

CROW BUTTE RESOURCES, INC.

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



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

40-8943

March 2, 2004

Mr. Michael Linder, Director
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, Nebraska 68509-8922

Subject: Injection Well I622-10 10-Year MIT Failure
Class III Underground Injection Control Permit NE0122611

Dear Mr. Linder:

During the week of February 16, 2004, Crow Butte Resources, Inc. (CBR) performed a mechanical integrity test (MIT) of injection well I622-10. The test was the 10-year MIT required by the referenced permit. The well failed the MIT with a slow loss of test pressure during the course of the test, indicating a small leak in the casing. Further testing involving moving the bottom packer determined that the leak was at approximately 180 foot depth and may involve a casing coupling. This report describes the actions taken by CBR to determine whether the MIT failure had an impact on the environment in accordance with Title 118, *Groundwater Quality Standards and Use Classification, Appendix A, Groundwater Remedial Action Protocol*.

MIT Failure

The 10-year MIT was performed on well I622-10 on February 19, 2004. The MIT Operator noted a slow loss of test pressure during the course of the test. Testing was resumed on February 23. After determining that the pressure loss was due to a casing leak and not a leaking packer, the bottom packer was moved in intervals to determine the approximate location of the leak. Based on this testing, the leak was isolated at approximately 180 feet, which is the location of a casing coupling that may be the source of the leak.

Well I622-10 History

Well I622-10 is located in Mine Unit 4 and operated through Wellhouse 10. MITs were performed on the well on March 2, 1994, on June 30, 1995, and on June 17, 1999. The well passed all of these MITs. In the period since the five-year MIT performed in June 1999, the well has been in service as

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an injection well with a total of 102,681,279 gallons injected. The well was shut off on November 3, 2003 when Mine Unit 4 was placed in restoration.

A review of the operating history of well I622-10 was conducted. The well operated at an injection pressure of approximately 60 to 78 psi and a flow of approximately 16 to 20 gpm. Wellfield operations personnel report that this well took good injection flow and was never operated with the injection throttle valve wide open. The well did not have a history of building backpressure, which would be indicated by decreasing flow rates and the necessity of repeatedly relieving the backpressure at the wellhead. During the last wellfield water level survey conducted while Mine Unit 4 was in service, the static water level in a nearby well (CM1-10) was 195 feet. Based on this data and the apparent ability of well I622-10 to accept high injection flows with little if any backpressure, it is expected that the operating water level in the well was seldom at the 180 foot level where the casing leak is located. If the operating water level were below the location of the casing leak, injection solutions would not be released to the shallow aquifer. A potentiometer surface map of this area of the mine during Mine Unit 4 operations is attached.

Aquifer Investigation

A review of the original geophysical log for well I622-10 indicated that the location of the failure is in a siltstone portion of the Brule formation. Sandstone/silty sandstone horizons occur at 159 to 175 feet and 191 to 203 feet.

CBR reviewed the monitoring results for nearby shallow monitor wells in Mine Unit 4 to determine if there was any impact from mining solutions indicated.

- Well SM4-1 is located approximately 120 feet west of I622-10. The well was cased to 260 feet and screened from 279 to 299 feet. The monitoring results for well SM4-1 are stable. A graph of the conductivity results for biweekly sampling since June 1999 is attached.
- Well SM4-2 is located approximately 200 feet southeast of I622-10. The well was cased to 290 feet and screened from 319 to 334 feet. The monitoring results for well SM4-2 are stable. A graph of the conductivity results for biweekly sampling since June 1999 is attached.

Based on discussions with Dave Carlson of the NDEQ, CBR installed test hole I622a approximately 15 feet north of well I622-10. The purpose of this test hole was to determine shallow groundwater quality in the immediate vicinity of the leak to determine whether any impact to the environment was indicated. Well I622a was drilled to 200 feet. Fresh water was used as drilling fluid to clean



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drill cuttings from the hole.

Following a geophysical log, the open hole was airlifted from 195 feet. The hole made approximately 10 to 13 gallons per minute. Three water samples were obtained during airlifting and analyzed for conductivity in the CBR Environmental Laboratory. The following results were obtained:

Total Time Airlifting	Approximate Gallons Airlifted	Conductivity ($\mu\text{mhos/cm}$)
1 Hour	600 to 780	445
2 Hours	1,200 to 1,560	422
3 ½ Hours	2,100 to 2,730	421

The conductivity results indicate that the shallow groundwater near well I622-10 has not been affected by the loss of mechanical integrity in the well. The conductivity ranged from 421 to 445 $\mu\text{mhos/cm}$, which is similar to the conductivity from shallow monitor wells SM4-1 and SM4-2. Due to the high total dissolved solids (TDS) in the injection solutions, the average conductivity of injection solution is approximately 5,800 $\mu\text{mho/cm}$. Any leak of mining solutions into the shallow aquifer would be indicated by increased conductivity.

Conclusions

The operating history and characteristic of the well indicate that it accepted high injection flows with little backpressure. This characteristic, when considered with a static water level in this area of the mine that was fifteen feet below the elevation of the casing failure, indicates that the operating level of the well was likely below the casing failure point. Water quality results from the test hole (I622a) drilled near well I622-10 indicates general water quality that is within the normal range of the Brule Formation in this area. Monitoring results from two nearby shallow monitor wells during the period since the last MIT indicate no trends in the monitored parameters, which would indicate a potential impact from mining solutions. If significant quantities of mining solutions had been released from the well, the water quality (as indicated by conductivity) from the test hole and/or the shallow monitor wells would be affected.

The data collected during the initial site assessment indicates that the casing failure in well I622-10 did not cause an impact on the shallow aquifer. As required in Title 118, Appendix A, Step 6, if the initial site assessment reveals that there is no threat to groundwater, the Remedial Action Protocol

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proceeds to step 11, indicating that the situation does not pose a threat to groundwater quality. There are no other safety, health, or environmental concerns posed by this failed MIT.

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

Sincerely,
CROW BUTTE RESOURCES, INC.

A large, stylized handwritten signature in black ink, appearing to read 'M. Griffin'.

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

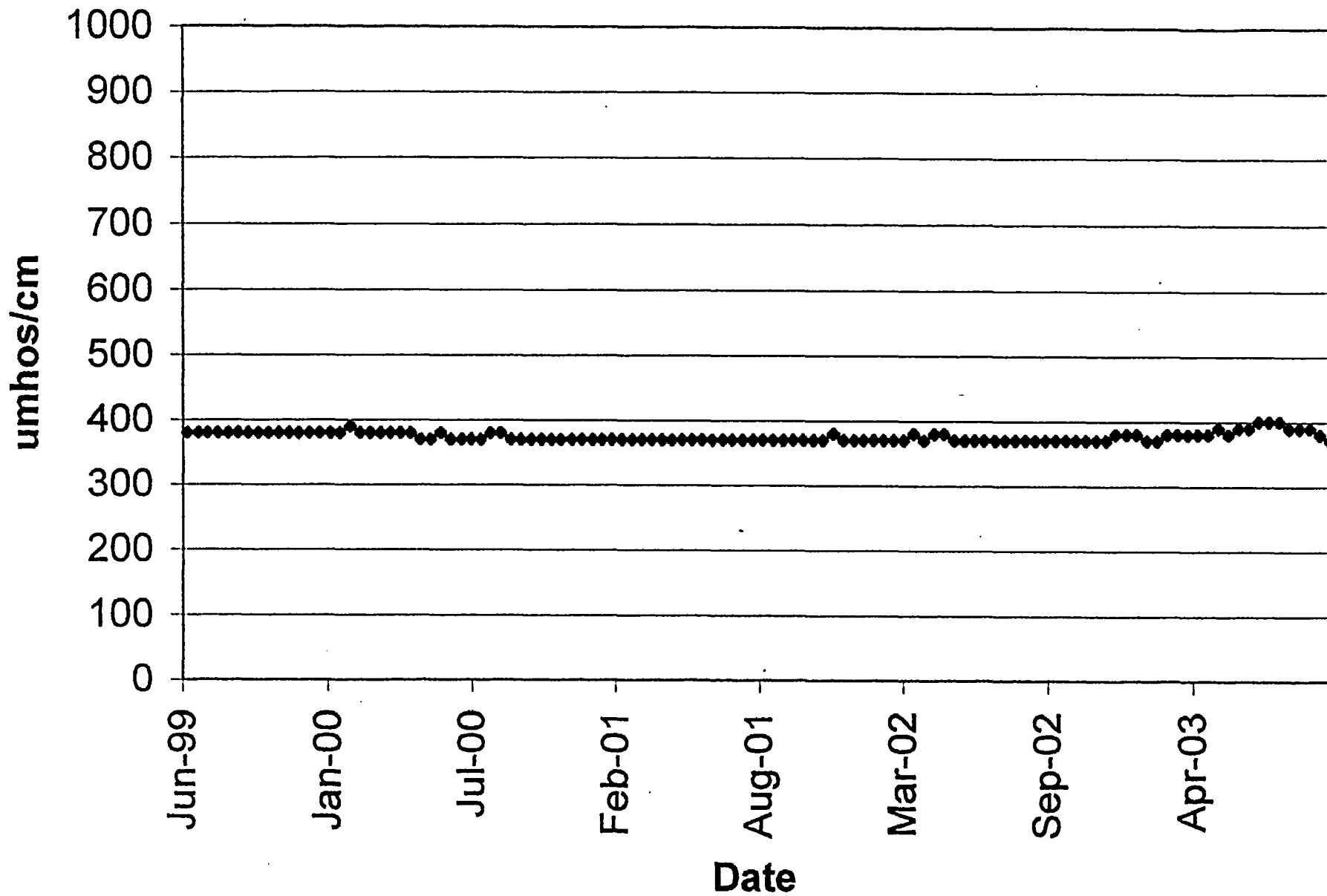
Enclosures: As Stated

cc: U.S. Nuclear Regulatory Commission
Mr. John Lusher - ADDRESSEE ONLY
Fuel Cycle Licensing Branch
Mail Stop T-8A33
Washington, DC 20555

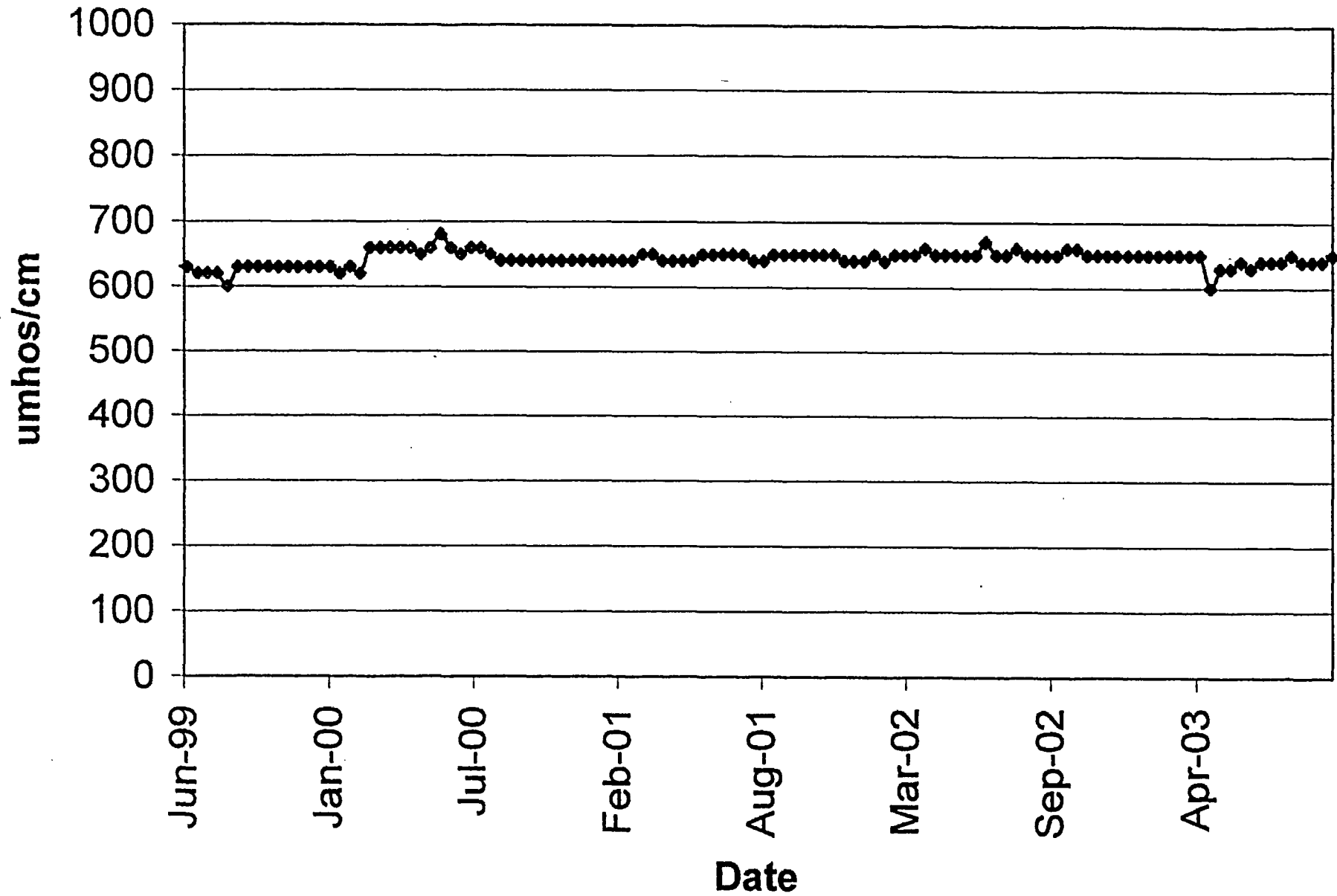
Nebraska Department of Environmental Quality
Mr. Dave Carlson, Program Specialist
Northwest Field Office
250 Main Street
Chadron, Nebraska 69337

Mr. Steve Collings
Crow Butte Resources, Inc.
274 Union Boulevard
Suite 310
Lakewood, Colorado 80228

SM4-1 Conductivity



SM4-2 Conductivity



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**"CROW BUTTE RESOURCES
MASTER MINE MAP."**

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