NUCLEAR DYNAMICS

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July 9, 1979

Mr. R. A. Scarano, Chief
Uranium Recovery Licensing Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Source Material License No. SUA-1331, Sundance Project, Crook County, Wyoming, Docket No. 40-8663

Attention: R. Cooperstein

Gentlemen:

Transition from end of leaching to restoration proper has been a gradual process.

The end of the leaching period came on April 25, 1979. Water containing some introduced chemicals (not natural untreated formation water) was injected into the field for the last time on that day.

Because the injection wells I-1, I-2, I-3, and I-4 had lost their injectivity almost totally, the month of May was spent largely in repair and experimentation with the I wells. During most of that time the Recovery well R was kept pumping, and the buffer wells B-1, B-3, and B-4 were injecting the usual untreated formation water at a higher average rate of 1.5 gpm per well instead of the previous rate of 0.3 gpm. On May 22, observation and sampling well OSB-2 was put on recovery duty as an additional recovery well by installation of a submersible pump.

During the first week of June, the U. S. Bureau of Mines (Twin Cities Mining Research Center) experimental high pressure water perforator was tried on wells I-1, I-2, B-1 and B-3. After an experimental period of washing and cleaning, improvement in injectivity in these wells was noted. Throughout this period which extended through June, recovery wells R and OSB-2 were pumping at 7 gpm each and B-1, B-3 and B-4 were injecting (combined) from a low of 2.25 gpm to a current 8 gpm (combined) except for Saturdays and Sundays. It should be noted that since the end of April the field has been shutdown on weekends.

Considering the injection well breakdowns, the recovery well breakdown, the continued injection of formation water in the buffer wells, and the experimentation involved, etc., it is difficult to pinpoint when restoration actually started. Nevertheless, some restoration was started shortly if not immediately after April 25th. Since then restoration activity has been gradually increasing and is now more stabilized as to procedure.

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To this date sampling frequency and analysis of chemical parameters has not been changed materially from leaching period procedures.

The analytical results to date indicate that restoration is well on its way, and that certain trends have been, and more are being established. (see figure B) As a result, a less frequent sampling routine (within the requirements of the Source Material License) is indicated and will be implemented beginning July 9th, 1979, as follows (for location of wells refer to fig. A):

1) Recovery Well R, discharge and Recovery Well OSB-2, discharge

a) One analysis for each parameter from a three consecutive shifts composite sample, three times a week (Monday, Wednesday, Friday) as follows:

Conductivity	
pH	Mo
HCO_3^-	U_3O_8
CO_3^{--}	V_2O_5

b) Analysis to be run from R only, once a month; sample for analysis to be a composite sample from three consecutive shifts; sampling to be done preferably in the first week of the month;

Full Suite, Table III, page 14 of the Application for Source Material License (See appended)

2) Discharge of IX Columns; all goes to ponds (sampling point R-3)

a) Monday, Wednesday and Friday samples;

pH	Mo
HCO_3^-	U_3O_8
CO_3^{--}	V_2O_5

b) Once a month, preferably in the first week of the month:

Radium 226	SO_4^{--}
Selenium	TDS
Arsenic	

3) Monitor Wells and water supply well 789-V

a) Wells M-1, M-4, and M-5 only (M-2 and M-3 are across the hydrologic barrier): Sample and analyze once every two weeks for:

Conductivity	CO_3^{--}
pH	U_3O_8
HCO_3^-	V_2O_5

b) All monitor Wells, M-1, M-2, M-3, M-4, M-5, OSA-1 and water supply well 789-V:

Sample and analyze once a month for:

Entire suite, Table III, page 14 of Application for Source Material License.

4) Any additional analyses at any time when deemed necessary to do so (the above listings are minimum).

5) Nuclear Dynamics, Inc. proposes to observe the trend of restoration under the current conditions and modify as necessary within the requirements of the Source Material License. Significant changes will be discussed with the Nuclear Regulatory Commission.

Injection of natural formation water into the I wells will be established when analyses of these wells indicates the restoration front has reached them.

Proposed plans for post-restoration monitoring will be submitted in the near future, as we get a better picture of the restoration process.

Thank you for your continued interest in this project. We will keep you informed on developments.

Very truly yours,

Francis X. Cannaday

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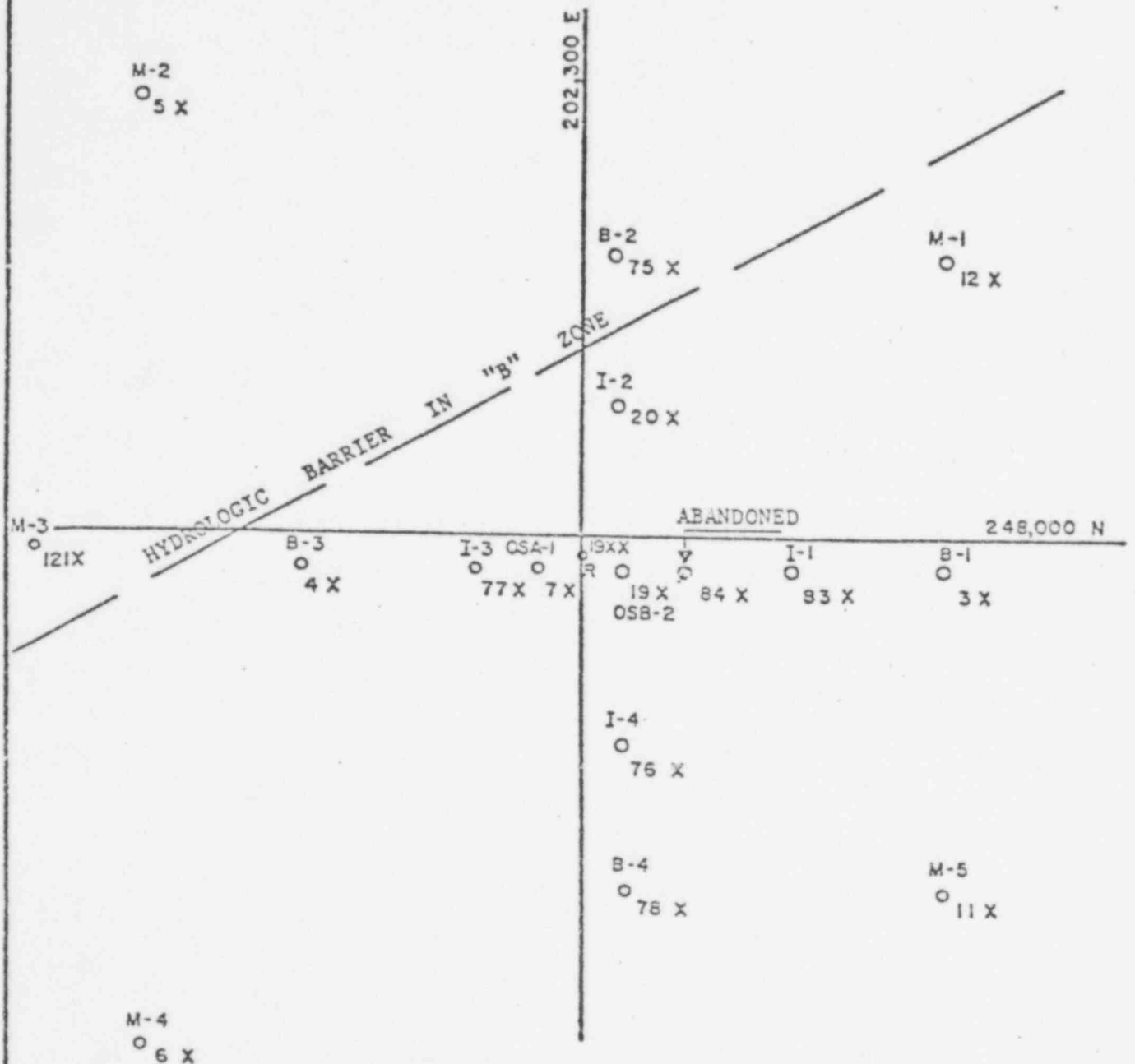
Project Engineer
Sundance Project

FXC:sem
Enclosures

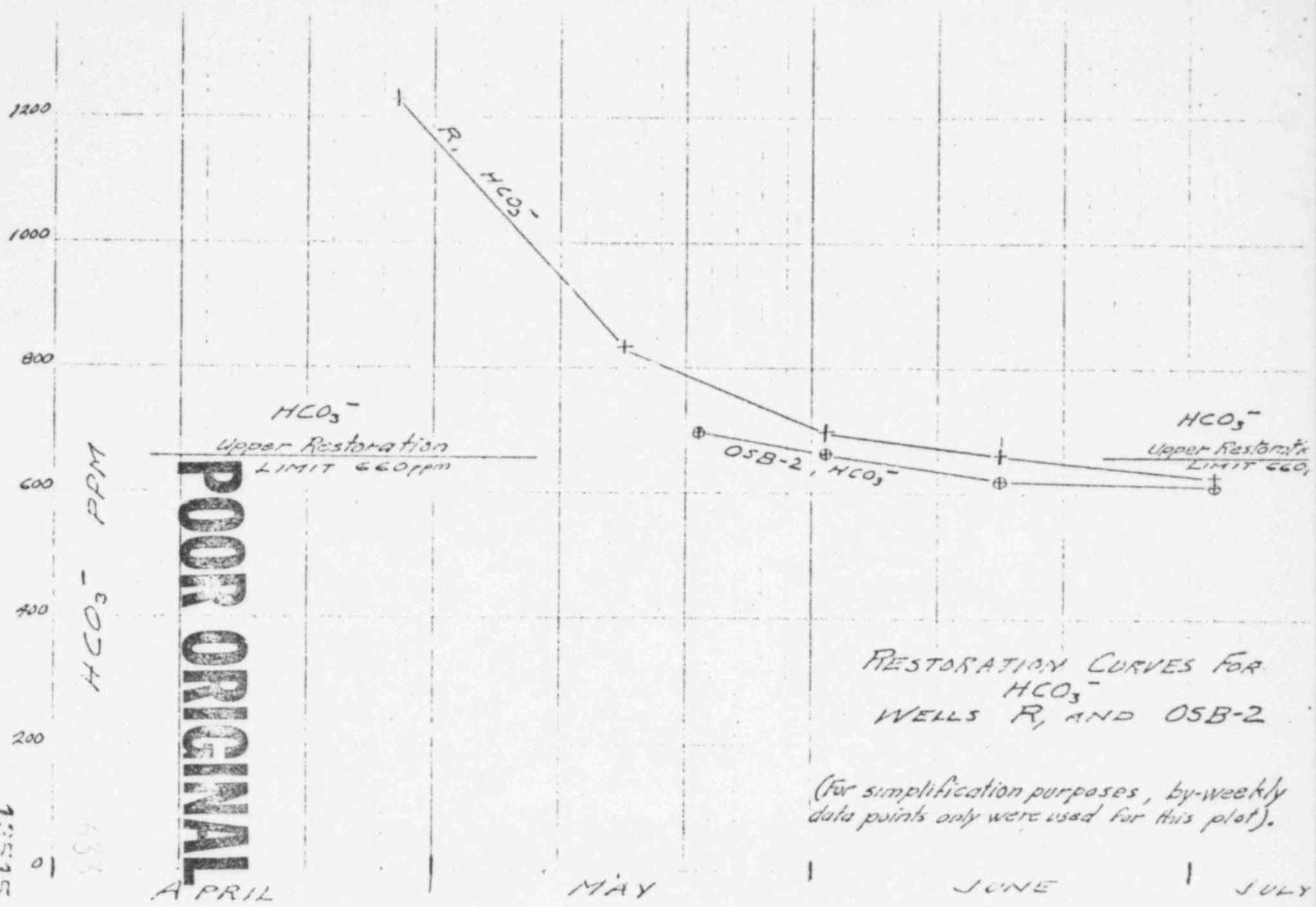


SCALE: 1" = 40'

mdb

	R	RECOVERY WELL
I-1, I-2, I-3, I-4		INJECTION WELL
B-1, B-2, B-3, B-4		BUFFER WELL
	OSB-2	ON RECOVERY WELL DUTY
M-1, M-2, M-3, M-4, M-5		MONITOR WELL / ORE ZONE
	OSA-1	MONITOR WELL / ZONE "A"
	04X	ABANDONED WELL

FIGURE A



RESTORATION CURVES FOR HCO_3^- WELLS R, AND OSB-2

(For simplification purposes, by-weekly data points only were used for this plot).

FIGURE B

TABLE III

PRELIMINARY BASELINE WATER CHEMISTRY

as of 8-77

(All values mg/l except conductivity which is in micromhos and Radium 226, Gross Alpha and Gross Beta which are in pCi/l)

	Surface Aquifer Two wells		"A zone"	"B zone" Five wells		EPA[1] Public Water	EPA[1]	EPA[1]
	Min.	Max.	One well	Min.	Max.	Supply	Livestock	Irrigation
Ca	17	18	7.8	6 0	20.5			
Na	66	205	325	320	700		2000	
Na milliequiv/l	2.87	8.9	14.1	13.9	30.4			1.25[2]
K	3.5	4.0	7.3	2	7.9			
Mg	9.6	11	1.5	1.8	16			
Cl^-	9.0	9.0	12	10	27.3	250	2000	100
CO_3^-	0.0	9.2	74	0.0	120			
HCO_3^-	188	411	374	321	643	150		
SO_4^{--}	14.0	129	202	106	880	250	3000	200
NH_3	.1	.3	1.8	.1	1.48			
TDS	288	559	917	939	1860	1000	5000	500-5000
Cond.	368	957	1320	1190	2580			
U	.006	.01	< .002	.012	.85			
B	< .01	< .1	.24	.2	.8	1	5	.75-2
Cu	< .005	< .005	.04	< .005	.04	1	.5	.2-5
Zn	< .009	< .03	.02	.002	.58	5	25	2-10
Pb	< .002	< .01	< .002	.002	.05	.05	.1	5-10
Mo	< .01	< .01	.02	< .01	.03			.01-.05
V	.004	< .004	.011	< .002	.006		.1	.1
Se	.003	.008	.005	.003	.22	.01	.05	.02
Ag	.001	< .002	.001	< .002	.008	.05		
Cd	.002	< .002	.01	< .002	.008	.01	.05	.01-.05
Mn	.002	.01	.03	.004	.08	.05	10	.02-10
Ba	.5	< .5	.05	< .005	.5	1		
Hg	< .0001	< .0001	< .0001	< .0001	.001	.002	.01	
Fe	.11	.40	1.0	.05	.4	.3		.5-20
As	.01	< .04	.02	< .01	.02	.05	.2-1.0	.1-2.0
Cr	< .005	.01	.04	< .005	.32	.05	1	.1-1.0
NO_3^-	.05	3.54	.85	< .05	8.3	10 (as N)	100	
pH	7.7	8.4	9.4	7.7	8.6	4.5-9.0	6.0-9.0	4.5-9.0
Ra 226	0.0 ± 0.6	0.4 ± 0.3	0.0 ± 0.7	0.4 ± 0.4	100 ± 15	5		
Gross Alpha	3.5 ± 1.7	12.2 ± 3.0	4.4 ± 2.4	14.4 ± 4.0	380 ± 20			
Gross Beta	0 ± 7	3.0 ± 11.0	37.0 ± 12	0 ± 22	740 ± 20			

(1) Wyoming DEQ - Compiled Primarily by Water Quality Division - DEQ (7/8/77) from EPA Proposed Water Quality Criteria

(2) Wyoming DEQ (7/8/77) Irrigation Water Quality - Secondary Criteria.