

40-8943
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CROW BUTTE RESOURCES, INC.
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February 5, 1996

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Mr. Joseph J. Holonich, Chief
High Level Waste and Uranium
Recovery Projects Branch
Division of Waste Management, NMSS (T-7-J9)
U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20850

RE: License No. SUA-1534
Docket No. 40-8943

Dear Mr. Holonich:

On October 5, 1995, Crow Butte Resources, Inc. requested an amendment to License Condition No. 53 of SUA-1534 regarding the Crow Butte Mine Evaporation Pond Inspection Plan. The amendment request pertained to changing the frequency of inspections of the pond underdrain systems from daily to weekly.

From discussions with Mr. James Park of your staff, a provision for inspecting the underdrains on a daily basis in the event of seismic activity, flooding, severe rainfall or other event which could cause the pond to leak should be included in the plan. The attached plan dated December 1992 (Revised February 5, 1996) contains such a provision. Section 2.2.3 has been modified to include the requirement of daily inspections of the underdrain systems during the above mentioned events.

If you have any questions regarding this matter please contact me.

Sincerely,

Stephen P. Collings
Stephen P. Collings

Enclosure

cc: Mr. Ross Scarano

CROW BUTTE RESOURCES, INC.

**CROW BUTTE MINE
DAWES COUNTY, NEBRASKA**

EVAPORATION POND ONSITE INSPECTION PROGRAM

**December, 1992
(Revised February 5, 1996)**

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Figure 1 - Commercial Pond Inspection Form

Figure 2 - R&D Pond Inspection Form

Figure 3 - Stage-Volume Analysis of Commercial Ponds 1, 3 and 4

Figure 4 - Stage-Volume Analysis of R&D Ponds 1 and 2

Figure 5 - Weekly Evaporation Pond Underdrain Analysis Form

1.0 Description of the Evaporation Pond Onsite Inspection Program

The evaporation pond onsite inspection program provides the basis for systematic inspections and evaluations of the Crow Butte evaporation ponds in accordance with USNRC regulatory guide 3.11.1 and Crow Butte USNRC license SUA-1534, license conditions 25 and 53. The program consists of daily, weekly, monthly, and quarterly inspections in conjunction with an annual technical evaluation of the pond system. The technical evaluation will compare field inspection data with design data used in the Engineering Design Reports to assess structural stability and hydraulic and hydrologic capacities.

An annual report will be written presenting the results of the technical evaluation and the inspection data. The inspection report will be kept on site with a copy sent to the USNRC within one month of completion of the annual report. The person performing the annual technical evaluation and inspection report shall be a registered professional engineer experienced in dam safety. In addition, field personnel performing the systematic inspections shall be trained annually.

Five ponds have been constructed to date, two R&D ponds (R&D ponds 1 and 2), and three commercial ponds (Commercial Ponds 1, 3 and 4).

2.0 Onsite Inspections

2.1 Daily Inspections

Daily inspections of the evaporation ponds shall be performed and documented on the Pond Inspection Forms (Figure 1 - Commercial Ponds, Figure 2 - R&D Ponds). Following are the items to be inspected and a description of each.

- 2.1.1 Pond depth - The depth of water in each pond shall be measured and recorded. Water depth will be taken at the pond level markers on the inside slope of each pond. The measurements should be checked against the stage-volume analyses charts to assure that there is adequate freeboard and the contents of one pond can be transferred to the other ponds in the event of a leak. The stage-volume chart for the commercial ponds is attached as Figure 3, the stage-volume chart for the R&D ponds is attached as Figure 4.
- 2.1.2 Pond Embankments - The pond embankments shall be visually inspected for signs of cracking, slumping, movement or a concentration of seepage. Any unusual conditions should be noted on the Pond Inspection Forms and the inspector shall inform his supervisor.

2.2 Weekly Inspections

Weekly inspections shall be documented when performed on the Pond Inspection Forms. Following are the items to be inspected on a weekly basis.

- 2.2.1 Perimeter Fence - The game proof perimeter fence shall be inspected for holes which would allow livestock to enter the pond area.
- 2.2.2 Inlet Pipes - Pond inlet piping is to be inspected to verify that it is not clogged with ice, dirt, etc.
- 2.2.3 Underdrain Measurements - The underdrains shall be measured and the vertical depth of fluid in the standpipe shall be recorded on the Pond Inspection Forms. **During periods of seismic activity, flooding, severe rainfall or other event which could cause the pond to leak, underdrain measurements will be taken daily and recorded.**
- 2.2.4 Pond Liner - The liner shall be visually inspected weekly for holes or other signs of distress. The inspector shall examine the liner anchor trench areas for cracks or other signs of excessive stress on the liner. The inspection shall be done from the top of the pond berms.

- 2.2.5 **Leak Detection System** - The leak detection pipes for all ponds shall be measured for fluid in the standpipes and the vertical depth of the fluid shall be recorded on the Pond Inspection Forms. If more than six inches of fluid is present in the standpipe, the contents shall be analyzed for specific conductance. If water quality is degraded beyond the action level, the water shall be further sampled for chloride, alkalinity, sodium and sulfate.

Results of the specific conductance analyses shall be documented on the Evaporation Pond Underdrain Analysis report sheet attached hereto as Figure 5.

Upon verification of a liner leak, through the above analyses, the fluid level shall be lowered by transferring the pond's contents to an alternate cell. Water quality in the affected standpipes shall be analyzed for the five parameters listed above once every 7 days during the leak period, and once every seven days for at least two weeks following repairs.

2.3 Monthly Inspections

Monthly inspections are to be performed and documented on the Pond Inspection Forms. Following are the items to be inspected and a description of each.

- 2.3.1 **Wasteline Pipe** - The piping from the plant building to the ponds shall be visually inspected for signs of seepage indicating a possible pipeline break.
- 2.3.2 **Diversion channels** - Diversion ditches surrounding the ponds shall be examined for channel bank erosion, obstruction to flow, undesirable vegetation or any other unusual operational behavior.

2.4 Quarterly Inspections

Quarterly inspection of the evaporation ponds shall be done and documented. Following are the items to be inspected and a description of each.

- 2.4.1 **Embankment settlement** - The top of the embankments and downstream toe area shall be visually examined for settlement or depressions.
- 2.4.2 **Embankment Slopes** - Embankment slopes are to be visually examined for irregularities in alignment and variances from originally constructed slopes (i.e., sloughing, toe movement, surface cracking or erosion).
- 2.4.3 **Seepage** - Evidence of seepage in any areas surrounding the ponds

especially the downstream toes should be investigated and documented.

2.4.4 Slope Protection - Vegetation on the outslopes of the pond should be examined. Any evidence of rills or gullies forming shall be noted.

2.4.5 Post Construction Changes - Any changes to the upstream watershed areas shall be noted that could affect runoff to the ponds.

3.0 Technical Evaluation and Inspection Report

A technical evaluation of the pond system shall be done annually which addresses the hydraulic and hydrologic capacities of the ponds and ditches and the structural stability of the embankments.

A survey of the pond embankments will be done on an annual basis and the survey results documented and incorporated into the annual inspection report. The survey shall be reviewed for evidence of embankment settlement, irregularities in embankment alignment and any changes in the originally constructed slopes.

The technical evaluation will be the result of an annual inspection and a review of the weekly, monthly, and quarterly inspection reports by a registered professional engineer. Examination of the pond monitor well sampling data will also be reviewed for signs of seepage in the embankments.

The inspection report will present the results of the technical evaluation and the inspection data collected since the last report, and will be kept on file at the site for review by regulatory agencies. A copy shall also be submitted to the NRC within one month of the annual inspection.

FIGURE 1

CROW BUTTE MINE		COMMERCIAL POND INSPECTION FORM				
CHECK ACCORDINGLY: √=OK X=NEEDS ATTENTION OR REPAIRS						
FOR THE MONTH OF:		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
ENTER DATES ▶						
LOCATION	FREQUENCY					
POND 1-DEPTH	Daily					
EMBANKMENTS	Daily					
N.E. UNDERDRAIN	Weekly					
N.M. UNDERDRAIN	Weekly					
N.W. UNDERDRAIN	Weekly					
S.E. UNDERDRAIN	Weekly					
S.M. UNDERDRAIN	Weekly					
S.W. UNDERDRAIN	Weekly					
POND 3-DEPTH	Daily					
EMBANKMENTS	Daily					
N.E. UNDERDRAIN	Weekly					
N.M. UNDERDRAIN	Weekly					
N.W. UNDERDRAIN	Weekly					
S.E. UNDERDRAIN	Weekly					
S.M. UNDERDRAIN	Weekly					
S.W. UNDERDRAIN	Weekly					
POND 4-DEPTH	Daily					
EMBANKMENTS	Daily					
N.E. UNDERDRAIN	Weekly					
N.M. UNDERDRAIN	Weekly					
N.W. UNDERDRAIN	Weekly					
S.E. UNDERDRAIN	Weekly					
S.M. UNDERDRAIN	Weekly					
S.W. UNDERDRAIN	Weekly					
INSPECTED INLET PIPING	Weekly					
PERIMETER FENCE	Weekly					
OTHER (EXPLAIN ON BACK)						
LEAK DETECTION ANALYSES	Weekly					
INSPECTED LINERS	Weekly					
INSPECTED DIVERSION DITCHES	Monthly					
INSPECTED WASTE PIPELINE	Monthly					
INSPECTOR INITIAL HERE ▶						

- Add 3 inches to the reading of each pond underdrain measurement device to obtain correct water level of the underdrain.

COMMENTS ON BACK

FIGURE 2

CROW BUTTE PROJECT

R & D POND INSPECTION FORM

For The Month of _____

CHECK ACCORDINGLY: = OK
 = NEEDS ATTENTION OR REPAIRS

		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
ENTER DATE ►						
LOCATION	FREQUENCY					
CELL 1 (WEST)						
DEPTH	Daily					
EMBANKMENTS	Daily					
UNDERDRAIN (<6")	Weekly					
CELL 2 (EAST)						
DEPTH	Daily					
EMBANKMENTS	Daily					
UNDERDRAIN (<6")	Weekly					
INSPECTED INLET PIPING	Weekly					
PERIMETER FENCE	Weekly					
OTHER (EXPLAIN BELOW)						
INSPECTED LINERS	Weekly					
INSPECTED DIVERSION DITCHES	Monthly					
INSPECTED WASTE PIPELINE	Monthly					
INSPECTOR INITIAL HERE ►						

OTHER:

Figure 3

CROW BUTTE MINE
Commercial Ponds - Stage Volume Analysis

Elevation from Pond Bottom (ft)	Pond 1 Volume (AF)	Pond 2 Volume (AF)	Pond 3 Volume (AF)	Description
0.0	0.00	0.00	0.00	Bottom of Ponds
0.5	0.24	0.20	0.20	
1.0	0.98	0.80	0.80	
1.5	2.20	1.81	1.81	
2.0	3.90	3.21	3.21	
2.5	5.86	5.02	5.02	
3.0	7.85	7.04	7.04	
3.5	9.86	9.08	9.08	
4.0	11.90	11.15	11.15	
4.5	13.96	13.24	13.24	
5.0	16.05	15.33	15.33	
5.5	18.15	17.47	17.47	
6.0	20.28	19.62	19.62	
6.5	22.43	21.80	21.80	
7.0	24.61	23.99	23.99	
7.5	26.82	26.01	26.01	
8.0	29.05	28.46	28.46	
8.5	31.30	30.72	30.72	
9.0	33.58	33.01	33.01	
9.5	35.88	35.32	35.32	
10.0	38.21	37.66	37.66	
10.5	40.56	40.02	40.02	
11.0	42.93	42.40	42.40	
11.5	45.33	44.80	44.80	
12.0	47.75	47.23	47.23	Max. operating level Pond 1
12.5	50.19	49.68	49.68	Max. operating level Ponds 3 & 4
13.0	52.66	52.15	52.15	
13.5	55.16	54.65	54.65	
14.0	57.67	57.18	57.18	Max. emergency level Pond 1
14.5	60.26	59.72	59.72	Max. emergency level Ponds 3 & 4
15.0	62.78	62.29	62.29	
15.5	65.37	64.89	64.89	
16.0	67.99	67.51	67.51	
16.5	70.62	70.15	70.15	
17.0	73.29	72.81	72.81	Crest of Pond 1
17.5		75.51	75.51	Crest of Ponds 3 & 4

- Notes:
1. The maximum storage capacity of the pond system is 117.39 acre feet (AF).
 2. Normal operating freeboard level is 5.0 feet,
emergency freeboard level is 3.0 feet.

FIGURE 4
CROW BUTTE MINE
R&D POND STAGE-VOLUME CHART

MAXIMUM OPERATING DEPTH 12 FOOT EMERGENCY MAXIMUM TRANSFERABLE				MAXIMUM OPERATING DEPTH 12 FOOT EMERGENCY MAXIMUM TRANSFERABLE			
WEST INCHES	WEST GALLONS	EAST GALLONS	EAST INCHES	WEST INCHES	WEST GALLONS	EAST GALLONS	EAST INCHES
43	311541	1304908	144	94	738788	877662	107
44	318744	1297706	144	95	748449	868001	106
45	325991	1290459	143	96	785161	858288	105
46	333283	1263167	142	97	767926	848524	104
47	340620	1275830	142	98	777742	838708	103
48	348002	1268448	141	99	787611	828839	102
49	355429	1261021	141	100	797532	818918	101
50	362902	1253548	140	101	807506	808944	100
51	370420	1246029	139	102	817532	798918	99
52	377985	1238465	139	103	827611	788839	98
53	385595	1230855	138	104	837743	778707	97
54	393251	1223199	138	105	847928	768522	96
55	400953	1215497	137	106	858166	758284	95
56	408701	1207749	136	107	868457	747992	94
57	416496	1199954	136	108	878802	737648	93
58	424337	1192113	135	109	889201	727249	92
59	432225	1184225	134	110	899653	716797	91
60	440160	1176290	134	111	910159	706291	90
61	448142	1168308	133	112	920719	695730	89
62	456170	1160279	132	113	931334	685116	88
63	464246	1152203	132	114	942002	674447	86
64	472370	1144080	131	115	952726	663724	85
65	480541	1135909	130	116	963503	652947	84
66	488759	1127690	130	117	974336	642114	83
67	497026	1119424	129	118	985223	631227	82
68	505340	1111110	128	119	996165	620285	81
69	513702	1102747	127	120	1007162	609287	79
70	522113	1094337	127	121	1018215	598235	78
71	530572	1085878	126	122	1029323	587127	77
72	539079	1077370	125	123	1040487	575963	76
73	547635	1068814	124	124	1051706	564744	74
74	556240	1060210	124	125	1062981	553469	73
75	564894	1051556	123	126	1074312	542138	72
76	573597	1042853	122	127	1085699	530751	70
77	582348	1034101	121	128	1097142	519307	69
78	591150	1025300	121	129	1108642	507808	68
79	600000	1016449	120	130	1120198	496251	66
80	608901	1007519	119	131	1131811	484639	65
81	617851	998599	118	132	1143481	472969	64
82	626850	989599	117	133	1155208	461242	62
83	635900	980550	117	134	1166991	449459	61
84	645000	971450	116	135	1178832	437618	59
85	654150	962299	115	136	1190730	425719	58
86	663351	953099	114	137	1202686	413764	56
87	672602	943847	113	138	1214699	401750	55
88	681904	934546	112	139	1226771	389679	53
89	691257	925193	111	140	1238900	377550	52
90	700661	915789	111	141	1251087	365363	50
91	710116	906334	110	142	1263332	353118	48
92	719622	896828	109	143	1275635	340814	47
93	729179	887271	108	144	1287997	328452	45

FIGURE 5
 CROW BUTTE PROJECT
 WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS

COMMERCIAL PONDS		INSTRUMENT READING	TEMPERATURE .C	TEMPERATURE CORRECTION	CONDUCTIVITY umhos/cm	LAB/FIELD MEASUREMENT
N O R T H P O N D 3	POND CONTENTS					
	N, E, UNDERDRAIN					
	N, M, UNDERDRAIN					
	N, W, UNDERDRAIN					
	S, E, UNDERDRAIN					
	S, M, UNDERDRAIN					
	S, W, UNDERDRAIN					
S O U T H P O N D 4	POND CONTENTS					
	N, E, UNDERDRAIN					
	N, M, UNDERDRAIN					
	N, W, UNDERDRAIN					
	S, E, UNDERDRAIN					
	S, M, UNDERDRAIN					
	S, W, UNDERDRAIN					
P O N D N U M B E R 1	POND CONTENTS					
	N, E, UNDERDRAIN					
	N, M, UNDERDRAIN					
	N, W, UNDERDRAIN					
	S, E, UNDERDRAIN					
	S, M, UNDERDRAIN					
	S, W, UNDERDRAIN					

FIGURE 5

DATE: _____
 ACTION LIMIT EXCEEDED? _____
 SAMPLER/ANALYST: _____

REMARKS: