CROW BUTTE RESOURCES, INC.

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

(308) 665-2215
(308) 665-2341 – FAX

August 23, 2000

U.S. Nuclear Regulatory Commission
Mr. Philip Ting, Chief
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards
Mail Stop T8A-33
Washington, D.C. 20555-0001

Re: Source Materials License SUA-1534
Docket No. 40-8943
Request to Amend License Condition 10.4

Dear Mr. Ting:

Crow Butte Resources, Inc. (CBR) is providing this letter to request an amendment to Source Materials License SUA-1534 for the Crow Butte Uranium Project. Specifically, License Condition 10.4, Part C. states the following:

"For each monitor well, UCLs shall be calculated for each indicator parameter as equal to 20 percent above the maximum concentration measured for that parameter among the three samples."

CBR has recently had three shallow aquifer monitor wells in Mine Unit 6 placed on excursion status due to exceeding very low upper control limits (UCLs) for chloride and/or sulfate. Using the calculational method specified in License Condition 10.4 with low baseline concentrations of the indicator parameters results in a conservative UCL. CBR believes that the exceedance of the UCLs in these shallow monitor wells did not indicate an excursion of mining solutions, but was due to variation in the natural concentrations of these parameters. In these cases, the conservative UCL does not allow for a reasonable amount of natural variation for the indicator parameters.

Each of the Mine Unit 6 monitor wells on excursion status this year (SM6-13, SM6-18 and SM6-28) exhibited relatively low concentrations of chloride and/or sulfate during baseline sampling. Since the calculational method specified in License Condition 10.4 is based upon a set percentage above the maximum concentration, the result has been relatively low UCLs. Table 1 provides the baseline average and the calculated UCL for the parameters that were exceeded in the three Mine Unit 6 monitor well excursions.

NMSS01 Public
Process
Per Bill Ford
9/15/00

Table 1

Excursion Well Baseline Data (mg/l)

Well ID	Chloride Baseline Average	Chloride UCL	Sulfate Baseline Average	Sulfate UCL
SM6-13	-	-	15	18
SM6-18	12	16	-	-
SM6-28	5.4	7	26	33

As shown in Table 1, an increase of several mg/l in these parameters can cause an exceedance of the UCL. The three Mine Unit 6 monitor wells that were placed on excursion status this year exceeded the UCLs by a small margin. CBR believes that these small increases are not indicative of a true excursion. In an actual excursion, it is expected that the elevated concentrations of these excursion indicators in the mining solutions would result in a more pronounced increase at the monitor well. To illustrate this, Table 2 provides the minimum and maximum values for the excursion indicators in the lixiviant from the first quarter of 2000. For comparison, the average baseline for the Mine Unit 6 shallow monitor wells is also shown.

Table 2

Lixiviant Composition versus Shallow Aquifer Water Quality

	Chloride	Sulfate	Sodium	Alkalinity (as ppm $CaCO_3$)
Lixiviant Minimum	561	986	1284	1395
Lixiviant Maximum	610	1098	1392	1763
Mine Unit 6 Shallow Monitor Average	13	27	68	219

As shown in Table 2, the elevated concentrations of the excursion parameters in the lixiviant are significantly higher than the background concentration in the shallow aquifer. A vertical excursion in this aquifer would be indicated by a significant increase above these background concentrations for at least several indicator parameters concurrently. This was shown in the only real excursion of mining solutions at the Crow Butte Project. On July 1, 1999, perimeter monitor well CM6-6 exceeded the UCLs for all five indicator parameters. The trend graphs (attached) for these indicator parameters began detecting the excursion during the biweekly sampling performed on June 17, 1999. During the time from the June 3 sample, when the well was at normal concentrations, to the initial excursion sample taken July 1, all excursion parameters exhibited a significant increase as shown in Table 3.

Table 3

CM6-6 Monitor Well Excursion

	Chloride	**Sulfate**	**Sodium**	**Conductivity**	**Alkalinity (as ppm $CaCO_3$)**
June 3, 1999 Sample	198	388	428	2060	308
July 1, 1999 Sample	263	550	552	2680	378

The confirming sample taken 24 hours later on July 2, 1999 exhibited further increases in all five indicator parameters. This excursion data confirms that a true excursion will be indicated by an increase in several, if not all, of the indicator parameters. These increases will be substantial and would be very apparent in the shallow aquifer at Crow Butte, which exhibits good water quality compared to the mining zone.

CBR believes that the proper resolution to these false excursions is to modify the method used to calculate the UCL for those wells that exhibit very low baseline concentrations of excursion indicators. Several calculational methods have been used by other in-situ leach uranium recovery facilities to determine UCLs. The Draft Standard Review Plan[1] prepared by NRC discusses these acceptable methods. In areas with good water quality, NRC states that the UCL may be

[1] U.S. Nuclear Regulatory Commission, NUREG-1569, *Draft Standard Review Plan for In Situ Leach Uranium Extraction License Applications*, October 1997

calculated by adding 5 standard deviations to the baseline average. Where a narrow statistical distribution is noted, a specified concentration (15 mg/l is suggested) or 5 standard deviations above the mean has been used, whichever is greater.

CBR proposes to use both of these approved methods to determine the most appropriate UCL for shallow monitor wells with good water quality. CBR proposes to limit the use of these alternate methods to wells with a baseline average of 50 mg/l or less for the chosen indicator parameter. This criterion would effectively limit the application of this method to calculating UCLs for sodium, sulfate, and chloride in shallow monitor wells. The other indicator parameters (alkalinity and conductivity) are not below this selected criterion in the shallow aquifer. None of the indicator parameters in the production zone monitors will meet the criteria. In most cases, use of the baseline average plus 5 standard deviations will result in an acceptable UCL for the wells with low baseline averages. However, the sulfate and chloride data for many of the Mine Unit 6 and 7 shallow monitor wells has shown a narrow statistical distribution, with standard deviations as low as 0.1 mg/l. In these cases, using a specified concentration of 15 mg/l to determine the UCL would be necessary to avoid false excursions.

In summary, CBR believes that the use of these alternate methods to calculate UCLs will be protective of the environment while reducing the number of false excursions. CBR has selected proven methods, since NRC has previously approved both approaches for use in aquifers with good water quality at other in situ leach uranium mines. Using the proposed 50 mg/l ceiling value, the proposed methods would result in increasing the sodium, chloride, and sulfate UCLs for some shallow monitor wells by a minimal amount. This minimal change would be adequate to prevent false excursions similar to those experienced this year. If the proposed License Condition were used to calculate UCLs for Mine Units 6 and 7, the following changes would result for the 53 shallow monitor wells in the two Mine Units:

Table 4

Mine Unit 6 and 7
UCL Changes as a Result of Proposed Amendment

Parameter	Number of Wells Affected	Average UCL Change (mg/l)
Sodium	12	+4.5
Sulfate	43	+7.3
Chloride	52	+10

CBR requests that NRC amend License Condition 10.4, Part C. to state the following:

"For each monitor well, UCLs shall be calculated for each indicator parameter as equal to 20 percent above the maximum concentration measured for that parameter among the three samples. For those monitor wells where the baseline average of the indicator parameter is 50 mg/l or less, the UCL shall be calculated as equal to 20 percent above the maximum concentration measured for the parameter, the baseline average for the parameter plus 5 standard deviations, or the baseline average plus 15 mg/l, whichever is greater."

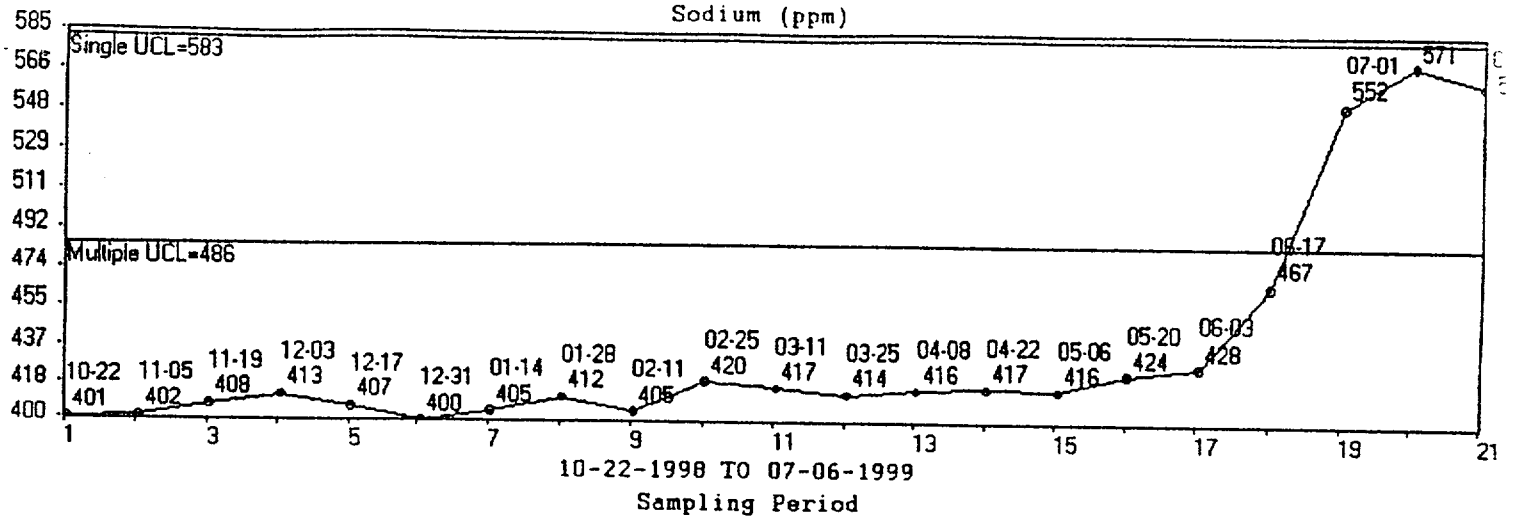
CBR believes that this amendment will reduce the likelihood of reporting false excursions. These false excursions result in a significant expenditure in CBR and NRC resources due to unnecessary monitoring and reporting. If you have any questions concerning this amendment request, please do not hesitate to contact me at (308) 665-2215.

Sincerely,
CROW BUTTE RESOURCES, INC.

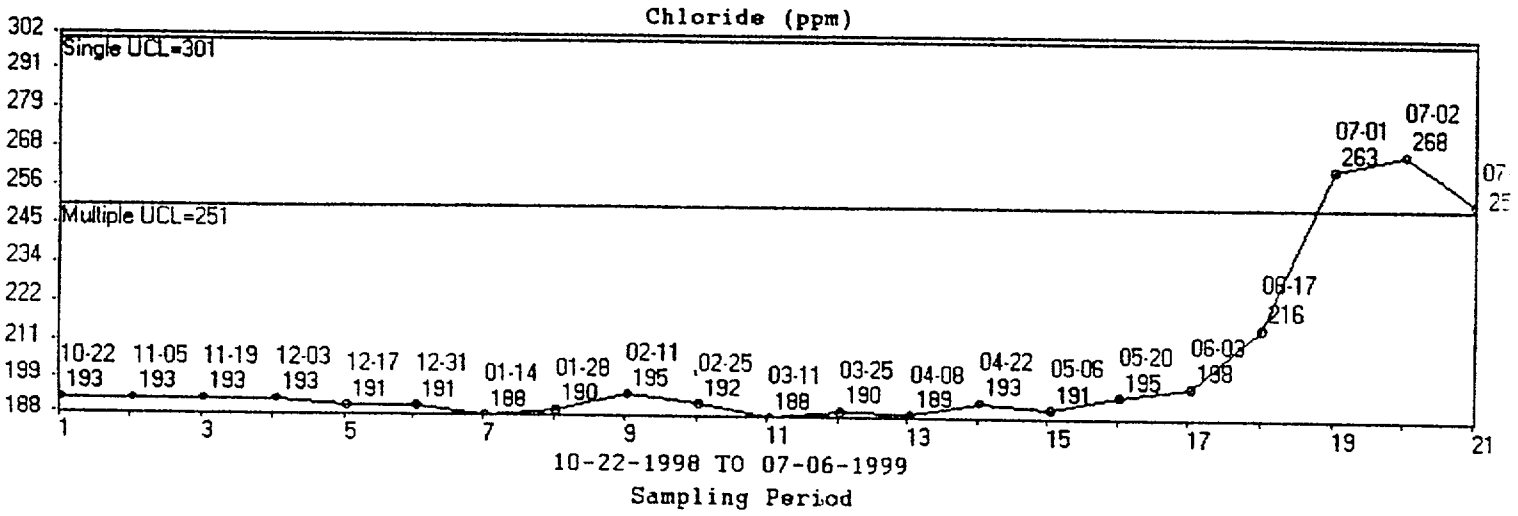
Michael Griffin
Manager of Environmental and Regulatory Affairs

Attachments: As Stated

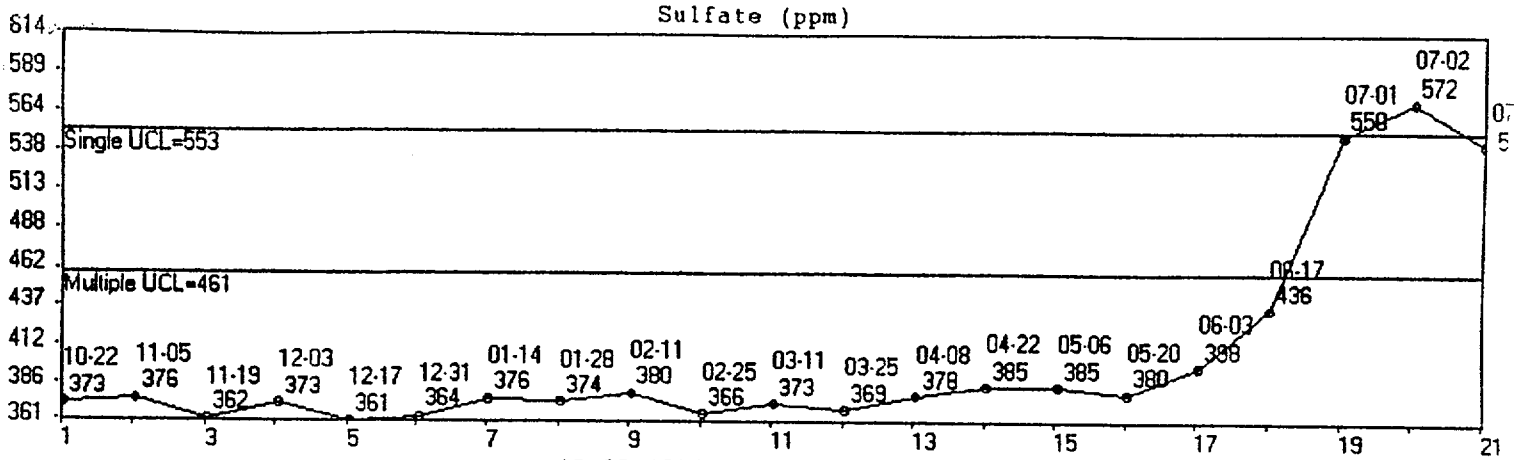
cc: Mr. Steve Collings – CBR, Denver
Mr. William Ford – NRC Uranium Recovery Branch


Sodium (ppm)
Single UCL=583
Multiple UCL=486
585
566
548
529
511
492
474
455
437
418
400
10-22 401
11-05 402
11-19 408
12-03 413
12-17 407
12-31 400
01-14 405
01-28 412
02-11 405
02-25 420
03-11 417
03-25 414
04-08 416
04-22 417
05-06 416
05-20 424
06-03 428
06-17 467
07-01 552
571
1
3
5
7
9
11
13
15
17
19
21
10-22-1998 TO 07-06-1999
Sampling Period

CM6-6


Chloride (ppm)
Single UCL=301
Multiple UCL=251
302
291
279
268
256
245
234
222
211
199
188
10-22 193
11-05 193
11-19 193
12-03 193
12-17 191
12-31 191
01-14 188
01-28 190
02-11 195
02-25 192
03-11 188
03-25 190
04-08 189
04-22 193
05-06 191
05-20 195
06-03 198
06-17 216
07-01 263
07-02 268
1
3
5
7
9
11
13
15
17
19
21
10-22-1998 TO 07-06-1999
Sampling Period

Sulfate (ppm)

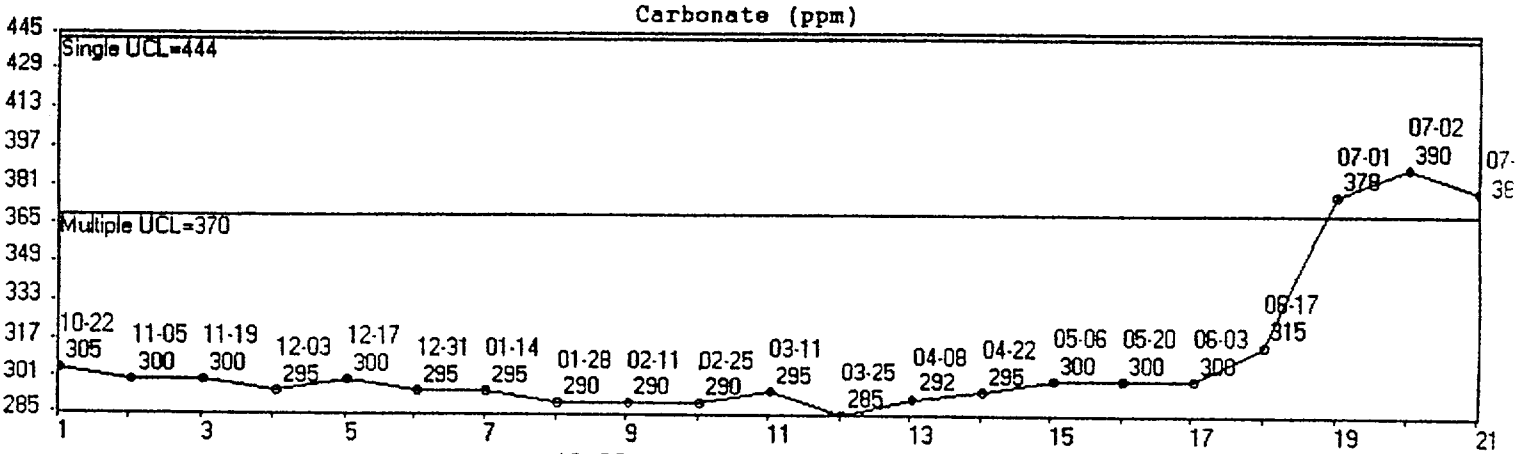


10-22-1998 TO 07-06-1999

Sampling Period

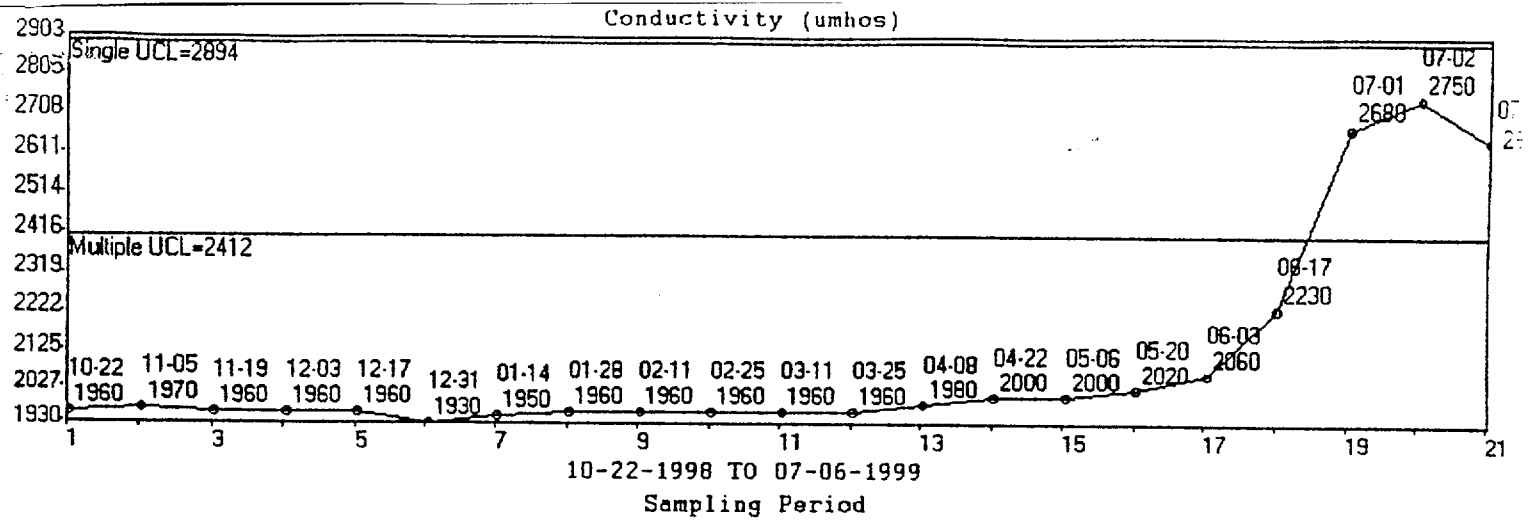
CM6-6

Carbonate (ppm)



10-22-1998 TO 07-06-1999

Sampling Period


Conductivity (umhos)
Single UCL=2894
Multiple UCL=2412
2903
2805
2708
2611
2514
2416
2319
2222
2125
2027
1930
10-22 1960
11-05 1970
11-19 1960
12-03 1960
12-17 1960
12-31 1930
01-14 1950
01-28 1960
02-11 1960
02-25 1960
03-11 1960
03-25 1960
04-08 1980
04-22 2000
05-06 2000
05-20 2020
06-03 2060
06-17 2230
07-01 2680
07-02 2750
1
3
5
7
9
11
13
15
17
19
21
10-22-1998 TO 07-06-1999
Sampling Period