

PDR

CC Cooperstein ✓
Lester
MILL file: Cotter

M-6



LAW OFFICES
EDWARD J. McGRATH
14th FLOOR
51 MONROE STREET
ROCKVILLE, MARYLAND 20850
(301) 340-0600

June 12, 1979



Mr. Ross Scarano
Senior Fuel Cycle Licensing
Specialist
United States Nuclear Regulatory
Commission
1915 Eastern Avenue
Silver Spring, Maryland 20910

Re: Cotter Corporation Canon City Mill Expansion Project

Dear Mr. Scarano:

For your information, we enclose copies of the following:

1. Letter of June 5, 1979 to W. A. Wahler and Associates from John Logan suggesting criteria for recognizing degradation in water quality for Lincoln Park adjacent to the Cotter Mill which was submitted to the Colorado Department of Health in connection with a contemplated license condition requiring additional control measures if certain levels of degradation occur.
2. Copy of a impoundment drawing by W. A. Wahler and Associates with attachment indicated disposition of existing tailings in the event that Cotter had been required to move the same prior to reprocessing.
3. Copy of a memorandum dated May 23, 1979 from Dr. Stan Ferguson CDH Epidemiologist to Dr. Traylor, Director of the Health Department, giving a standardized total cancer mortality rate for Fremont County, Colorado.

I am transmitting simultaneously to Dr. Williams a copy of the letter identified in item 1 above.

Sincerely yours,

Edward J. McGrath

FREE EXEMPT

EJM:bmn
Enclosures

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JOHN LOGAN

CONSULTANT SPECIALIZING IN
Ground-Water geology & hydrology
Water resources development

P.O. BOX 2096, CARMEL, CALIF. 93921 • PHONE (408) 624-8204

June 5, 1979

W. A. Wahler & Associates
1023 Corporation Way
Palo Alto, California 94303

Attention: Mr. R. H. Lubina

Subject: Cotter Project, Recognition of Chemical
Degradation in Lincoln Park Ground Waters

Dear Dick:

The area in Lincoln Park affected by raffinates appears to have stabilized. Indeed, there are some evidences that it has shrunk in geographic extent and that concentrations of deleterious chemical components have reduced, beginning in about August 1975, perhaps as a result of the construction of the SCS reservoir and/or the implementation of molybdenum recycling at the mill, each of those events having occurred a few years before 1975.

The remedial actions now in process should improve the situation. Nevertheless we must be prepared for degradation in the affected area. Degradation is not likely, but no one can state that it is impossible.

How can degradation be recognized in the affected area? What actions should be taken if degradation occurs?

In our October 1978 report, it was suggested that the SCS reservoir serve as an early warning indicator to tell us whether the seepage interception program is working as intended. This suggestion remains our recommendation; however, it is thought that some definitive criteria in Lincoln Park, which is the main concern, is also required to gauge the effectiveness of our seepage interception program. In fact, all the monitoring data, including the proposed deep wells, should be analyzed or taken into consideration when formulating decisions on groundwater and seepage.

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One of the problems in evaluating both the SCS reservoir and Lincoln Park well waters is dilution by fresh water (direct runoff in the first case; recharge from irrigation and ditch leakage in the second case). At the SCS reservoir such dilutions could be so episodic as to mask completely any secular trends. The same could happen at the wells, of course, but the magnitude of any dilution event would be much lower. Further, pump-back from the interception ditches could change the chemistry of the reservoir's water quite rapidly. The main concern is Lincoln Park and our observations should focus on that area. The following section describes in detail our proposed criteria in Lincoln Park.

RECOGNITION OF DEGRADATION

The molybdenum content of Lincoln Park groundwaters is the key parameter for the recognition of raffinates. Uranium and conductivity are also valuable and must not be overlooked, but I propose that our principal attention be directed to Mo.

Unfortunately the observed variations of Mo in any given well are quite high (and we do not understand all of the reasons therefor). Those variations must be accounted for in any interpretative scheme and they must necessarily be treated on a statistical basis.

The monitoring program proposed in my report of 29 March 1978 included 17 wells in Lincoln Park, to which will be added those stations that are to be constructed north of the SCS reservoir as part of the "deep path" investigation. For each of those stations, assemble the entire chemical record. Determine means, standard deviations, and time-oriented regressions.

During the regular monitoring program, should Mo at any station exceed that station's mean plus one standard deviation*, immediately begin special testing at twice-monthly intervals, determining Mo, U, and EC. For convenience, I will term the mean plus one standard deviation "concentration T" (T for

* Example: If the mean is 0.6 and the standard deviation is 0.3, this value will be 0.9, and for normally distributed data, will be exceeded in about 1/6th of the samples.

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W. A. Wahler & Associates
June 5, 1979
Page three

"triggering"). Continue this special program at any station as long as Mo exceeds T. The "standard" quarterly program will not be interrupted.

If the observed variations of Mo result from random events, T will be exceeded about 1/6 of the time. Such a frequency is not too rare; whereas it is high enough to call for special attention, it is not so high as to require any heroic type of remediation. However a great amount of concern should result if T is exceeded in two or more stations for any appreciable period of time.

If Mo exceeds T in two or more stations in three consecutive twice-monthly samplings, provisionally consider that degradation is occurring. All interested parties should then confer and discuss the necessity of action.

This scheme should not be implemented immediately. Major remedial actions are still in progress at and near the mill. The proposed scheme should not be begun until the actions are far advanced and the completion of the clean-up of the SCS reservoir may be a useful target.

REMEDIAL ACTIONS

Several possible remedial procedures could be considered if the criteria based on T are exceeded and the following two would be high on any list.

1. Remove the existing tailings ponds to the new lined impoundment, without reprocessing.
2. Establish a pump-back system from Lincoln Park to the lined impoundment.

Yours truly,

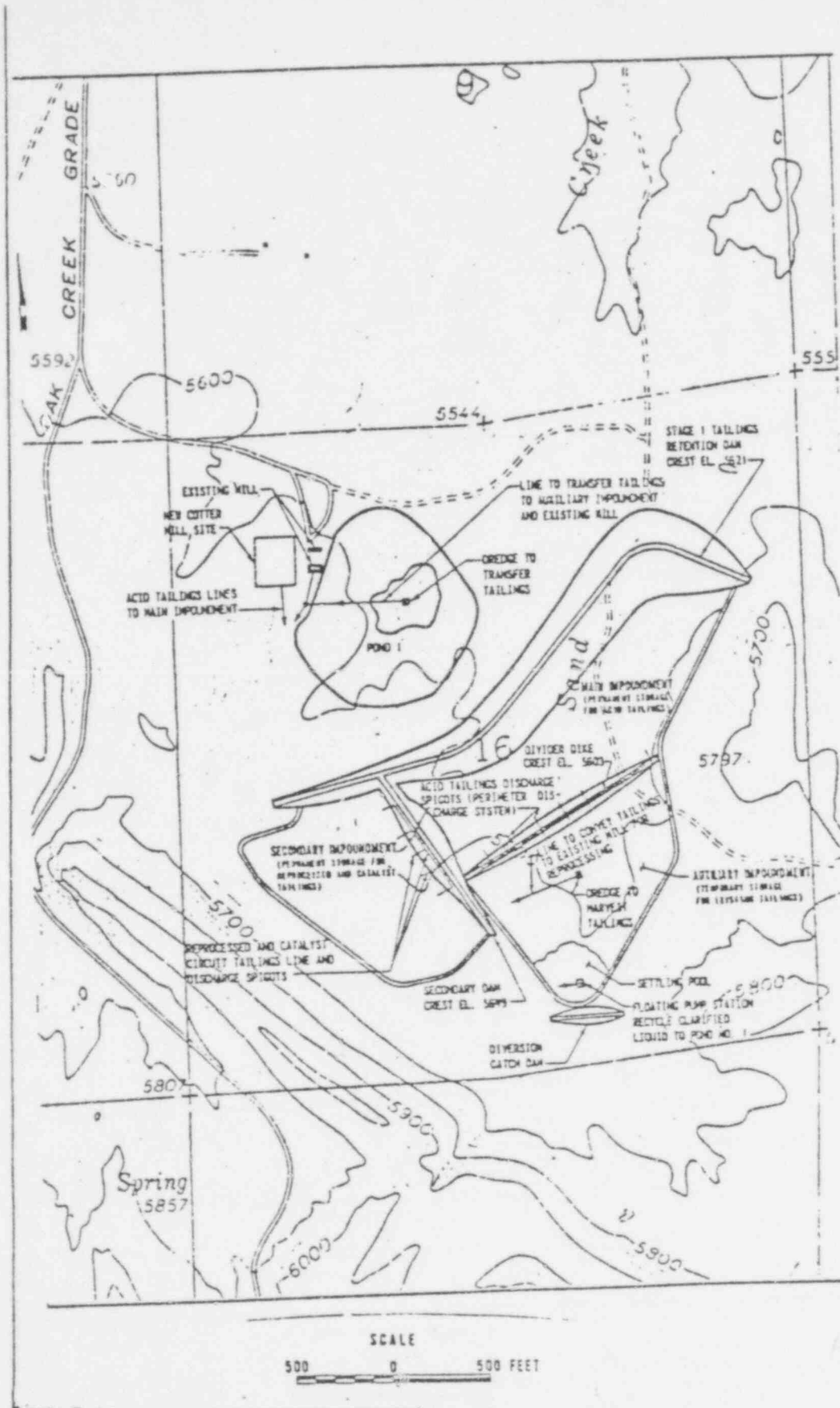
ORIGINAL SIGNED BY

John Logan

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JL/jm

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631-247

FROM U.S. GEOLOGICAL SURVEY
 CANON CITY QUADRANGLE
 MT. CO., COLORADO 1959.

mountain states engineers
 TUCSON ARIZONA

REV.	DATE	DESCRIPTION	APPROVED
DESIGNED		DRAWN	REVIEWED
			APPROVED

WAHLER
 SOCIATES

COTTER CORPORATION URANIUM-VANADIUM PLANT
 CANON CITY, COLORADO

COTTER URANIUM TAILINGS IMPOUNDMENT
 PROPOSED EXISTING TAILINGS TRANSFER-DISPOSAL OPERATION

PALO ALTO • NEWPORT BEACH • CALIF.

PROJECT NO.	DATE	FIGURE NO.
WSM-101	FEBRUARY 1973	1

OPERATIONAL PROCEDURES

I PHASE I — START-UP

1. BEGIN MILL OPERATIONS AND CONSTRUCT DIVIDER DIKE (EARTH FILL OR ACID TAILINGS) IN MAIN IMPOUNDMENT TO FORM AUXILIARY IMPOUNDMENT.
2. INSTALL TAILINGS PIPELINE DISTRIBUTION SYSTEM.
3. FLOAT DREDGE IN POND NO. 1.

II PHASE II — OPERATIONS FOR TRANSFER OF EXISTING TAILINGS (3-6 MONTHS)

1. TRANSFER EXISTING TAILINGS WITH DREDGE TO AUXILIARY IMPOUNDMENT.
2. DISCHARGE ACID TAILINGS FROM NEW MILL FROM CREST OF DIVIDER DIKE INTO MAIN IMPOUNDMENT
3. REPROCESSING OF EXISTING TAILINGS IN POND 1 CAN COMMENCE SIMULTANEOUSLY WITH TRANSFER OF EXISTING TAILINGS.
4. DISCHARGE REPROCESSED TAILINGS FROM EXISTING MILL AND CATALYST CIRCUIT TAILINGS INTO SECONDARY IMPOUNDMENT.
5. AFTER TRANSFER OF EXISTING TAILINGS TO AUXILIARY IMPOUNDMENT COMPLETE RECLAMATION OF EXISTING POND AREAS.

III PHASE III — HARVESTING AND PROCESSING OF TRANSFERRED TAILINGS (7 YEARS)

1. HARVEST TRANSFERRED TAILINGS FROM AUXILIARY IMPOUNDMENT, PROCESS THROUGH EXISTING MILL AND DISCHARGE REPROCESSED TAILINGS INTO SECONDARY IMPOUNDMENT.
2. CONTINUE DISCHARGING ACID TAILINGS FROM CREST OF DIVIDER DIKE AND FROM PERIMETER BERM INTO MAIN IMPOUNDMENT.
3. CONTROL FREE LIQUID SURFACE IN MAIN IMPOUNDMENT BY DECANING EXCESS LIQUID INTO SECONDARY IMPOUNDMENT OR INCREASE EVAPORATION RATE'S BY SPRAYING.
4. RAISE DIVIDER DIKE WITH ACID TAILINGS TO KEEP ACID TAILINGS AND TAILINGS IN AUXILIARY IMPOUNDMENT SEPARATED.
5. RAISE TAILINGS RETENTION DAM AND EXTEND IMPOUNDMENT LINING AS REQUIRED (AFTER APPROXIMATELY 4 YEARS OF MILL OPERATION).

IV PHASE IV — OPERATIONS AFTER REPROCESSING OF EXISTING TAILINGS

1. AFTER TAILINGS HAVE BEEN HARVESTED AND REPROCESSED FROM AUXILIARY POND INSPECT AUXILIARY IMPOUNDMENT LINING SYSTEM.
2. UTILIZE AUXILIARY IMPOUNDMENT FOR ACID TAILINGS DISPOSAL.
3. RAISE TAILINGS RETENTION DAM AND EXTEND IMPOUNDMENT LINING AS REQUIRED

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ED
V.
NE
—

Epidemiology

Dr. Frank Traylor

May 23, 1979

Dr. Stan Ferguson

Your Request for Canon City
Cancer Mortality Data

Frank,

Attached, please find age-standardized total cancer mortality rates for Fremont County and the State of Colorado for 1950 thru 1975. Standardization technique is from "Introduction to Demography" by Spiegelman, Society of Actuaries, 1955. The "indirect" method of standardization is used since the population of Fremont County is too small for the computation of age-specific rates in all age strata (a requirement of the direct standardization procedure).

I have computed rates for total cancer mortality because no sub-grouping of sites provides numbers of sufficient size for "good" rate calculation (and also since sites are not broken out in our mortality data prior to 1960).

I used the 3rd National Cancer Survey incidence rates as a standard. The rates and the standardization procedure utilize only white persons (the non-white population in Fremont County is very small, therefore, we saved a lot of math and sacrificed very little accuracy).

For simplicity (and in light of the short time), I computed standardized rates only for every five-years. I "eye-balled" the remainder and assure you the others fall into line. We will fill in the other figures as soon as possible.

Attachment

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CANCER MORTALITY RATES*
for FREMONT COUNTY and
the STATE OF COLORADO

	1950	1955	1960	1965	1970	1975
Colorado (crude)	128.3	150.2	125.9	118.4	121.6	120.1
Fremont (crude)	206.9	190.6	198.1	194.2	173.2	245.8
Fremont (AS**)	124.1	125.3	122.4	123.8	117.6	126.5

* Rates per 100,000 population

** Age-standardized

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W.A. WAHLER
& ASSOCIATES

PALO ALTO • WASHINGTON, D.C. • NEWPORT BEACH
1023 CORPORATION WAY P.O. BOX 10023 PALO ALTO, CALIFORNIA 94303
(415) 968-6250 • TELEX NUMBER: 348-427 • CABLE ADDRESS: WAWAENGUSA

June 8, 1979
Project MSM-102A

RECEIVED

JUN 11 1979

EDWARD J. McGRATH

Mr. Edward J. McGrath
51 Monroe Street
Unibank Building
Rockville, Maryland 20850

Subject: Cotter Groundwater Data

Dear Ed:

As per your request of earlier this week, John Logan has assembled what we believe is the only outstanding baseline data not included in our October 1978 report. Attached are 2 - 8-1/2 X 11 sheets with handwritten listings and 34 "Certificates of Assay" made by the Cotter Corporation.

It should be noted that the locations of some of the stations in the listings have not been identified. Also, it may be that a few of the analyses attached may actually be listed in our previous report, as a cross-check of these data has not been done. The attached miscellaneous analyses add little to our knowledge of Lincoln Park ground waters. These analyses were received after the publishing of our October 1978 report, but they do not change any of the conclusions stated in that report.

To our knowledge, the only remaining data which has not been considered by us are those additional analyses made by the Colorado Department of Health and by Dr. Runnels of Colorado University. We have not been able to obtain copies of these data.

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Mr. Edward McGrath
June 8, 1979
Page two

In conclusion, the best and most important data summarization is that found in our October 1978 report. All of the analyses available to us at that time were assembled in those listings. Considerable effort was expended to assemble and summarize a somewhat vast and, at times, confusing mass of analytical analyses.

It is hoped that this information is sufficient for your purposes. If there are any additional questions, please contact me at your convenience.

Sincerely yours,

W. A. WAHLER & ASSOCIATES

Richard H. Lubina

Richard H. Lubina
Project Manager

*by Jack H. Wulff
Chief Engineer*

RHL:ds

Enclosures

cc: Mr. John Logan with attachments
Mr. Jack Pierce
Mr. Myles Fixman

Analyses acquired from Lynn Boughton, LB/1
20 Feb 79

I probably have most of these. Check to be certain, but also
copy all, just in case.
All in mg/l unless otherwise indicated

- ✓ 6-25-68: Boughton's well
H=444 Mo=0.0 U=.046 mg/l
- ✓ 6-28-68: Hahn H=368 Mo=0.0 mg/l U=0.06 mg/l
- ✓ 6-28-68: Dominic Bosco, dug well 1953, 1428 Cedar. House well
H=352. Mo=10.5 mg/l U=0.831 mg/l Alk=0
- ✓ 6-28-68: D. Bosco, field well
alk=0 H=1784 Mo=24.3 U=3.243 mg/l
- ✓ 6-28-68. Rex Cooper, 1428 Cedar, Dug well
Alk=0 H=280 Mo=0.5 mg/l U=0.155
- ✓ 6-28-68. C.R. Ransom, 1430 Cedar. Dug well. TD=37'. Next to house
alk=0 H=600 Mo=11.5 U=1.020
- 6-28-68. C.R. Ransom. Drilled well. TD=154' DW=73'
alk=0 H=28 Mo=0.1 U=0.101
- 6-28-68. Olin Nichols. Pond.
alk=0 H=304 Mo=0.0 U=0.101
- 6-9-70. Portec Inc. New well.
TDS=2070 H=780 Ca=450 Mg=330 Fe=22.4 Cl=60.0
SO₄=High EC=2300
- 8-3-68. C.A. Crow
H=328 Mo=5.7
- 8-3-68. Cooper
H=260 Mo=0.5
- 8-3-68. Ransom house well
H=746 Mo=12.8
- 8-3-68. Ransom drilled well
H=4.4 Mo=0.9
- 8-3-68. Bosco house well
H=684 Mo=16.3
- 8-3-68. Bosco field well
H=1806 Mo=30.3
- 7-31-68. Boughton
H=100

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3-26-77. E. Starika well (by NALCO)

$\alpha = 12.2 \pm 4.9$

$\beta = 6.6 \pm 2.4$

Station	July 1975			Aug 1975		
	mg/L U	mg/L Mo	α	mg/L U	mg/L Mo	H
Marshall	0.008	0.40	33.9 ± 4.4	0.008	nil	158
Boughton	.038	.60	12.3 ± 3.1	.050	.80	248
Four miles	.008	nil	2.6 ± 1.1	nil	nil	96
Grape Crk	.015	.4	2.8 ± 1.1	nil	0.20	98
Dalweese	.008	.2	8.4 ± 1.9			
Ransom	.244	2.4	19.4 ± 15	.200	1.30	82
Cooper -	.053	.2	14.2 ± 3.5	.100	nil	258
Blossom	.183	1.7	59.9 ± 8.4	.200	2.20	180
Boser house	.538	3.3	28.4 ± 21	.300	1.90	78
" field	2.32	23.2	2073 ± 98	1.500	18.66	270
Sand Creek	11.03	50.8	4580 ± 340	11.00	50.20	1700
North well	25.85	156.	24020 ± 1320	28.00	167.0	2100
South "	43.90	208.	11360 ± 2810	44.00	218.0	2740
Welf Park				-	18.10	2550
Di. Ohio				0.040	nil	302
Hahn				0.030	nil	178
Martin				0.130	1.30	264

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C.T.C.
Mo & Hardness
from Bouvier's "Slips"

Date	Sta	Mo	Ha	Date	Sta	Mo	Ha
Aug 68	44	0.4	603	Jan 69	39	21.4	1612
	17	0.6	226	✓	40	13.9	1356
	39	15.9	1112		41	0	24
	38	24.1	1706		21	0.4	390
	42	5.9	238	Feb 69	44	0.2	328
	21	0.8	260	✓	39	21.7	1720
	40	10.4	430		41	0.2	32
	41	0.9	34		40	15.9	1540
	22	1.1	138		21	0.6	440
✓ Sept 68	39	18.2	1356	July 70	42	14.5	860
	38	27.5	1636	✓	39	23.3	1220
	21	0	255		39	19.1	480
	40	11.0	583	✓ May 70	40	30.0	940
	41	0	12		40	28.3	930
Oct 68	39	12.3	1496	✓ July 70	41	0.6	15
	38	23.9	1720	Oct 71	39	10.5	720
	21	0	250		38	20.0	2200
	40	10.5	331		23	0.6	160
	41	0	20		40	8.7	158
	44	0	371	25/09 June 73	Front Swel	0.6	260
	17	0	250		23	1.1	290
Nov 68	39	18.0	1660		44	0.6	330
	41	0?	20		39	2.9	240
	40	11.5	1000		38	13.0	1360
	21	0?	268		40	2.6	220
	44	0?	443	Front Swel	0.5	290	
Dec 68	43	13.5	1240		?	0	320
	39	23.8	1712		55	15.6	1020
	21	0?	200		-	-	200 13220
	11	0?	200		40	631	256

Date	Sta	Min	Hd
2/29 Jun 78	19	2.6	180
	20	0.6	290
	18	1.0	200
	21	0.3	260
	51	0.1	180

Values from NALCO

Date	Sta	Min	Hd
10/75	55	3.3	687
	38	8.1	345
	39	0.7	63
	21	0.1	426
	51	-	-
	40	0.2	64
	23	0.2	221
	44	0.1	345
	22	1.0	312
	14	<0.05	303
	33	0.1	278
	510	<0.05	278
	53	-	-
Sum 2	170		5571

Date	Sta	Min	Hd
6/76	55	3.7	1837
	38	8.9	1194
	39	3.2	192
	21	-	-
	51	<0.05	195
	40	3.6	288
	23	1.0	272
	44	0.35	343
	22	0.3	265
	14	<0.05	347
	33	0.2	235
	510	0.06	260
	53	<0.05	328
Sum 2	190		3875

631 257

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 2-7-73

S04

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz/Ton	Ni %	Co %	Cu %	Mo	V ₂ O ₅	Gr	Ph
2-5-73	.007						.125		3.17	7.4
	.058						.252		23.31	8.0
	.037						.059		4.03	7.3
	.041						.052		7.20	7.7
	.042						.256		33.64	2.7
	.02						.190		16.48	8.5
	.055						.353		25.00	8.1
	.074						.346		26.17	
	.077						.347		29.52	8.7
	.003						.002		1.17	7.3
	.017						.003		0.99	7.5
	.014						.012		3.45	8.1
	.014						.016		4.16	8.1

CC: DPM
MF
MINE
DL
EXP

Lynn Beckett
CHIEF CHEMIST

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 2-13-75

Water Sampler

Poly

Dis. Solids

PPM

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz/Ton	Ni %	Co %	Gr %	Mo	V ₂ O ₅	PPM →	Ph	Hardness
2-9-75	.009						.032		6300	7.7	460
	.061					NIL	.237		4500	7.3	4200
	.038					NIL	.110		720	6.3	3000
	.040						.145		15300	7.2	2350
10	.023					NIL	.209		75000	2.7	3500
	.040						.146		23300	8.1	2450
-1A	.073						.322		51750	7.7	3500
-1B	.077					NIL	.304		49500	8.2	3100
-1C	.070						.400		50900	8.5	2900
-16	.0024					NIL	.002		2520	8.0	270
	.0004						.0005		3510	7.4	1170
	.008						.010		5760	7.8	1370
Date V	.007						.010		5670	8.0	1020

CC: DPM
MF
MINE
DL

631 258

Lynn Beckett
CHIEF CHEMIST

13220

Certificate Of Assay

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Water Samples

from
COTTER CORPORATION
 ANALYTICAL DEPARTMENT
 P. O. Box 751
 Canon City, Colorado 81212

DATE 2-26-78

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Ni %	Co %	Cu %	% Mo	V ₂ O ₅	Se	PH
1 <u>2-20-78</u>	.014						.040			7.7
2	.066						.221			7.9
3	.036						.118			6.9
4	.036						.124			7.3
10-10	.024						.232			2.7
TCH	.031						.142			9.0
U-1A	.076						.305			7.5
U-1B	.072						.303			9.1
U-1C	.066						.356			8.5
DH-16	.002						.002			7.5
Z-1	.012						.002			7.7
C	.015						.013			7.5
SC DAM	.011						.014			7.5

cc: DPM
 MF
 MINE
 DL
 EXP

L. J. Bonalton
 CHIEF CHEMIST

Certificate Of Assay

Water Samples

from
COTTER CORPORATION
 ANALYTICAL DEPARTMENT
 P. O. Box 751
 Canon City, Colorado 81212

DATE 3-28-78

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Ni %	Co %	Cu %	% Mo	V ₂ O ₅	Se	PH
A-1 <u>3-3-78</u>	.013						.055			7.4
A-2	.056						.223			8.3
A-3	.034						.110			7.0
A-4	.039						.148			7.5
10 Pond	.025						.236			3.5
<i>Ottawa below pond</i>	.047						.182			8.4
OW-1A	.073						.332			7.8
OW-1B	.071						.332			8.2
OW-1C	.071						.377			8.6
DH-16	.001						.001			7.8
Z-1	.008						NIL			7.2
<i>Sand Creek spring</i>	.011						.011			3.0
<i>Sand Creek Pond</i>	.013						.020			7.6

later samples
September 1968

Certificate of Assay

from

COTTER CORPORATION
 ANALYTICAL DEPARTMENT
 P. O. Box 751
 Canon City, Colorado 81212

DATE 10-9-68

MARKED	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	Hardness %	H/K %	MO %	PTT %
<u>base of mine</u>								1386	0	18.2	6.8
<u>base of field</u>								1636	0	27.5	7.0
<u>near Cooper</u>								256	0	Nil	6.9
<u>Ransom dug</u>								588	10	11.0	7.4
<u>Ransom drilled</u>								12	0	Nil	7.0

DPM WEG GG
 DRA GR MINE
 RFS MF

... Ransom, Ten Wells ?

CHIEF CHEMIST

later samples
October 1968

Certificate of Assay

from

COTTER CORPORATION
 ANALYTICAL DEPARTMENT
 P. O. Box 751
 Canon City, Colorado 81212

DATE 11-3-68

MARKED	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	Hardness %	H/K %	MO P.P.M.	PTT %
<u>base of mine</u>								1446	0	18.3	6.8
<u>base of field</u>								1728	0	23.9	7.0
<u>near Cooper</u>								250	0	Nil	6.8
<u>Ransom dug</u>								834	0	10.9	7.0
<u>Ransom drilled</u>								20	20	11.7	7.2
<u>near Cooper</u>								514	0	11.7	7.0
<u>Hahn</u>								250	0	11.2	7.0

DRA GR MINE

631 267

CHIEF CHEMIST

078220

Water Samples

NOV 1968

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE _____

MARKED	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Zd %	HAIR %	PH %	MO PPM	%
JOSCO House								1660	7.2	18.2	
Ransom Drilled								20	7.8	—	
RANSOM House								1000	7.4	11.5	
REX COOPER								228	7.1	—	
HAUGHTON well								448	7.6	—	

DPM WEG GG
DRA GR MINE
RES MF

CHIEF CHEMIST

Water Samples

Dec 1968

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE _____

MARKED	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	PH %	HAIR %	MO PPM	%
RANSOM House								7.5	1240	13.5	
Josco House								7.2	1212	20.8	
REX COOPER								7.1	700	.2	
HAUGHTON well								8.3	252	.5	
RANSOM Drilled								7.4	22	11.7	

DRA GR MINE

631 263

13020

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 9-17-69

Other Samples
April 1969

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton.	Au Oz./Ton.	Pb %	Zn %	Cu %	Cd %	Residue PPM
<u>1473 Cedar</u>									944.0
<u>Well?</u>									628.0
<u>Water Well</u>									188.0
<u>House</u>									1188.0
<u>2 ft</u>									1284.0
<u>Field</u>									1168.0
<u>Drill</u>									200.0

OPM WEG CO
DRA MINE JF
MF DL ECR

Lynn Baughton
CHIEF CHEMIST

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 9-17-69

Other Samples
May 1969

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton.	Au Oz./Ton.	Pb %	Zn %	Cu %	Cd %	Residue PPM
<u>Lighter Well</u>									208.0
<u>Canon Drilled</u>									200.0
<u>Drug</u>									1160.0
<u>House</u>									1692.0
<u>Well</u>									264.0
<u>Well</u>									176.0

631 265

MF DL ECR

Lynn Baughton
CHIEF CHEMIST

13220

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 9-17-69

Water Samples
June 1969

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	Mercury PPM
<u>Wrighton Well</u>									184.0
<u>Hahn Well</u>									188.0

DPM WEG CO
DRA MINE JF
MF DL ECR

Lynn Boughton
CHIEF CHEMIST

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 9-17-69

Water Samples
July 1969

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	Mercury PPM
<u>Hahn Well</u>									180.0
<u>Basco House</u>									142.0
<u>Basco Field</u>									1732.0
<u>Basco Drilled</u>									68.0
<u>Basco Dug</u>									1116.0
<u>paper well</u>									240.0
<u>raw well</u>									1108.0

DPM WEG CO
DRA MINE JF
MF DL ECR

631 266

Lynn Boughton
CHIEF CHEMIST 13220

Water Samples
August 1969

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 9-17-69

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	Horace ppm
Boughton Well									469.0
Hahn Well									244.0
Meister Well									400.0
paper Well									224.0
anion Drilled									64.0
anion dug									832.0
House									1069.0
Open Field									1704.0

CC DPM WEG CO
DRA MINE JF
MF DL ECR

7-5000

Lynn Boughton
CHIEF CHEMIST

Water Samples
Index

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 9-2-70

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	ppm	Cd %	Horace ppm
7125							14.8		960 ppm
3/12/70							33.3		1220 ppm
3/12/70							19.1		407 ppm
3/12/70							30.0		940 ppm
3/12/70							28.3		957 ppm
7/70							.6		15 ppm
off Park Sept							7.8		

MO

CC DPM WEG CO
DRA MINE JF
MF DL ECR

631-267

CHIEF CHEMIST

13220

Certificate Of Assay

TO: _____

from

Water Samples

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 1-11-71

Taken on State Health Visit 12-9-70

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	PPM		
									Mo	Ph	
# 1 Pond O'Flaw									107.0	7.3	
# 3 Pond									167.0	7.6	
Wolf Park Mine							-		15.0	8.1	
Water at Down Site							-	13.0	153.0	7.4	
Pond Below #3 Dike									163.0	163.0	8.4
Boughton Well Dec 1970										3	8.0

LB

CHIEF CHEMIST

CC DPM WEG CO
DRA MINE JF
MF DL ECR

0-68-3000

Certificate Of Assay

TO: _____

from

Water Samples
"1970"

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 1-13-71

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	PPM	
									Mo	Ph
Bosco Field 10/70									35.5	7.5
Bosco House 10/70									26.9	7.7
Boscom Dug 10/70									24.3	7.9
Boscom Dug 10/70									.3	8.7
Boscom "X" 10/70									7.6	7.7
Copper Well 10/70									.8	7.9
Bosco Field 7/70									38.6	7.9
Boscom Dug 7/70									.3	7.6
Cross- 7/70									24.7	8.2

LB

CHIEF CHEMIST

CC DPM WEG CO
DRA MINE JF
MF DL ECR

631 268

13220

0-68-3000

Water Samples
(Wells)

Certificate of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 9-4-70

Hardness

MARKED	U ₂ O ₈ G/L	U ₂ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	Ppm	
from Well 7-25-70									860	
from Field 7-18-70									1220	
from House 7-18-70									480	
from Well ① 5-70									940	
from Well ② 5-9-70									980	
from Drilled Well 7-70									18	

DPM WEG CO
ORA MINE JF
MF DL ECR

Lynn Bangston
CHIEF CHEMIST

Certificate of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 11-24-70

Well Water Samples
October

MARKED	U ₂ O ₈ G/L	U ₂ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	Ph	Hardness
from House									7.6	1420
from Field									7.5	2180
from Dug									7.8	610
from Drilled									8.5	16
from Well									7.6	250
"X" Well (Ransom)									8.3	1450

631 270

CHIEF CHEMIST

13020

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 8-6-71

Water Samples

Hardness

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	PPM	Ph
near Day Well 40 feet									124.0	7.5
200 feet "									1760.0	7.5
200 House "									244.0	7.7
new "									64.0	7.6
200m "									148.0	7.5

CC DPM WEG CO
DRA MINE JF
MF DL ECR

-3000

Lynn Baughman
CHIEF CHEMIST

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 8-6-71

Water Samples

Hardness

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %	PPM	Ph
2000 Well East								2.3	72.0	6.4
2000 Well "								3.2	228.0	6.8
2000 Well "								3.1	124.0	7.5
200 Well "								6.1	244.0	7.7
200 Field "								17.6	1260.0	7.5
2000 Well "								1.6	64.0	7.6
2000 Well "								3.7	148.0	7.5

CC DPM WEG CO
DRA MINE JF
MF DL ECR

631 271

CHIEF CHEMIST

12220

Certificate Of Assay

from

Water Samples

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 10-13-71

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton.	Au Oz./Ton.	Pb %	Zn %	Cu %	Cd %	Hardness PPM		
									PPM	PH	Mo
<u>see Hand</u>									72.0	8.0	10.5
<u>see Field</u>									22.00	7.8	20.0
<u>see</u>									16.0	7.9	.6
<u>see</u>									158.2	8.05	8.7

DPM WEG CO
ORA MINE JF
MF DL ECR

Lynn Baughman
CHIEF CHEMIST

Certificate Of Assay

from

Water Samples

COTTER CORPORATION
ANALYTIC DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

DATE 4-18-72

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton.	Au Oz./Ton.	Pb %	Zn %	Cu %	Cd %	Hardness PPM	
									PPM	Hardness
<u>see</u>									25	350.0
<u>see</u>									23.0	920.0
<u>see</u>									20.0	960.0

DPM WEG CO

631 272

13220

Certificate Of Assay

State
Water Samples
Sampled 6-29-79

from

COTTER CORPORATION
 ANALYTICAL DEPARTMENT
 P. O. Box 751
 Canon City, Colorado 81212

DATE 7-10-78

MARKED	PPM						PPM		PPM	
	U ₃ O ₈ G/G	U ₃ O ₈ %	Ag Oz./Ton	Ni %	Co %	Cu %	6/Mo %	Se	PH	hardness
Shant (S. Well) 1551 Lombard	.0002	.216					.0006	.6	9.0	260
Shant 1433 Cedar	.0003	.287					.0011	1.1	9.0	290
Sh. Well 1402 Cedar	.0003	.035					.0006	.6	9.1	330
Sh. - 5				.036			Nil	Nil	9.1	220
Sh. - 4	.0003	.036					.0002	.2	9.2	30
Sh. Well (House)	.0009	.761					.0029	2.9	9.2	240
Sh. Well (Field)	.0032	3.185					.012	12.0	9.1	150
Sh. 1430 Cedar	.0005	.543					.0026	2.6	9.1	22
Shant (S. Well) 1551 Lombard	.0003	.290					.0005	.5	9.2	290
Sh. - 1	.0003	.035					.0001	.1	9.5	1240
Sh. Ditch	.0812	81.32					.257	257.0	9.5	5.640
Sh. Ditch	.0695	69.53					.289	289.0	8.2	3990
Sh. - 4	.0643	64.34					.397	397.5	10.0	750
Sh. - 4	.0255	25.52					.182	182.0	8.8	2,530
Sh. - 4	.0664	66.93					.390	390.0	10.0	740

Lynn Brantley
 CHIEF CHEMIST

CC: DPM
 MF
 MINE
 DL
 EXP

State
Water Samples
Sampled 6-29-79

from

COTTER CORPORATION
 ANALYTICAL DEPARTMENT
 P. O. Box 751
 Canon City, Colorado 81212

DATE 7-10-78

MARKED	PPM						PPM		PPM	
	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Ni %	Co %	Cu %	6/Mo %	Se	PH	hardness
Shant - 725 Kadium	.0004	.036					Nil	Nil	9.2	320
Sh. - 5	.0017	1.714					.0019	1.9	8.0	510
Sh. Cr. Dam	.0077	7.714					.0156	15.6	8.2	1.02
Sh. - 2	.0037	3.714					.0102	10.2	7.9	1.55
Sh. Well 1551 Log.	.0001	.105					.0002	.2	9.1	220
Sh. Well 152' 1432 Cedar	.0005	.50					.0027	2.7	9.3	310
Sh. - 2	.0036	.357					Nil	Nil	7.9	2.22
Sh. Well 25' 1635 Birch	.0017	1.714					.0026	2.6	9.2	180
Sh. Column Well 30' 1424 Poplar	.0002	.216					.0006	.6	9.2	290
Sh. Water Pond	.0022	3.166					.0075	23.5	9.5	120
Sh. Creek 1433 Birch	.0002	.357					.001	1.0	7.9	200
Sh. Cooper 1433 Cedar	.0011	.144					.0003	.3	8.0	260
Sh. Roberts (McKellan) U ₃ O ₈	.0004	.144					.0001	.1	8.1	330
Sh. Cr. Spring	.0129	12.899					.0295	29.5	7.9	1.390
Sh. Ditch at Cooper Drive	.0007	.072					.0001	.1	8.4	130

Lynn Brantley
 CHIEF CHEMIST

CC: DPM
 MF
 MINE
 DL
 EXP

631 273

13220

Certificate Of Assay

from

Water Samples

COTTER CORPORATION

DATE 8-6-75

ANALYTICAL DEPARTMENT

P. O. Box 751

Canon City, Colorado 81212

PPM U

PPM

MARKED	U ₃ O ₈ G/L		Ag Oz./Ton	Ni %	Co %	Cu %	Mo	V ₂ O ₅	Se
261 Marshall		.008					.4		
262 Boughton (LYNN)		.038					.6		
263 Run at 4-mile		.008					NIL		
264 " " Ennel Creek		.015					.4		
265 P.O. Ditch		.008					.2		
266 Ransom		.244					2.4		
267 Cooper		.053					.2		
268 Blossom		.183					1.7		
269 Base House		.470					3.3		
270 " Field		1.83					23.2		
271 Sand Creek Pond		11.025					50.8		
272 North Well (Cotton)		25.95					156.0		
273 South Well (Cotton)		43.90					208.0		

CC DPM
MF
MINE
DL
EXP

Lynn Boughton
CHIEF CHEMIST

Certificate Of Assay

from

COTTER CORPORATION

DATE 3/29/78

ANALYTICAL DEPARTMENT

P. O. Box 751

Canon City, Colorado 81212

U₃O₈

myle

Specific
Conc

MARKED	U ₃ O ₈ G/L	U ₃ O ₈ %	Ag Oz./Ton	Ni %	Co %	Cu %	Mo	V ₂ O ₅	Se	↓
A DRAINAGE	3.11						7.3			1250 9.2
U FIELD	2.82						10.2			5300 7.6
U HOUSE	1.90						6.1			4660 7.7
U DRAINAGE	2.14						6.1			3520 7.7
U DRAINAGE							0.4			3000 9.1

CC DPM
MF
MINE
DL

.07 U₃O₈ G/L

631 274

CHIEF CHEMIST

12220

LAW OFFICES
EDWARD J. McGRATH
14TH FLOOR
51 MONROE STREET
ROCKVILLE, MARYLAND 20850
(301) 340-0600

June 13, 1979

Dr. Roy Williams
University of Idaho
Moscow, Idaho 83843

Re: Cotter Corporation Canon City Mill Expansion Project

Dear Dr. Williams:

Enclosed is a copy of a letter dated June 5, 1979 addressed to W. A. Wahler and Associates by John Logan and proposing a method of determining levels of degradation in the Lincoln Park area which would require further remedial action by Cotter Corporation as a license condition. The proposal has been submitted to the Colorado Department of Health and a copy sent to Mr. Scarano.

Sincerely yours,

Edward J. McGrath

EJM:bmm
Enclosure

cc: Mr. Ross Scarano ✓
Mr. James Montgomery

631 275

13300

LAW OFFICES
EDWARD J. McGRATH
14TH FLOOR
51 MONROE STREET
ROCKVILLE, MARYLAND 20850
(301) 340-0600

June 13, 1979

Dr. Roy Williams
University of Idaho
Moscow, Idaho 83843

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Edward J. McGrath

EJM:bmm
Enclosure

cc: Mr. Ross Scarano
Mr. James Montgomery

631 276

23220