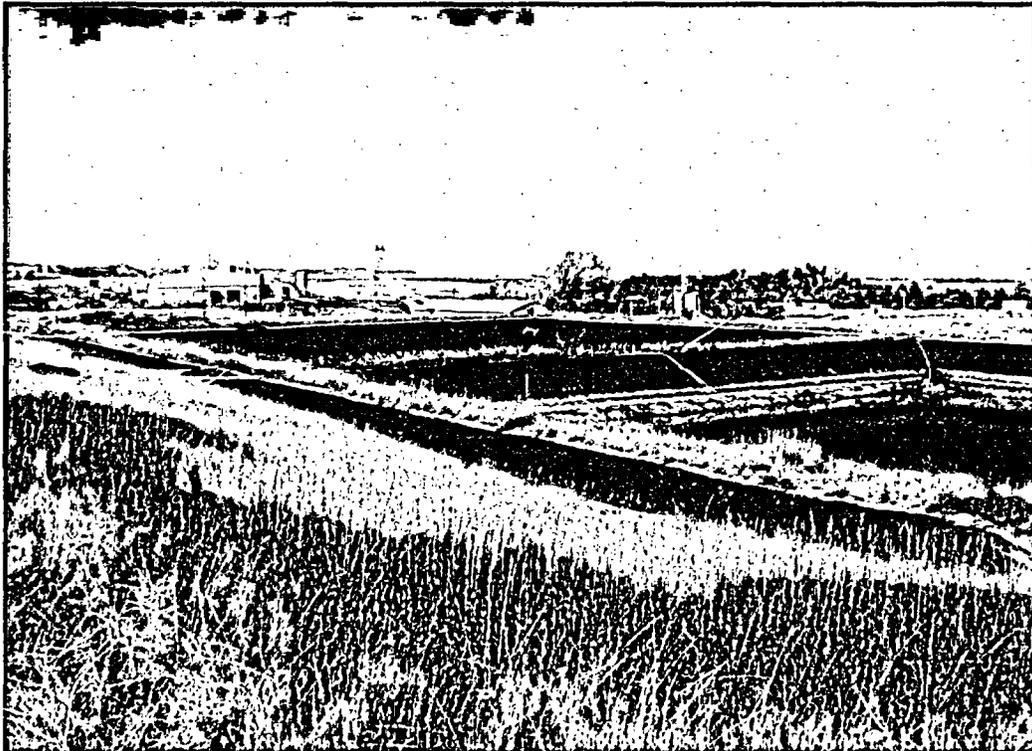
**Northwest view of pond #4. Date: 10/09/03**



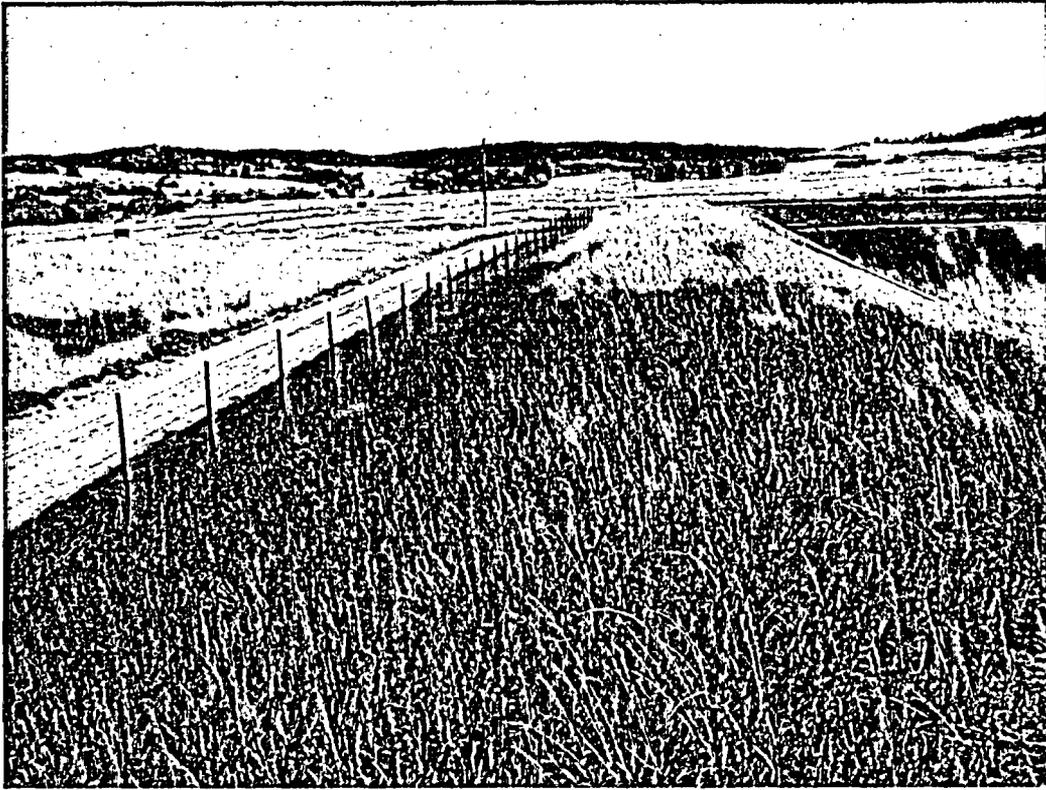
**Burrow hole of muskrat or badger adjacent to pond liner. Date: 10/09/03**



**Damp area in roadway between ponds #3 & #4. Damp area was in line with wheel way of vehicle traffic. Pond in upper part of photo is #3. Date: 10/09/03**



**Northwest view of R&D pond cells. Diversion "V" ditch on the center left of photo. Note excellent vegetation. Date: 10/09/03**



**East view of north embankment of R&D ponds. Excellent vegetative cover.  
Date: 10/09/03**

## ATTACHMENT 2

CROW BUTTE RESOURCES, INC.  
 RANGE ONE  
 CROSS SECTIONS FOR PONDS  
 STATION 0+00  
 September 25, 2003

LEFT OF BASELINE	SEA LEVEL ELEVATION	DESCRIPTION	SHOT TAKEN ON
0.00	3851.73	0+00 B.L.	REBAR&CAP
89.00	3850.87	FENCE	GROUND
118.10	3852.67	GROUND	HUB
131.8	3854.31	TOE OF SLOPE	TOE
162.60	3866.88	MIDPOINT SLOPE/DIRT	GROUND
195.60	3879.98	OUTSIDE OF BERM	GROUND
356.80	3880.80	MIDPOINT POND ON BERM	REBAR
532.70	3880.90	OUTSIDE EDGE BERM	GROUND
538.10	3878.88	"V" OF DITCH	GROUND
548.40	3882.96	TOP OF SLOPE	GROUND
553.90	3883.63	FENCE	GROUND
564.60	3884.33	WEST EDGE OF ROAD	GROUND
576.40	3884.31	EAST EDGE OF ROAD	GROUND
585.50	3882.82	"V" OF DITCH	GROUND
594.10	3884.99	TOP OF DITCH	GROUND
639.71	3888.5	0+00 E.B.	REBAR&CAP

Note: Elevations taken with a Topcon Total Station, with my estimated accuracy of .10 of a foot.

  
 Alan M. Curd, LS-519

ATTACHMENT 2

CROW BUTTE RESOURCES, INC.  
 RANGE TWO  
 CROSS SECTIONS FOR PONDS  
 STATION 5+00  
 September 25, 2003

LEFT OF BASELINE	SEA LEVEL ELEVATION	DESCRIPTION	SHOT TAKEN ON
0.00	3862.16	5+00 B.L.	REBAR&CAP
92.61	3860.90	FENCE	GROUND
144.08	3862.27	HUB	HUB
150.61	3863.04	TOE OF SLOPE	GROUND
173.21	3871.23	MIDPOINT OF SLOPE	GROUND
194.61	3880.49	OUTSIDE EDGE BERM/DIRT	GROUND
205.11	3881.37	INSIDE EDGE BERM/LINER	LINER
522.21	3880.54	INSIDE EDGE BERM/LINER	LINER
527.99	3880.39	OUTSIDE EDGE BERM/REBAR	REBAR
537.41	3878.68	"V" OF DITCH	GROUND
563.11	3882.50	WEST EDGE OF ROAD	GROUND
577.21	3882.89	EAST EDGE ROAD	GROUND
608.71	3893.97	MIDPOINT OF SLOPE	GROUND
634.41	3904.61	OUTSIDE EDGE BERM	GROUND
636.84	3904.93	PREV. OUTSIDE EDGE BERM	REBAR
646.41	3905.12	INSIDE EDGE BERM	LINER
907.11	3905.02	EDGE BERM	LINER
909.71	3905.07	INSIDE EDGE BERM	LINER
915.37	3904.86	CENTER OF BERM	REBAR
919.11	3904.86	OUTSIDE EDGE BERM	GROUND
934.01	3899.83	W. EDGE FLAT BOTTOM DITCH	GROUND
945.31	3899.80	E. EDGE FLAT BOTTOM DITCH	GROUND
970.01	3908.62	TOE OF SLOPE	GROUND
993.21	3910.21	FENCE	GROUND
999.41	3910.92	TOP OF SLOPE	GROUND
1006.81	3914.07	W. EDGE OF ROAD	GROUND
1018.91	3918.17	E.EDGE OF ROAD	GROUND
1022.11	3915.59	E. TOE OF SLOPE	GROUND
1033.71	3919.54	MIDPOINT OF SLOPE	GROUND
1077.31	3928.77	TOP OF SLOPE	GROUND
1094.55	3929.37	5+00 E.B.	REBAR&CAP

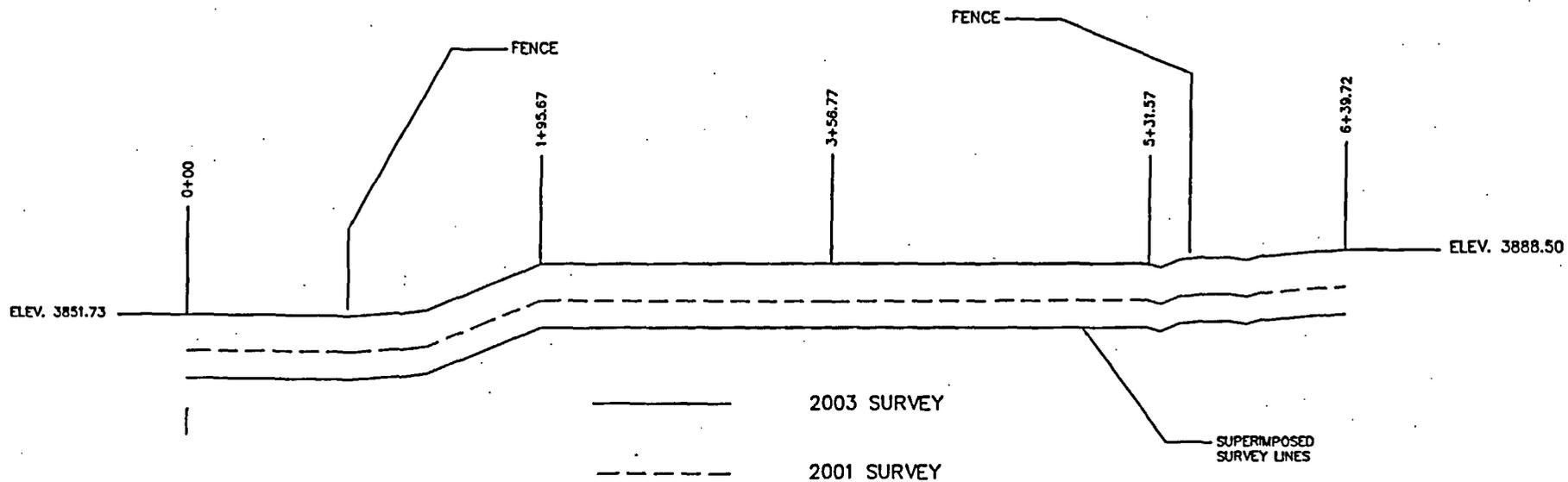
**ATTACHMENT 2**  
**CROW BUTTE RESOURCES, INC.**  
**RANGE THREE**  
**CROSS SECTIONS FOR PONDS**  
**STATION 10+00**  
**September 25, 2003**

LEFT OF BASELINE	SEA LEVEL ELEVATION	DESCRIPTION	SHOT TAKEN ON
0.00	3874.31	10+00 B.L.	REBAR&CAP
96.16	3868.91	FENCE	GROUND
122.06	3870.24	TOE OF SLOPE	HUB
148.00	3879.43	MIDPOINT SLOPE	GROUND
174.30	3889.97	OUTSIDE EDGE BERM	REBAR GONE
186.00	3890.84	INSIDE EDGE BERM	LINER
500.50	3890.79	INSIDE EDGE BERM	LINER
509.90	3889.72	OUTSIDE EDGE BERM	REBAR
537.20	3887.88	WEST EDGE ROAD	GROUND
545.30	3888.11	EAST EDGE ROAD	GROUND
553.30	3886.94	W. EDGE FLAT BOTTOM DITCH	GROUND
560.60	3886.91	E. EDGE FLAT BOTTOM DITCH	GROUND
569.90	3889.41	TOP OF DITCH	GROUND
598.90	3890.81	TOE OF SLOPE	HUB
617.40	3898.07	MIDPOINT OF SLOPE	GROUND
634.57	3904.88	OUTSIDE EDGE BERM	REBAR
644.30	3905.26	INSIDE EDGE BERM	LINER
908.80	3904.85	INSIDE EDGE BERM	LINER
918.84	3904.86	OUTSIDE EDGE BERM	REBAR
931.90	3900.54	W. EDGE FLT. BTM. DITCH/TRAIL	GROUND
942.80	3900.24	E. EDGE FLT. BTM. DITCH/TRAIL	GROUND
974.70	3910.98	TOP OF DITCH	GROUND
989.60	3912.01	FENCE	GROUND
1006.20	3913.04	TOE OF SLOPE	GROUND
1014.20	3914.86	TOP OF DITCH	GROUND
1020.40	3913.33	"V" OF DITCH	GROUND
1024.50	3915.04	TOP OF DITCH	GROUND
1038.10	3917.68	MIDPOINT OF SLOPE	GROUND
1066.90	3920.54	TOP OF SLOPE	GROUND
1086.50	3919.86	LOW POINT	GROUND
1148.43	3924.74	10+00 E.B.	REBAR&CAP

**ATTACHMENT 2**  
**CROW BUTTE RESOURCES, INC.**  
**RANGE FOUR**  
**CROSS SECTIONS FOR PONDS**  
**STATION 15+00**  
**September 25, 2003**

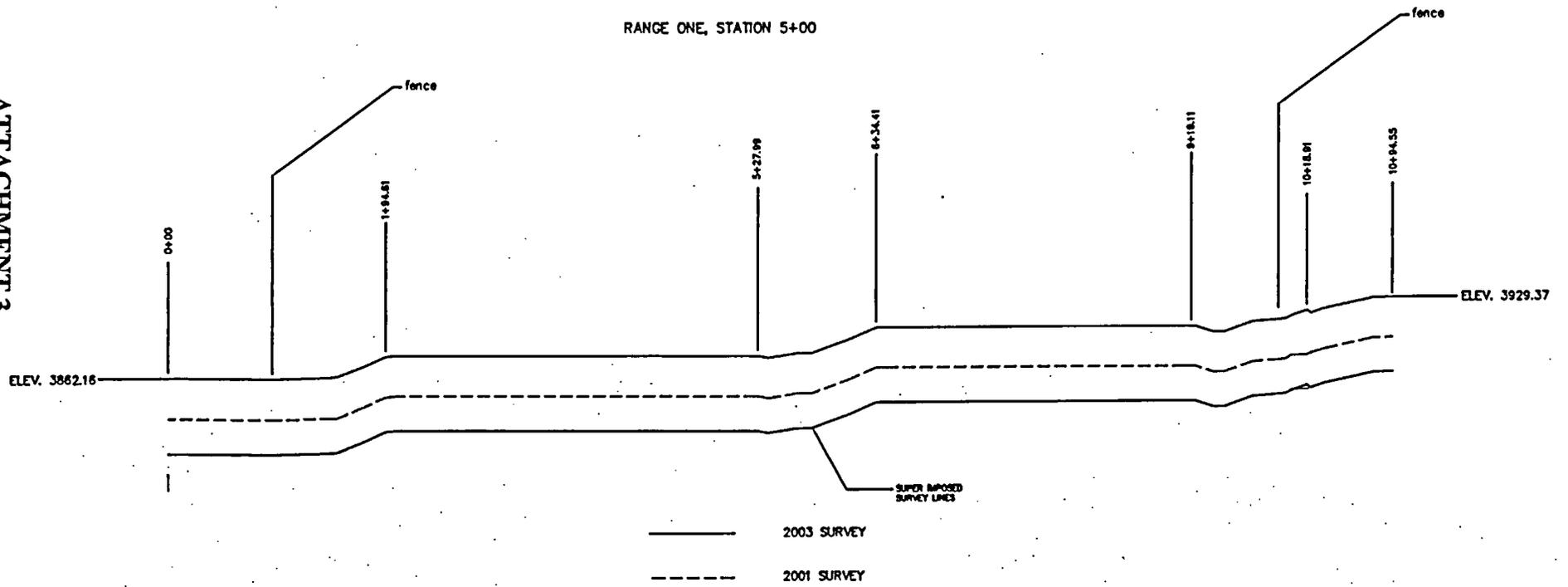
LEFT OF BASELINE	SEA LEVEL ELEVATION	DESCRIPTION	SHOT TAKEN ON
0.00	3883.63	15+00 B.L.	REBAR&CAP.
99.74	3875.51	FENCE	GROUND
136.76	3876.08	TOE OF SLOPE	HUB
156.14	3883.63	MIDPOINT OF SLOPE	GROUND
173.04	3890.17	OUTSIDE EDGE BERM	GROUND
185.94	3891.11	INSIDE EDGE BERM	LINER
499.24	3890.84	INSIDE EDGE BERM	LINER
508.44	3891.05	OUTSIDE EDGE BERM	GROUND
514.74	3889.64	"V" OF DITCH	GROUND
524.64	3892.37	TOP OF DITCH	GROUND
536.14	3892.70	FENCE	GROUND
554.44	3893.31	TOE OF SLOPE	GROUND
559.64	3894.89	TOP OF SLOPE	GROUND
696.94	3904.01	HIGH POINT	GROUND
789.44	3905.01	LOW POINT	GROUND
985.60	3915.14	15+00 E.B.	REBAR&CAP

RANGE ONE, STATION 0+00



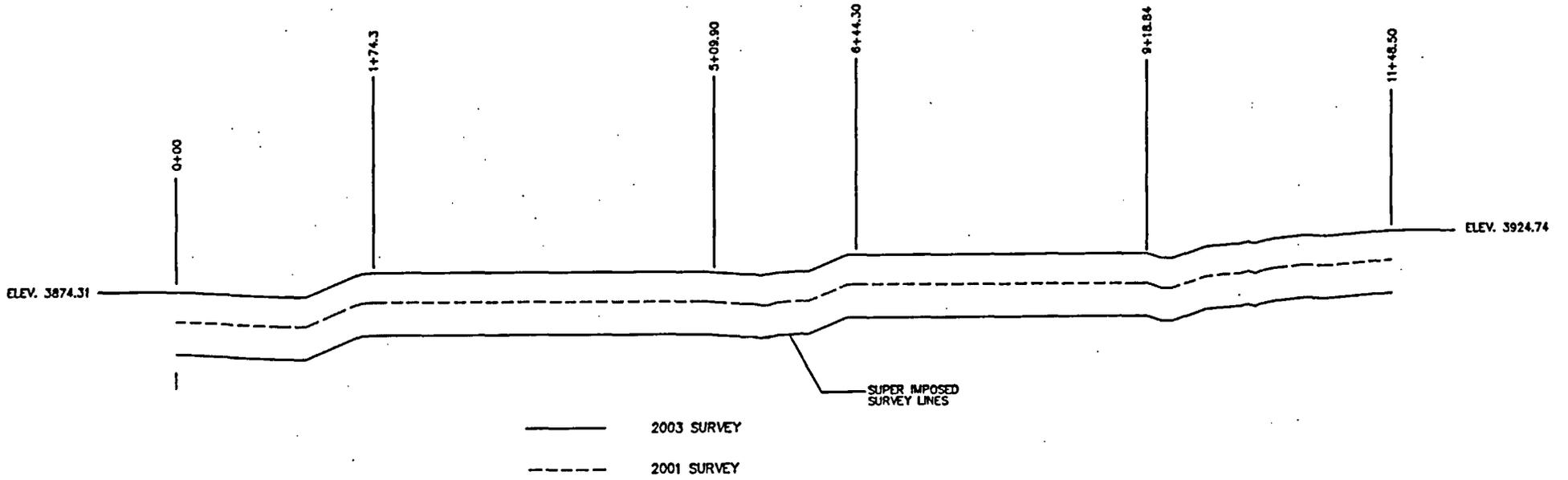
CROW BUTTE RESOURCES, INC

ATTACHMENT 3



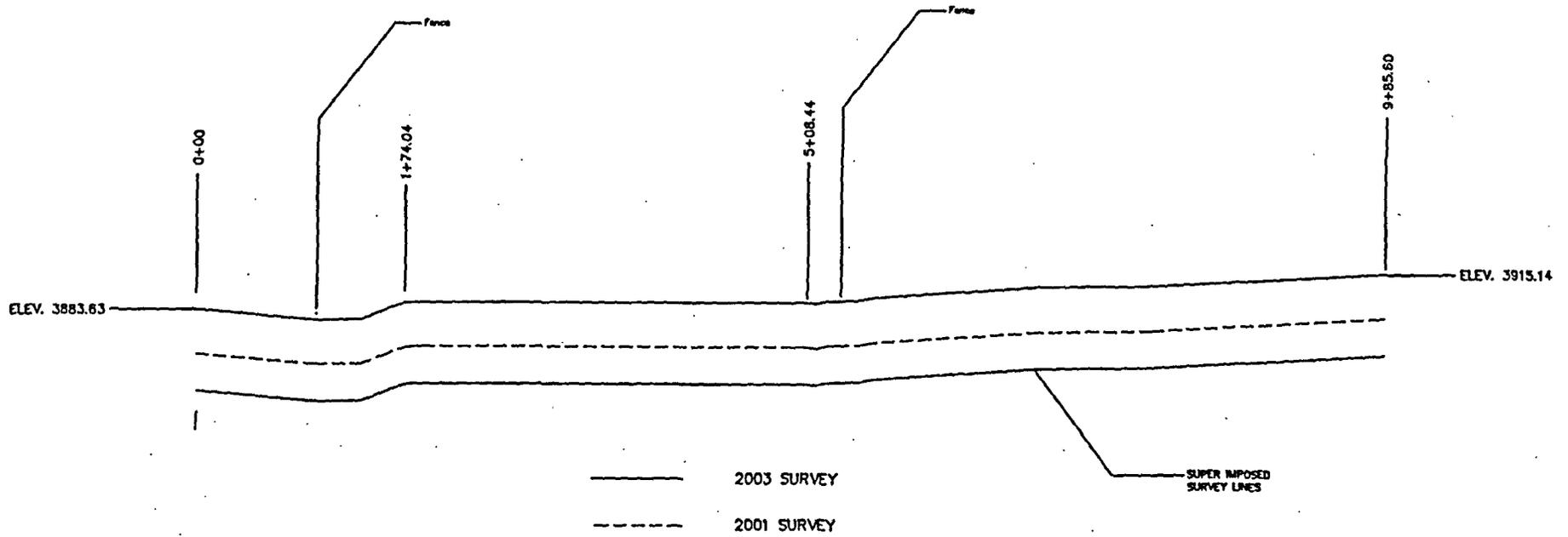
CROW BUTTE RESOURCES, INC

RANGE ONE, STATION 10+00



CROW BUTTE RESOURCES, INC

RANGE ONE, STATION 15+00



CROW BUTTE RESOURCES, INC