HEALTH ENVIRONMENT department

STATE OF NEW MEXICO
ENVIRONMENTAL IMPROVEMENT DIVISION
P. O. Box 2536 - 708 Uranium Av
Milan, NM 87021

Denise Fort, Director

TONEY ANA
GOVERNO
JOSEPH GOLD
SECRETARY
TED GUAMBAN
DEPUTY SECRET
JOSEPH F. JOHNS
DEPUTY SECRET

September 18, 1984

Mr. Arthur Gebeau
General Manager
Quivira Mining Company
P. O. Box 218
Grants, NM 87020

Dear Mr. Gebeau:

This letter reports on an unannounced routine inspection conducted August 7 through August 15, 1984 of activity authorized by AEC license SUA-616, now under extended expiration date as provided by New Mexico Radiation Protection Regulations, Section 3-430B.

The inspection was an examination of activities authorized under the license as it relates to radiation safety; to compliance with the Environmental Improvement Board's Radiation Protection Regulations; and adherence to activities detailed in the extended license.

During the inspection the following deficiencies were found:

1. An employee was found eating lunch and drinking coffee in a particularly dusty area (Tripper Station) above the fine ore bins. Eating and drinking in this area may cause an internal dose problem from ingestion of radioactive material. This practice shouldn't be continued.

2. It was observed that workers in mill areas other than the precipitation and yellow-cake areas are not required to change from work clothes to street clothes before leaving the mill. In order to avoid possible contamination on clothing and shoes from being carried to homes from the mills, this procedure should be investigated to assure that no contamination problem exists.

3. Employees wear their personal film badges (TLD's) in their hard hats. Does this result in undue shielding by the head and body when radioactive materials are at waist level and

below? Does the TLD indicate a lower exposure level than if the badge was at lapel or waist height? This procedure should be investigated to assure that representative exposures are being recorded from the TLD's worn in the hard hats.

Please inform this Bureau within twenty days of the receipt of this report of measures taken to correct the deficiencies enumerated above.

Thank you for the courtesy and cooperation extended to us during the inspection.

Sincerely,

Theodore G Brough

Theodore G. Brough
Environmental Scientist

TGB/hcg

xc: Felix Miera
Mike Brown
Benito Garcia
File

QUIVIRA MINING COMPANY

POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

October 10, 1984

Mr. Theodore G. Brough
Environmental Scientist
Environmental Improvement Division
P. O. Box 2536
Milan, New Mexico 87021

Dear Mr. Brough:

This letter constitutes our reply to your letter which was received on September 25, 1984. While we do not view the items as deficiencies, but only as possible or perhaps potential problems, we offer the following actions.

1. Tripper Deck operators will be instructed to eat their lunch at the provided table location only. Reference to the Tripper Deck area as particularly dusty is not technically correct as both EID and Quivira samples show the area to be well below MPC.

2. Random alpha concentration surveys of workers from other areas of the mill will be conducted to detect contamination, if any, as these workers prepare to leave the mill facility. If such contamination is detected, a program will be instituted to prevent its occurrence.

3. Our present practice will be investigated in the following manner: Five operators will be equipped with duplicate badges to be worn on the lapel and will be closely monitored for compliance. This correlation will be run for two calendar quarters, the results will be analyzed and further action (if any) will be as a result of our findings.

You will be kept apprised of the results of the above actions on a timely basis. If you have further questions or thoughts concerning these items, please feel free to contact me.

Sincerely,

QUIVIRA MINING COMPANY

Art Gebeau
General Manager
Ambrosia Lake Operations

rlk

xc: John Stauter
Al Dooley
Jim Cleveland
Charles Stanley
file

MILL

DRAFT INSPECTION REPORT FORM

1. Name and address of license
K-McGee (Divcas)
Ambrosia Lake
P.O. Box 218
Grants NM, 87020

2. Date of Inspection aug 7, 1984 - aug 15 + aug 20, 1984

3. Type of Inspection R-U

4. License number(s), docket number(s), number and date of last amendment for each license. Category and Priority of each licensee.
SUA-616 amend 35 (2/17/82) last amendment

5. Date of previous inspection nov 11-16, 1983

6. Proprietary information none

7. Scope of inspection if other than routine R-U

8. Participants (Licensee representatives and titles, State representatives, etc.)

art Colbean, Mgr
K-McCoy (Quivera) Mike Garcia - Lineman Rep
Dave Kump Eng Eng. Asst
~~Ron Overstreet~~ Pat Swanson
Bruce Carver, Branch head Licensing
Bell + Lloyd | EID
Mike Brown, Surveillance Repr.
Ted Brough, Inspector

9. Management Interview (Information required for N/C cases)

3 deficiencies (not violations)
discussed with art Colbean
+ Dave Kump.

10. Action and Date: Letter to Licensee Sept 18, 1984

AEC-591 Clear _____

AEC-591 N/C ✓

11. Recommend reinspection date January, 1985

12. Theodore G Brough
Inspector

9/18/84
Date of Report

_____
Reviewer

_____
Date of Review

13. Inspection Summary (Including violations and safety items, and status of previously reported violations and safety items, etc.)

No deficiencies found:

1. Eating lunch in dusty area
2. workers leaving premises possibly uncheched for rad. on clothing
3. TLD's worn in helmets (too low reading?)

measurements taken in and out of mill (side x side)

14. Summary of Licensed Program (Kind of program, number of people, rate of use or quantities on hand, places and frequency of use, type, quantity and use as authorized, etc.)

5 day on 6 day off — 2000 tons/day when runs
30-35000 tons/month — 130 mill people = Everybody
Wasted Need = 600 tons/day — 300 mine people — out of office.
V.C. open 4 hours per day
NPC weekly calc: Board — V.C. Twice a month
on 5 min x 25 CFM Basis — Board — once a month
Perks (11-21)

15. Organization and Administration (Management organization, RSO, authorities and responsibilities, authorized users, qualifications, supervision, etc.)

Reviewed with Arizona
mine mill mine Env.

16. Facilities (Use facilities, storage facilities, control of access, control devices and alarms, etc.)

Personnel Monitor!
Vehicle monitor: NaI crystals (would pick up 2-3 lbs Pu in a trunk of a car)
Controlled access at entrances + gate - 24 hr.

17. Equipment (Devices utilizing licensed material, monitoring instrumentation, special equipment as glove boxes, hoods, handling tools, respirators, etc.)

monitoring devices at door; Resp. program - Industrial Hygienist for silica dust etc.

18. Radiological Safety Procedures (Written operating and emergency procedures, availability of procedures, license and regs, training, Form AEC-3, etc.)

Chapter 12 (admin). Oct 1983 application
Qualified key personnel
Env., Health Physics + Indus Hygiene Tech Rental Feb-1984
(personnel + animal area year). [all Tech, Mill Op, Mine Ops all
have copies of Procedures, + Ventilation manual.]

19. Personnel Monitoring and Exposure to External Radiation (Type of monitoring, range of exposures, supplier, period worn, exposure history, etc.)

(Resp. program): Revised Feb 1987
gamma monitor (Monthly TLD - Eberline)
gamma exp 106 - 120 mrem/Q for Millopore
100 - 250 mrem/Q for V.C. open (see pp
{See Item 31 for incident of dropped badge} (11 & 15 attached)

20. Exposure of Employees to Airborne Radioactive Materials (Method of evaluation, type of samples, radioisotopes, records, bioassay, etc.)

Bioassay; Prot Rev Feb 1984 : Semi-monthly submission
by operators in V.C area, Maint and personnel
requiring respirators also submit (at least 4 hrs after
last exposure) action ~~50 mg/l~~

Eberline urinalysis

21. Effluents to Unrestricted Areas (Types, source, measurements, flow rates, applicable MPC, analytical procedures, environmental samples, etc.)

Rn (Track Etch measured, see p. (17), attached
water assayed (see p. (21), (22)

22. Disposals (Methods, typical quantities, etc.)

Junk from Junkyard (+dirt) accepted in tailings pile as radioactive from Junk sold to dealer from K-25 (July 1984)

23. Miscellaneous Surveys, Evaluations and Records (External radiation levels, contamination levels, leak tests, etc.)

Clothing surveys probably should be done at most buildings with Sample Plant + Laboratory of course kept together Study of Empty Drums for alpha levels - result in using masks when opening returned drums (see p(3), notes)

24. Special License Conditions

Respirator Program

Env. Program

25. Posting and Labelling

As required, Bulletin boards checked

26. Independent Measurements (Type, results, comparison to licensee results, etc.)

WL measurements, air Sampling indoors, wipes, compared with Company RSS; See pp. (3) - (4), attached

Perimeter gamma (see p(1))

27. Operations Observed

change barrels in Y.C.

tailings running to tails

28. Emergency/Contingency Response Plans

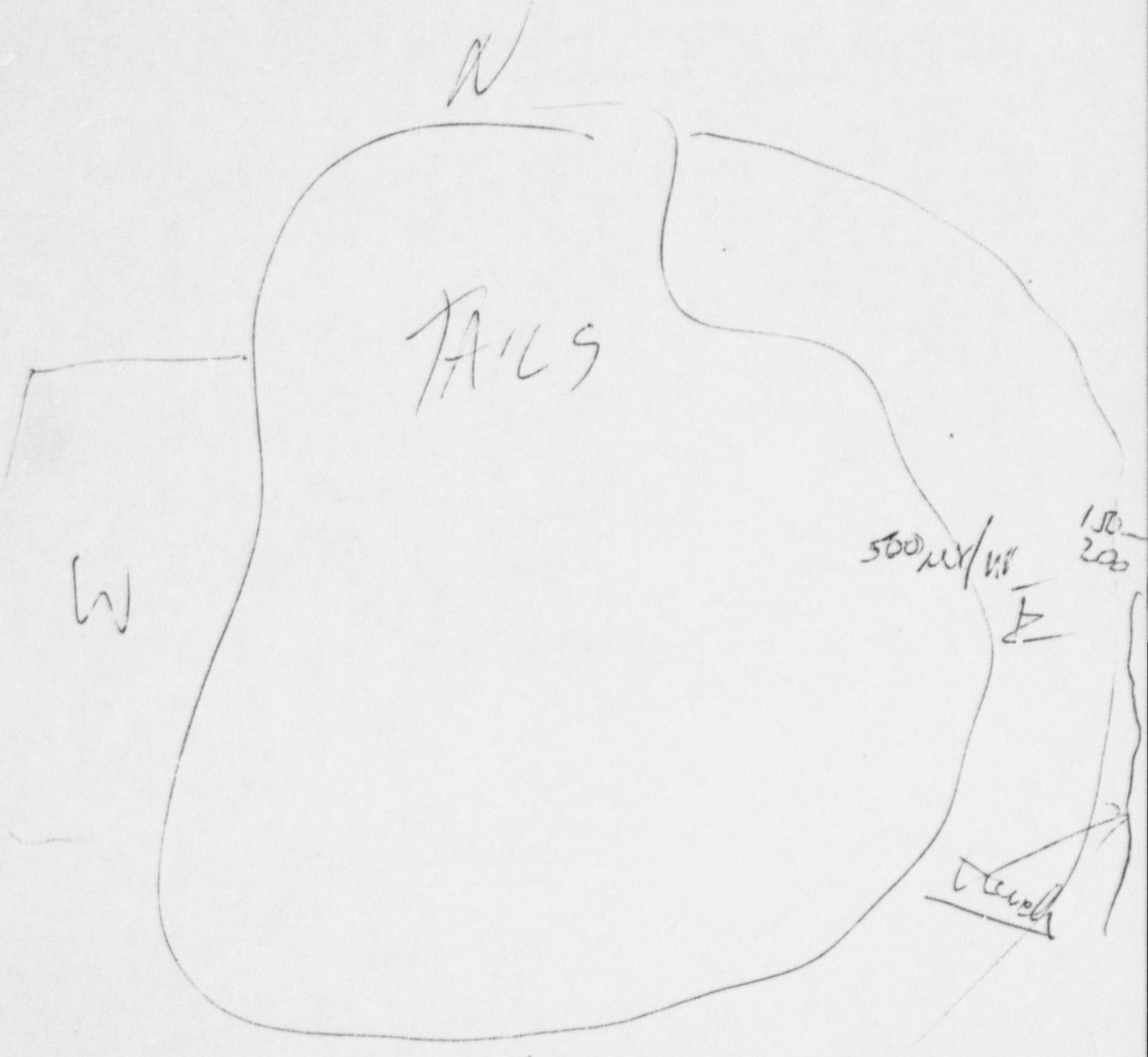
Spill Prevention Control - mill
Transportation
Emergency Response
) all available

29. Operational Records

mill office keeps records including effluents
totals and water level
(See pp. (23) - (30) attached

30. Land Use

Trench being constructed.



Sec 35
Ther IX
400 gpm

to mill
1X plant
60 MM/HR at main floor

2500 gpm

31. Incidents, Overexposures, Theft or Loss, Equipment Malfunction (Those not described elsewhere should be reported here.)

None

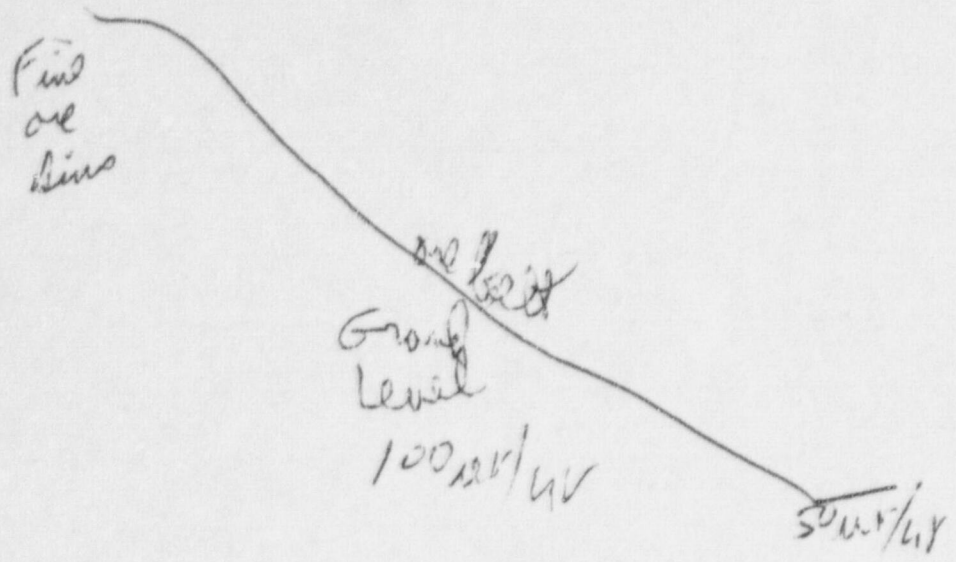
Fan on Crusher was installed upside down - result was in Am[ou]nt Monday read 1.23 W.L. Shut down Crusher circuit: Ventwork not giving much flow: a used fan installed: mill circuit was down 4-hrs.

Badge dropped in Y.C. barrell tank

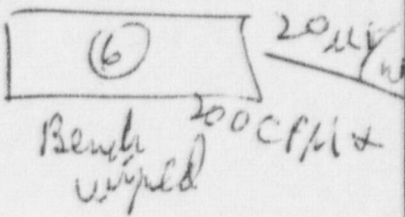
Exposure should 12 mrem,

actual dose = ~ 420 mrem

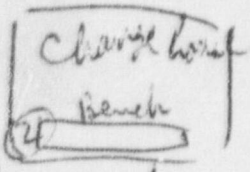
32. Other Information or Continuation from Previous Paragraphs



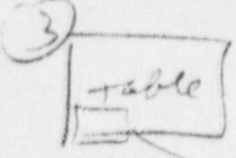
I.C. Charge Room Bench



(7) Locker (High)



High 15-20 μR/hr



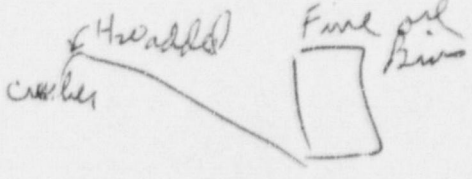
Triple deck
100 μR/hr
250 CPM ∝ Cobalt

High (4)

60 μR/hr
100 CPM ∝

Leach Bldg. open std

High (5) 20 CPM ∝
100 μR/hr gamma



Wilay Enrironing wet Scrubber
(Handles only Pilot air)

STATE AGREEMENTS BRANCH
DIVISION III
INFORMATION NOTICE

Other

H.-1 - Implementation of
Part 19 Equivalent

The purpose of this Information Notice is to provide the SAB staff and the Agreement States with a check list of items for implementing Part 19, or the State equivalent, for agreement material licensees.

The checklist is attached.

IMPLEMENTATION OF PART 19 EQUIVALENT REGULATION

Check List

I. POSTING	Yes	No	N/A	*N/R
A. Equivalent regulations to Parts 19 & 20	✓			
B. The license and license conditions	✓			
C. Document tied to the license	✓			
D. Operating procedures	✓			
E. Any Notice of Violation, proposed Penalties or Orders	✓			
F. Notice to Employees	✓			
G. Documents, notices, or forms required to be posted are posted in a sufficient number of places to permit being seen when going to and from any licensed activity location to which the document applies.	✓			
H. Documents, etc., are legible and have not been altered.	✓			
I. Agency documents posted pursuant to I.E. and have been posted within 2 working days after receipt.	✓			
J. Licensee response, if any, posted for a minimum of 5 working days, or until corrective action was completed, whichever was later.	✓			
When posting of items I.A., I.B., I.C., I.D. is not practicable, the licensee may post a notice describing the material and where it may be seen.	✓			

*Not Reviewed

II. INSTRUCTION TO WORKERS	Yes	No	N/A	N/R
A. Individuals working in or frequenting restricted areas have been kept informed of storage, transfer or use of radioactive materials.	✓			
B. Persons in A. have been instructed in health protection problems associated with exposure to such radioactive materials.	✓			
C. Persons in A. have been instructed in precautions and procedures to minimize exposures and the purpose and use of protective devices employed.	✓			
D. Persons in A. have been instructed in, and instructed to observe, to the extent within the worker's control, the applicable provisions of the Agency's regulations and license conditions.	✓			
E. Persons in A. have been instructed of their responsibility to report promptly to the licensee any condition which could or has caused a violation of Agency regulations, license, or unnecessary exposure to radiation or radioactive material.	✓			
F. Persons in A. have been instructed in the appropriate response to warnings regarding any unusual occurrence or malfunction that may involve radiation exposure.	✓			
G. Persons in A. have been instructed in the radiation exposure reports which can be requested.	✓			
The extent of the instructions should be commensurate with the real or potential radiological health hazards.	✓			

III. NOTIFICATIONS AND REPORTS TO INDIVIDUALS		Yes	No	N/A	N/R
A.	All radiation exposure data (internal and external) has been reported to the individuals noted in II.A as specified below.	✓			
B.	Reports as specified in III.A. have included the appropriate legend "This report is furnished to you under the provisions of the (Agency) regulations _____. You should preserve this report for further reference."	✓			
C.	The licensee has upon request of any worker advised him annually of his radiation exposure as shown in records maintained pursuant to Agency regulations.	✓			
D.	The licensee has upon request of any former worker furnished a report of his radiation exposure to him.	✓			
E.	The licensee has provided his workers with reports of any exposure to these workers which are required to be submitted to the Agency.	✓			

Radiation exposure data for an individual, and the results of any measurements, analyses, and calculations of radioactive material deposited or retained in the body of an individual, shall be reported to the individual as specified. The information reported shall include data and results obtained pursuant to Agency regulations, orders or license conditions, as shown in records maintained by the licensee pursuant to Agency regulations. Each notification and report shall: be in writing; include appropriate identifying data such as the name of the licensee, the name of the individual, the individual's social security number; include the individual's exposure information.

III. NOTIFICATIONS AND REPORTS TO INDIVIDUALS (Cont'd.)

	Yes	No	N/A	N/R
At the request of a worker formerly engaged in licensed activities controlled by the licensee, each licensee shall furnish to the worker a report of the worker's exposure to radiation of radioactive material. Such report shall be furnished within 30 days from the time the request is made, or within 30 days after the exposure of the individual has been determined by the licensee, whichever is later; shall cover, within the period of time specified in the request, each calendar quarter in which the worker's activities involved exposure to radiation from radioactive materials licensed by the Agency; and shall include the dates and locations of licensed activities in which the worker participated during this period.				
IV. PRESENCE OF REPRESENTATIVES OF LICENSEES AND WORKERS DURING INSPECTION A. Agency inspectors were allowed to consult privately with workers on appropriate matters. (1)	✓			
B. Inspector was informed of the identity of the worker's representative for Agency inspections. (2)	✓			
C. The worker's representative was allowed to accompany the inspector during the inspection of physical working conditions.	✓ Mike Garcia			
(1) Inspectors may consult privately with workers concerning matters of occupational radiation protection and other matters related to applicable provisions of the regulations and licenses to the extent the inspectors	✓			

IV. PRESENCE OF REPRESENTATIVES OF LICENSEES WORKERS DURING INSPECTION (Cont'd)

deem necessary for the conduct of an effective and thorough inspection.

During the course of an inspection any worker may bring privately to the attention of the inspectors, either orally or in writing, any past or present condition which he has reason to believe may have contributed or caused any violation of the chapter, or license condition, or any unnecessary exposure of an individual to radiation from licensed radioactive material under the licensee's control. Any such notice in writing shall comply with the requirements of the following:

(2) Any worker or representative of workers who believes that a violation of the regulations in this chapter, or license conditions exist or have occurred in license activities with regard to radiological working conditions in which the worker is engaged, may request an inspection by giving notice of the alleged violation to the Director of the Agency or to Agency inspectors. Any such notice shall be in writing, shall set forth the specific grounds for the notice, and shall be signed by the worker or representative of workers. A copy shall be provided the licensee by the Director of the Agency or the inspector no later than at the time of inspection except that, upon the request of the worker giving such

IV. PRESENCE OF REPRESENTATIVES OF LICENSEES WORKERS DURING INSPECTION (Con't)

notice, his name and the name of individuals referred to therein shall not appear in such copy or on any record published, released, or made available by the Agency, except for good cause shown.

(3) Each worker's representative shall be routinely engaged in licensed activities under control of the licensee and shall have received instructions as specified in II.

Different representatives of licensees and workers may accompany the inspectors during different phases of an inspection if there is no resulting interference with the conduct of the inspection. However, only one worker's representation at a time may accompany the inspectors.

With the approval of the licensee and the worker's representative an individual who is not routinely engaged in licensed activities under control of the license, for example, a consultant to the licensee or to the workers' representative, shall be afforded the opportunity to accompany inspectors during the inspection of physical working conditions.

Notwithstanding the other provisions of this section, inspectors are authorized to refuse to permit accompaniment by any individual who deliberately interferes with a fair and orderly inspection. With regard to any area containing proprietary information, the workers' representative for that area shall be an individual previously authorized by the licensee to enter that area.

SAFETY SUGGESTIONS RECEIVED DURING INSPECTIONS

During inspections, inspectors may receive safety suggestions relating to plant conditions or operations from licensee employees. Inspectors must be receptive to such suggestions and should attempt to resolve or deal with each one received. Even in those cases where the suggestion would require a licensee to do more than is required by NRC regulations, license conditions, or technical specifications, the inspector should discuss the suggestion with the employee and provide, to the best of the inspector's ability, the options that are available.

Depending upon the nature of the suggestion, some possible courses of action are as follows:

1. Encourage the employee to forward the suggestion in writing to plant management and, if appropriate, to the NRC.
2. For matters clearly under the jurisdiction of another Federal agency, or a state or local agency, encourage the employee to contact the appropriate agency, or offer to bring the information to the attention of the proper official.
3. Inform the employee that the matter will be evaluated and, if appropriate, brought to the attention of NRC management.

It is important that an employee profferring a suggestion related to safety be made aware that the NRC is interested in such suggestions and they will be pursued.

TAILINGS RETENTION SYSTEM
INSPECTION CHECK LIST

See attached pp (27) (30)

1. Project _____

2. Applicant _____

3. Docket Nos. _____

4. Available Documents

   a. _____

   b. _____

   c. _____

   d. _____

5. Date of Inspection _____

6. Inspection Team _____

7. Structure Inspected _____

8. Construction History

   Year _____

   Type _____

   Materials _____

   _____

   Seepage Control Measures _____

   _____

9. Top of Dam Elevation _____ Top Width _____

10. Elevation of Existing Pond Level _____

11. Upstream Side Slopes ____H to V____

12. Downstream Side Slopes ____H to V____

13. Maximum height _____ Length of Dam _____

14. Est. Depth of Water over Tailings _____

15. Est. Max. Depth of Tailings _____

MPC Data		max MPC		Max MPC
July, 1983	period			
Crusher operator	7-19-83	0.61	Y.C. pack	0.3+
			Pdec	0.21

(Cont. with other shutdowns)

August

~~Crush~~ Crush oper bell & (0.19 to 0.3+)

Y.C. Pack .07
.08

September, 1983

Crusher oper (.13 : .19)

Y.C. Pack .02 - .17
Precip .02 - .11

October, 1983

{Cattle Samples (controls) from outside area Fairo)

Crusher oper .08 - .13

~~.06 - .13~~

Y.C. pack .06 - .13
Precip .03 - .06

November, 1983

Crusher oper .13 : .14

Y.C. Pack .04 - .15
Precip .04 - .07

December, 1983

Crusher oper
.10 - .20

Y.C Pack .02 - .13
Precip .02 - .04

Jan, 1983

Crusher oper.
.11 - .18

Y.C. Pack .05 - .15
Precip .05 - .21

Feb 1983

Crush oper
.12 - .13

Y.C. Pack .05 - .10
Precip .06 - .09

Mar 1983

crush oper
.10 - .14

Y.C. Pack .02 - .17
Precip .02 - .08

(1)

april 1984

Crusher
.05 - .15

Y.C. Pack .08 - .10
Precip .06 - .12

maintenance, SPT - washdown, 0.76 (include factor 10 for half mesh)

May 1984

Crusher
.09 - .12

Y.C. Pack .05 - .06
Precip .03 - .04

June 1984

Crusher oper
0.28

Slud down after
June 6, 1984

(Conv problems
starting - later
changed unit
about rain fan)

Y.C. pack 0.07
precip 0.05

(2)

Gamma exposure: Paddy James
(Badge dropped in Y.C. tank)
reported exposure was (12 Rem)
actual Exposure was Calc. as (0.45 Rem)

In March
Study of Exposure from Sequoyah empty drums being unloaded (Y.C. in drums + drum tops come off.) MPC's for this 1 week period Study (0.16 to 0.61 MPC) (operators used half mask.

In April MPC's were nil, problem generally solved

Microdyne's ~~in~~ exhaust circuit in crusher circuit. operation discontinued when changed to not using microdyne.

Operational (while taking Cont. Dil Samples in Fine Ore bin)

Quit Crushing 4/8 1:30 PM
Clearing up to ~ 3:30

Calibration

	calib. date
gamma scr 104	4/17/84
102	5/17/84

alpha scanner, 7/19/84 (EFF = .23)

Sci Alpha Counter 3/28/84 Calib. by HSHA

(4)

triple samples of sealed sources

Ohmart gage
12/14/83 0.5 μci
6/12/84 0.8 μci

check sources Geol. calib. sources Ra 3 cpm ≅ 3×10^{-6} μci
Ra 30 cpm ≅ 3×10^{-6} μci
Cs 4 cpm ≅ 4×10^{-6} μci

Troxler neutron probe
Am-Be
Cs-137 dens gage sent to OK for analysis 6/7/84

WIPES

~~1-9-84~~ ~~1-19-84~~ ~~1-23-84~~

1-9-84 1-19-84 1-23-84

~~1-9-84~~ ~~1-19-84~~ ~~1-23-84~~

dpm/100cm²

Y.C. Lunch Room	nil	11.40	15.00
Y.C. Fem. Clg Room	nil	0.00	13.25
Y.C. male clg Room	0.63	6.34	7.94

1X

Driveway Back = 100

Field Back = 45

Higher Ground = 80

Early Back 45 near Weeds

Evap

Sands Back = 10 hr/hr

Hoods in clean lab

D-4 120-150 fpm acid Hood

C-2 150

B-2 110 Y.C. room

Eberline

A DIVISION OF Thermo Electron CORPORATION

Post Office Box 2108
Santa Fe, New Mexico 87501
(505) 471-3232 TWX: 910-985-0678

KERR-MCGEE NUCLEAR CORP 3945
GEORGE SEIGLER
WHSE SEC 31 P O BOX 216
GRANTS NM 87020

FEMALE

OUR RECORDS SHOW THE FOLLOWING NUMBER OF BADGES IN THE INDICATED WHOLE BODY EXPOSURE RANGES FOR THE PERIOD FROM JAN. 01, 1983 TO DEC. 31, 1983

BADGES	EXPOSURE RANGE
6	LESS THAN .010 REM
16	.010 TO .099 REM
10	.100 TO .249 REM
12	.250 TO .499 REM
3	.500 TO .749 REM
4	.750 TO .999 REM
7	1.000 TO 1.999 REM
0	2.000 TO 2.999 REM
0	3.000 TO 3.999 REM
0	4.000 TO 4.999 REM
0	5.000 TO 5.999 REM
0	6.000 TO 6.999 REM
0	7.000 TO 7.999 REM
0	8.000 TO 8.999 REM
0	9.000 TO 9.999 REM
0	10.000 TO 10.999 REM
0	11.000 TO 11.999 REM
0	12.000 OR MORE REM

(9)

Eberline

A DIVISION OF Thermo Electron CORPORATION

Post Office Box 2108
Santa Fe, New Mexico 87501
(505) 471-3232 TWX: 910-985-0678

KERR-MCGEE NUCLEAR CORP 3944
GEORGE SEIGLER
WHSE SEC 31 P.O BOX 218
GRANTS NM 87020

OUR RECORDS SHOW THE FOLLOWING
NUMBER OF BADGES IN THE
INDICATED WHOLE BODY EXPOSURE
RANGES FOR THE PERIOD FROM
JAN. 01, 1983 TO DEC. 31, 1983

Everybody: mill, mine, M, no female

BADGES	EXPOSURE RANGE
186	LESS THAN .010 REM
124	.010 TO .099 REM
179	.100 TO .249 REM
221	.250 TO .499 REM
106	.500 TO .749 REM
40	.750 TO .999 REM
41	1.000 TO 1.999 REM
4	2.000 TO 2.999 REM
0	3.000 TO 3.999 REM
0	4.000 TO 4.999 REM
0	5.000 TO 5.999 REM
0	6.000 TO 6.999 REM
0	7.000 TO 7.999 REM
0	8.000 TO 8.999 REM
0	9.000 TO 9.999 REM
0	10.000 TO 10.999 REM
0	11.000 TO 11.999 REM
0	12.000 OR MORE REM

(10)

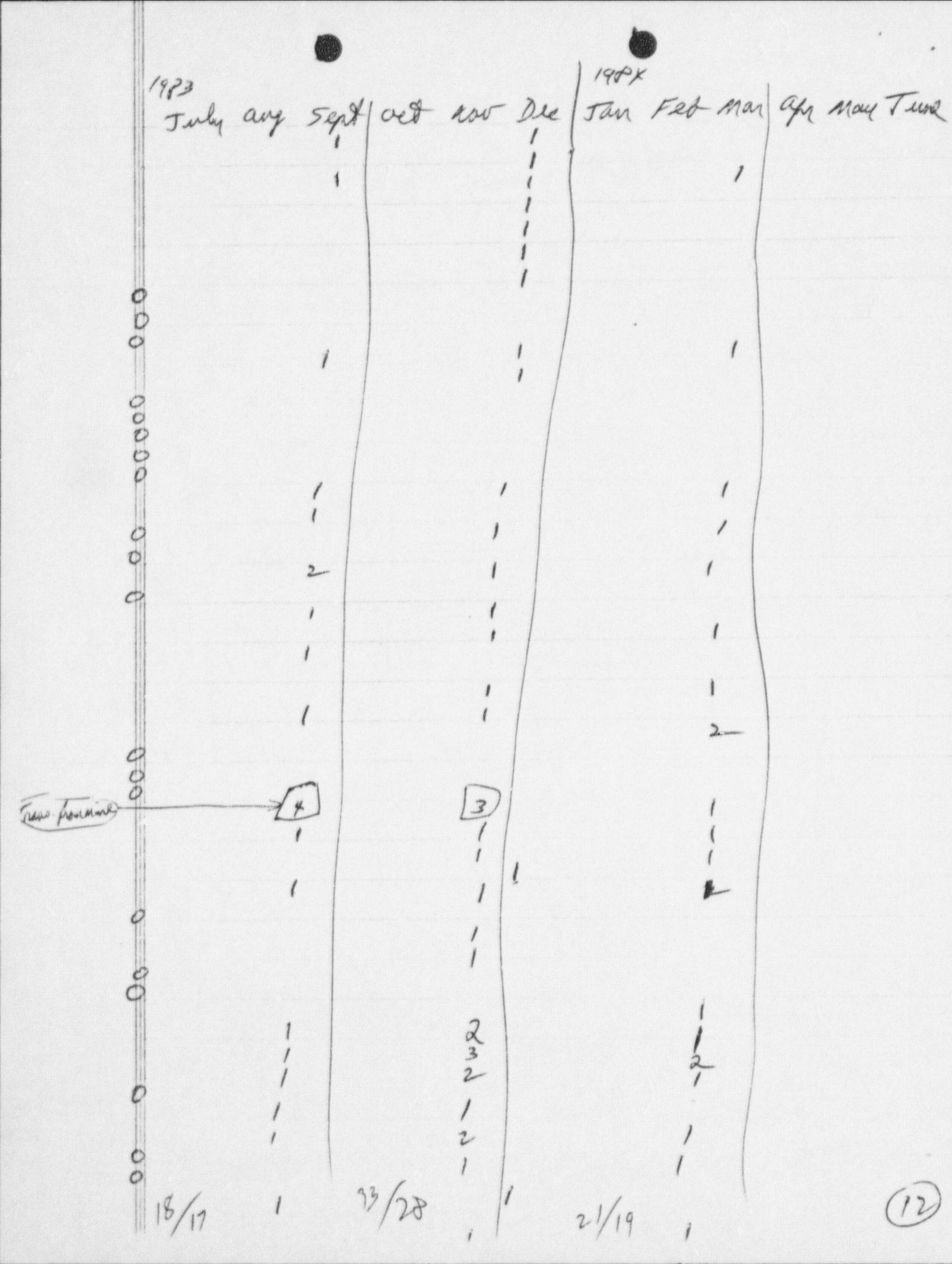
Sec 31 = mill

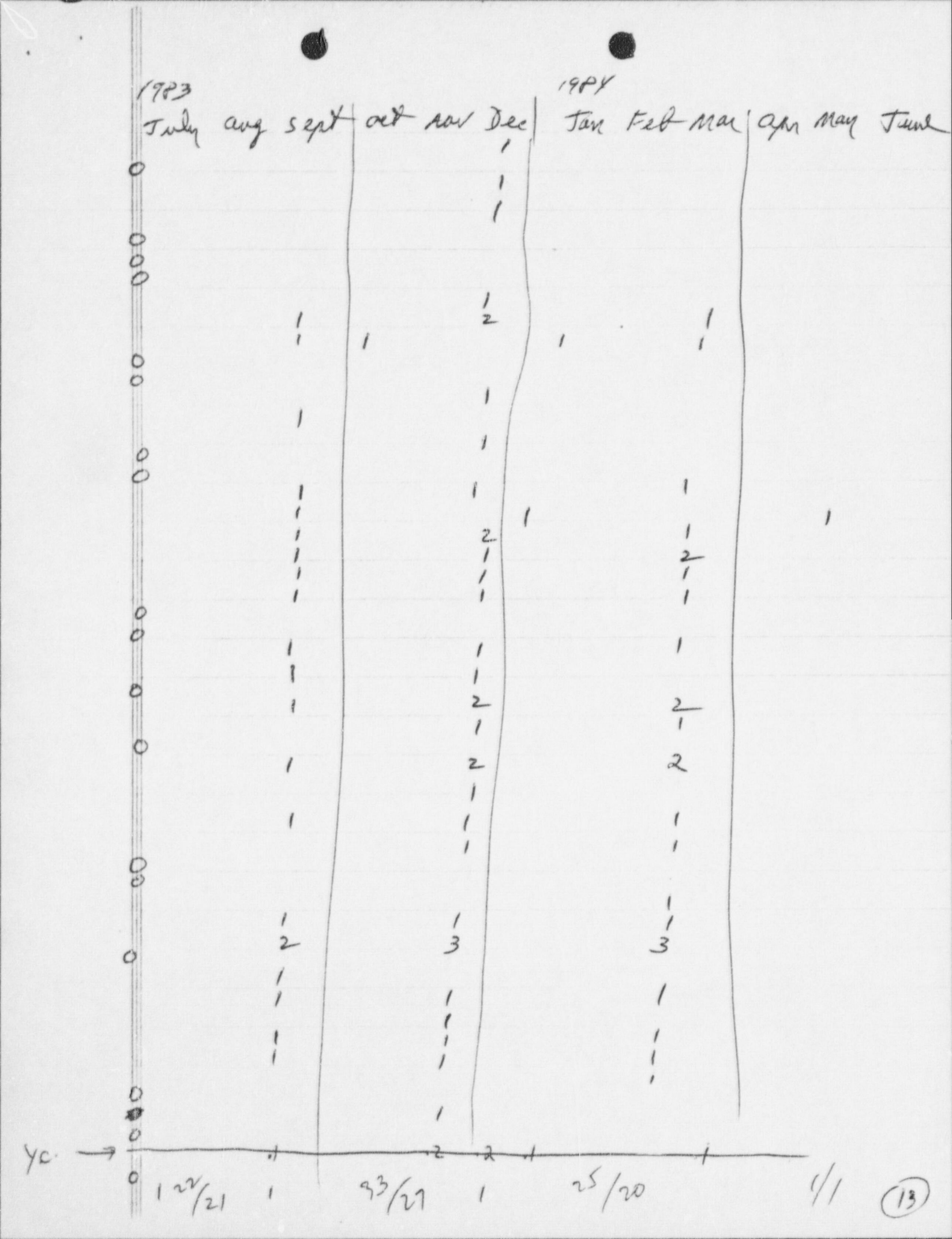
	11/5	10/4	9/3	8/22	~~Mar~~ 5/1	~~June~~ 6/Curr
Gannon	July / Jan	aug / Feb	sept / mar	oct / apr	nov / May	Dec / June
Robson	aug / Feb	sept / mar	oct / apr	nov / may	Dec / June	Jan / July

~~Jan Feb Mar apr May June July aug sept~~

	rem	July	aug	sept	oct	nov	Dec 1953	Jan	Feb	mar	apr	may	June 1954
Textiles		1	0	1					1				1
			~~0~~				1			1			
Y.C. open		1					1	1		1		1	
		0					1						
		0					1						
		0		1			1						
				1			1						
							1						
		0		2			2						
		0		1			2			1			
							1			1			
		0		2			1			1			
		0					1			1			
		8											
							0 2 1			1			
				1						1			
				1			1			1			
				1									
		0		2			1						
		0		1			1			1			
		0		1			1			1			
				1			1			1			
		14/~~21~~16		1		23/20	1		14/15		2/2		

(11)


1993
July aug Sept oct nov Dec
198X
Jan Feb mar apr may June
Trans-formation
4
3
18/17
23/28
21/19


1983
1984
July
aug
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oct
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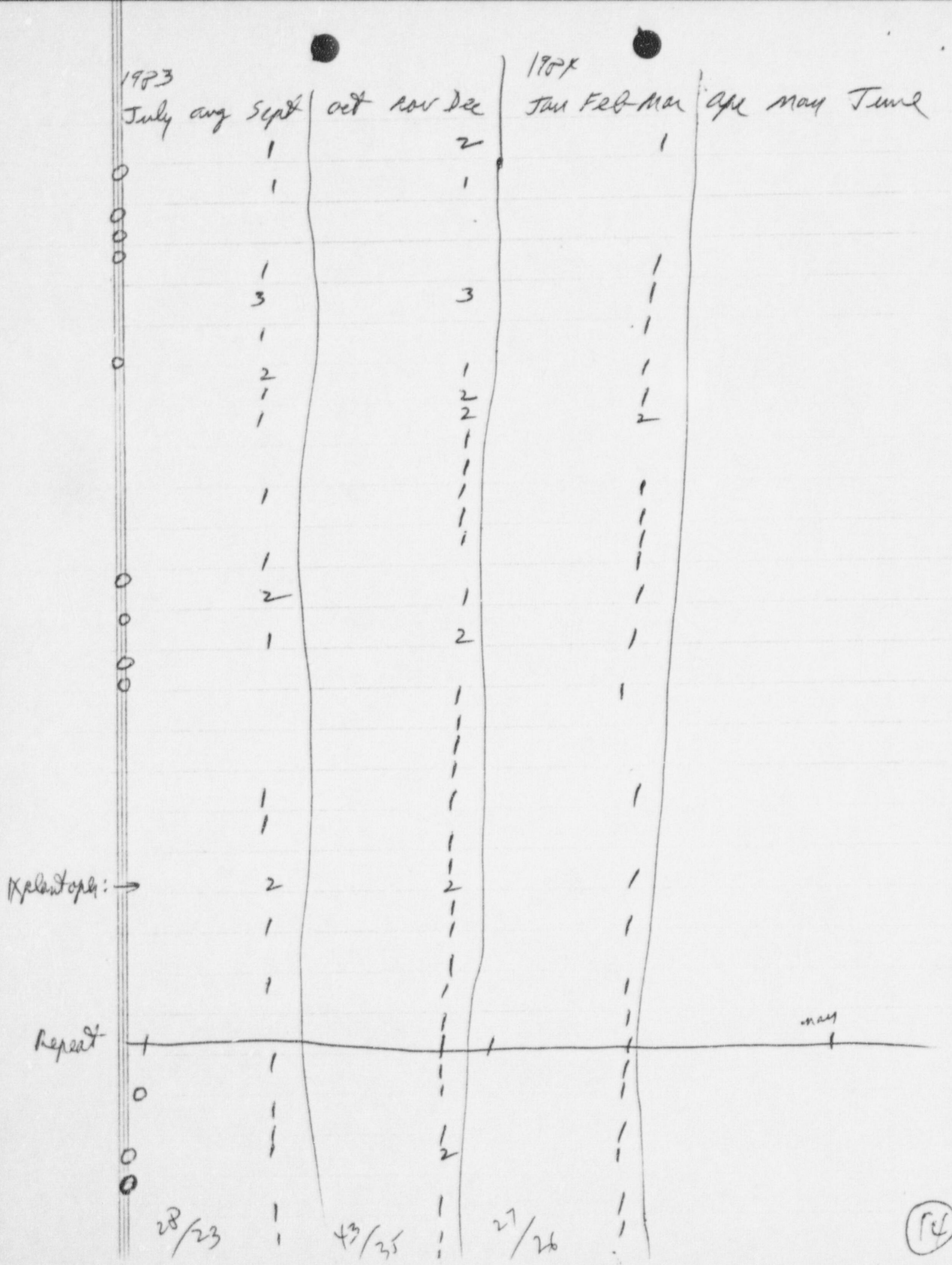
Yc
122/21
93/27
25/20
1/1


1983
July aug Sept oct nov Dec
1984
Jan Feb Mar Apr may June
Xplantopsis:
Repeat
may
28/23
43/35
27/26

Jean McCall

For Y.C. operators

	3Q 83	4th Q 83	1st Q 84	2nd Q 84
Y.C. oper	.1	.1	.2	.1
	.1	.2	.3	.1

DOS =	100 mrem 3Q 1983	150 mrem 4TH Q 1983	250 mrem 1st Q 198X	100 mrem 2nd Q 198X
3Q 1983				
	1.4 rem/16	2.3/20	1.X/13	.2/2
	1.8/17	3.3/28	2.1/19	0/0
	~~2.2/21~~	3.3/27	2.5/20	.1/1
	2.8/23	4.3/35	2.7/26	0/0
Total 8.2/77		13.2/110	8.7/78	.3/3
	106 mrem 3Q 1983	120 mrem 4TH Q 1983	112 mrem 1st Q 198X	100 mrem 2nd Q .985

TIME WEIGHTED AVERAGE

PACKAGING AREA - YELLOWCAKE

EXPOSURE LIMIT = 0.222 dpm/l = 1.0 MPC

FORMULA USED TO CALCULATE TIME-WEIGHTED AVERAGES

1.) $\frac{\Sigma (TXC)}{\text{Total Time}}$ = Average Exposure in dpm/l 2.) $\frac{\text{Average Exposure}}{\text{Exposure Limit}}$ = Time-Weighted Average in MPC

	TIME	DPM/l	TIME X CONC.	DPM/l	TIME X CONC	DPM/l	TIME X CONC	DPM/l	TIME X CONC
DATE		week of 9-9-83		week of 9-14-83		week of 9-23-83		week of 9-27-83	
LUNCHROOM	47.4	0.003	0.142	0.005	0.237	0.003	0.142	0.002	0.095
VIBRATING YC BARREL	43.0	0.003	0.129	0.257	11.051	0.031	1.333	0.003	0.129
CHANGING BARREL & PLACING LID	75.8	0.019	1.440	0.033	2.501	0.017	1.289	0.006	0.455
MISC. DUTY BARRELING AREA	44.3	0.010	0.443	0.016	0.709	0.010	0.443	0.005	0.222
WASHING MOVING BARREL TO SCALE	27.2	0.007	0.190	0.018	0.490	0.081	2.203	0.003	0.082
WEIGHING AND STENCIL BARREL	58.3	0.002	0.117	0.005	0.292	0.003	0.175	0.002	0.117
MISC. DUTY 2nd FLOOR OF DRIER	3.6	0.0073	0.0263	0.0076	0.274	0.137	0.493	0.061	0.220
INSPECTING DRIER FOR WET CAKE	2.9	0.016	0.046	0.188	0.545	0.033	0.096	0.097	0.281
HANDLING EMPTY BARRELS	62.4	0.002	0.125	0.008	0.499	0.003	0.187	0.005	0.312
MISC. DUTY LOADING DOCK	28.6	NIL	NIL	0.004	0.114	0.002	0.057	0.003	0.086
MISC. DUTY MOLY AREA	23.2	0.003	0.070	0.005	0.116	0.007	0.162	0.005	0.116
SX WASHING MACHINE	15.7	0.004	0.063	0.005	0.079	0.006	0.094	0.002	0.031
MISC. DUTY PRECIP AREA	23.4	0.004	0.094	0.020	0.468	0.002	0.047	0.002	0.047
WASH DOWN 1st FLOOR DRIER	24.2	0.002	0.048	0.014	0.339	0.007	0.169	0.001	0.024
TOTAL	480		3.170		17.714		6.890		2.217
T. W. A. FRACTION MPC		0.03		0.17		0.06		0.02	

AMBROSIA LAKE RADON DATA*

	Location	Average Radon Concentration (pCi/l)
R-1	Willcoxson Ranch	**
R-2	Ambrosia Lake	8.62
R-3	Pena Ranch	3.03
R-4	Section 17	4.75
R-5	Elks Flats (#74)	3.03
R-6	Little Hay Stack	3.63
R-7	Don Andres Hill	4.15
R-8	Ramon Hill	3.38
R-9	Mulatto Canyon (top)	3.38
R-10	Haystack Road (nob)	3.12
R-11	Section 22	7.76
R-12	Section 24	13.00
R-13	Section 20	4.66
R-14	Mulatto Canyon (bottom)	7.16
R-15	Section Corner 28, 29, 32, 33	5.95
R-16	Section Corner 26, 27, 34, 35	2.34
R-17	Section 33	8.50
R-18	Section Corner 4, 5, 32, 33	2.04
R-19	Sandstone	7.69
R-20	Mesa Montanosa (bottom)	1.92
R-21	Section 4 Ponds	11.48
R-22	Section 36 Vent Hole #6	7.92
R-23	Puertocito Creek	8.40***
R-24	Apodaca Lake	4.65
R-25	Mesa Montanosa (top)	2.20
R-26	Harris Ranch	6.38
R-27	Bridge	5.42
R-28	Ingersoll Rand	6.38
R-29	Marcus Ranch	4.84
R-30	Plateau	5.03

* Radon concentrations as determined from Track-Etch devices exposed at the stated locations for a period of 25-32 days during the period June 17 through July 17, 1983.

** Lost

*** Found on ground.

SPECIAL 1982 SHUTDOWN RADON SURVEYS
5/25/82 through 6/13/82
NRELD DATA

SAMPLE		5/25/82	5/27/82	6/03/82	6/08/82	6/10/82	Standard Deviation	Mean	Variance
401	48-HR	0.95	0.90	0.61	1.17	1.01	.205	.928	.034
402	48-HR	7.36	4.37	4.90*	7.81*	5.96*	1.497	6.08	1.797
	OUT GRAB	0.49	0.0098	0.15	0.82	0.15	.329	.324	.087
	IN GRAB	0.46	0.688	0.15	0.86	0.72	.278	.576	.062
	WL OUT	.000994	.000090	.000180	.000910	.000840	.000435	.000607	.00000015
	WL IN	.000601	.000430	.000580	.000570	.006100	.00249	.00166	.00000494
407	48-HR	4.39	0.98	5.72	3.66	5.09	1.839	3.968	2.706
408	48-HR	4.17	0.71	1.08	4.23	10.45	3.904	4.128	12.191
409	48-HR	5.78	0.66	1.45	11.89	6.53	4.514	5.262	16.303
412	48-HR	3.71*	0.35*	-	2.53	3.80	1.606	2.598	1.935
414	48-HR	1.31	0.29	0.30	2.47	1.95	.975	1.264	.761
	OUT GRAB	0.92	0.0098	0.12	1.84	2.20	.988	1.018	.781
	IN GRAB	0.61	-	1.05	1.75	3.94	1.478	1.838	1.639
	WL OUT	.000920	.000330	.001150	.009470	.010900	.00517	.00455	.0000214
	WL IN	.002030	-	.0002630	.023109	.006700	.01041	.01002	.0000813
420	48-HR	4.51	1.32*	1.70	5.54	7.32	2.554	4.078	5.219
421	48-HR	-	-	4.54	2.57	1.72	1.447	2.943	1.395
422	48-HR	0.60	0.53	-0-	0.55	0.30	.250	.396	.050
423	48-HR	1.24	-0-	1.33	-0-	0.97	.660	.708	.348
424	48-HR	2.03	1.82	1.72	2.26	2.21	.236	2.008	0.45
425	48-HR	0.74	-0-	0.33	0.75*	3.19	1.262	1.002	1.275
426	48-HR	5.84	2.58	3.14	12.68	3.61	4.163	5.57	13.862
	OUT GRAB	0.30	0.679	0.80	0.35	1.07	.321	.640	.082
	IN GRAB	1.90	1.41	1.71	3.52	0.29	1.162	1.766	1.881
	WL OUT	.003740	.000250	.003040	.000630	.000110	.00170	.00156	.0000023
	WL IN	.004030	.004610	.006370	.008100	.004510	.00169	.00552	.0000023
427	48-HR	3.03	0.66	1.35	4.33	2.59	1.439	2.392	1.658
428	OUT GRAB	-	0.098	0.57	3.97	-	2.112	1.546	2.975
	WL OUT	-	.000300	.002370	.003050	-	.00143	.00190	.0000014
430	OUT GRAB	0.18	-0-	0.24	2.08	-	.975	.625	.711
	WL OUT	.000580	.000040	.002070	.008630	-	.00396	.00283	.000013
431	OUT GRAB	0.76	-0-	-0-	0.29	5.88	2.531	1.386	5.126
	IN GRAB	0.56	1.94	0.73	3.94	5.66	2.194	2.566	3.850
	WL OUT	.000710	.000740	.000900	.006530	.020800	.00867	.00593	.000060
	WL IN	.001100	.003670	.001330	.001330	.012400	.00483	.00397	.000019

* Average of two readings.

SPECIAL 1982 SHUTDOWN RADON SURVEY
6/14/82 through 7/11/82
NHEID DATA

SAMPLE		6/15/82	6/17/82	6/20/82	6/22/82	6/24/82	6/29/82	7/01/82	7/03/82	7/07/82	7/09/82	7/11/82	Standard Deviation	Mean	Variance
401	48-HR	0.13	0.55	-	0.62	0.89	0.63*	0.66	-	0.80	0.76	-	.233	.629	.048
402	48-HR	3.14	7.32	-	3.97*	5.05*	7.98*	2.61	-	5.08*	4.11	-	1.898	4.908	3.153
	OUT GRAB	0.32	1.93	-	0.34	4.20	0.18	0.97	-	1.50	-	-	1.419	1.349	1.725
	IN GRAB	0.36	0.72	-	0.15	0.86	-0-	1.65	-	1.45	-	-	.512	.653	.225
	WL OUT	.00078	.00236	-	.00084	.00203	.00044	.00063	-	.00211	-	-	.000815	.001313	.00000057
	WL IN	.00063	.00357	-	.00068	.00122	.00091	.00090	-	.00174	-	-	.001025	.001307	.00000090
407	48-HR	3.90	2.70	-	2.12	3.44	0.51	2.59	-	-	5.54	2.23	1.472	2.679	1.895
408	48-HR	7.11	6.36**	-	0.62	6.05	1.12	0.38	-	4.45	3.62	-	2.709	3.589	6.420
409	48-HR	2.45	5.46	-	4.88	1.38	3.23	2.88	-	3.41	-	2.42	1.238	3.029	1.340
412	48-HR	3.82	2.00	-	3.98	3.01	1.87	2.35	-	2.36	0.99	-	1.018	2.548	.833
414	48-HR	0.99	1.98	-	1.01	1.23	-	1.09	0.56	1.78	1.18	-	.454	1.228	.180
	OUT GRAB	0.20	3.24	-	0.68	0.52	1.22	0.13	-	1.75	-	-	.805	.961	.555
	IN GRAB	2.30	-	-	1.83	1.47	2.87	3.31	-	-	-	-	.748	2.356	.448
	WL OUT	.00106	.02669	-	.00457	.00350	.01202	.000678	-	.01329	-	-	.00933	.00883	.0000744
	WL IN	.00186	-	-	.00571	.00462	.00904	.000573	-	-	-	-	.00304	.00518	.0000074
420	48-HR	6.08	8.16	-	2.93	6.46	3.42	2.55	-	3.70	3.07*	-	2.045	4.171	3.658
421	48-HR	1.35	1.62	-	1.30	1.46	2.80	1.09	-	1.34	1.77	-	.287	1.444	.072
422	48-HR	0.29	0.88	-	0.21	0.61	-	0.34	0.33	0.93	0.38	-	.245	.446	.053
423	48-HR	0.57	1.56	0.83	0.84	1.68	-	0.99	2.36	0.63	0.48	-	.638	1.104	.393
424	48-HR	2.10	-	-	2.67	2.41	2.93	1.52	-	2.09	4.02	-	.797	2.534	.545
425	48-HR	1.19	-	0.60	2.04	0.92	-	0.72	0.28	2.18	0.97	-	.673	1.113	.397
426	48-HR	3.90	6.20	-	4.33	10.03	0.64	2.54	-	1.58	-	-	3.462	4.46	10.274
	OUT GRAB	6.40	2.33	-	0.32	-	0.33	0.91	-	0.46	-	-	3.382	1.792	6.710
	IN GRAB	3.19	7.63	-	2.46	4.32	2.13	0.27	-	1.24	-	-	2.409	3.034	4.972
	WL OUT	.01355	.00294	-	.00113	.00061	.00044	.00025	-	.00059	-	-	.00483	.00279	.000030
	WL IN	.01355	.03762	-	.00544	.00329	.00615	.00089	-	.00213	-	-	.01292	.00987	.000143
427	48-HR	3.00	3.16	-	3.98	4.96	2.44	1.29	-	2.32	3.31	-	1.151	2.933	1.158
428	OUT GRAB	1.02	-	-	1.95	-	1.41	-	-	0.20	-	-	.736	1.145	.407
	WL OUT	.00250	-	-	.00843	-	.00632	-	-	.00048	-	-	.00360	.00443	.0000097
430	OUT GRAB	0.49	0.74	-	1.94	0.30	0.42	-	-	0.41	-	-	.617	.717	.317
	WL OUT	.00398	.00940	-	.01532	-	.00368	-	-	.00037	-	-	.005875	.00655	.0000276
431	OUT GRAB	0.21	0.93	-	0.25	0.87	0.58	5.00	-	0.74	-	-	1.688	1.226	2.442
	IN GRAB	3.23	6.41	-	2.66	3.67	0.88	2.65	-	1.85	-	-	1.740	3.05	2.595
	WL OUT	.00063	.00555	-	.00134	.00381	.00833	.00156	-	.00182	-	-	.00279	.00329	.0000067
	WL IN	.01246	.02197	-	.01006	.01392	.00259	.00406	-	.00384	-	-	.00698	.00984	.000042
402-C	OUT GRAB						-	-0-	-	-0-	-	-	-0-	-0-	-0-
	IN GRAB						-	0.61	-	3.46	-	-	2.015	2.035	2.031
	WL IN						-	.00114	-	-	-	-	-	.00114	-

* Average of two readings.
** Average of one reading.

SAMPLE		7/13/82	7/15/82	7/20/82	7/22/82	Standard Deviation	Mean	Variance
401	48-HR	1.21	1.97	0.41	0.85	.640	1.11	.327
402	48-HR	8.79*	6.41*	4.54*	3.54	2.310	5.82	4.861
	OUT GRAB	0.61	1.17	0.88	0.56	.281	.805	.059
	IN GRAB	0.46	1.16	0.89	0.79	.289	.825	.063
	WL OUT	.00159	.00190	.00354	.00161	.00093	.00216	.00000065
	WL IN	.00093	.00369	.00278	.00036	.00156	.00194	.0000018
407	48-HR	6.46	3.30	4.96	5.50	1.324	5.055	1.315
408	48-HR	9.57	8.99	3.72	7.18	2.635	7.365	5.20
409	48-HR	2.99	4.62	1.39	11.80	4.593	5.2	15.824
412	48-HR	8.82	1.52	3.44	2.08	3.311	3.99	8.224
414	48-HR	1.11	0.48	0.75	2.68	.984	1.255	.727
	OUT GRAB	1.22	0.13	0.24	1.27	.614	.715	.283
	WL OUT	.00836	.00082	.00236	.00989	.00444	.00536	.0000148
420	48-HR	6.88	4.08	6.84	9.17	2.082	6.743	3.253
421	48-HR	0.78	1.86	2.46	1.38	.713	1.62	.382
423	48-HR	0.15	0.33	0.39	0.47	.136	.335	.014
423	48-HR	0.42	1.96	3.10	1.19	1.143	1.668	.980
424	48-HR	2.33	3.09	2.44	2.72	.339	2.645	.084
425	48-HR	0.82	0.66	0.82	0.64	.098	.735	.007
426	48-HR	10.21	2.19	3.18	3.71	3.546	4.823	9.973
	OUT GRAB	0.30	1.84	0.42	0.51	.720	.766	.389
	IN GRAB	2.91	3.36	1.42	7.46	2.585	3.788	5.011
	WL OUT	.00060	.00775	.00096	.00153	.00338	.00271	.0000086
	WL IN	.00292	.00504	.00198	.01944	.00816	.00735	.0000500
427	48-HR	2.94	4.97	4.53	3.41	.947	3.963	.672
428	OUT GRAB	0.88	-	0.47	-	.290	.675	.042
	WL OUT	.00139	-	.00136	-	.000042	.00133	.0000000009
430	OUT GRAB	0.27	-	0.39	-	.085	.33	.0036
	WL OUT	.00057	-	.00143	-	.000608	.001	.00000018
431	OUT GRAB	0.32	2.84	0.90	1.45	1.079	1.378	.873
	IN GRAB	5.09	2.57	1.39	5.31	1.923	3.59	2.772
	WL OUT	.00028	.00475	.00227	.00985	.00378	.00409	.0000107
	WL IN	.01094	.00250	.00408	.01662	.00652	.00854	.0000319

* Average of two readings.

Lo Sec 35/36

NPDES outflow Sec 35/36

	Ra-226		U (mg/l)
Sal	1.09	5-8-84	1.2
Tal.	5.78	5-8-84	
	1.75	5-22-84	0.8
	4.22	5-22-84	

+ Heavy Metals

Bio assay: acc. contam (taken at work in Y.C. area, Sample came at 200 mg/l) — not real mine analysis.

Ken McGee water quality final 24-h comp.

From Sec 35/36, discharge (NPDES 5Ea)

Date	6-13-84	6-6-84	3-6-84
Ra_{226} (sol)	.82 pci/l	<.01	0.88
Ra (susp)	1.68	3.01	0.90
Ra_{226} (TOT)	2.43	3.01	1.78
TSS (mg/l)	~~10~~ 1.2	2.9	1.4
U_3O_8 sol mg/l	.94	1.5	2.6
Van	.046	.041	.053
SO_4	780	~~6~~	746
Cl	14.1	~~.443~~	25.5
Se	.061	.043	0.017
Zn	<.01	<.01	<.01
Mo	1.29	1.03	1.2

QUIVIRA MINING COMPANY
POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

May 30, 1984

Maxine S. Goad
Program Manager
Ground Water Section
Environmental Improvement Division
P. O. Box 968 - Crown Building
Santa Fe, New Mexico 87504-0968

Dear Ms. Goad:

Enclosed is our tails report for the first quarter of 1984.

Respectfully,

QUIVIRA MINING COMPANY

Jerry Patterson

JP:hc

Enclosure

BCC: Jim Marler
Jim Cleveland
Charles Stanley

(23)

Current water Elev
K-MC as of Aug. 6

#1 7013.50
#2 6980.33

KERR-McGEE NUCLEAR CORPORATION
Crants, New Mexico

TAILINGS REPORT

1st Quarter, 19 84

INPUT TO PONDS

	Tons	Acre Ft.
Solids to Ponds:	162,419	
Mill Solution to Ponds:	238,452	175.5
Water to Ponds:	39,616	29.2
Total Liquid	278,068	204.7

STATUS OF PONDS

Pond No.	Evaporation Area Acres	Average Depth Feet	Solution Volume Acre Feet
1	19.3	1.5	29.0
2	9.6	1.7	16.3
3	12.5	1.7	21.0
4	Abandoned	--	--
5	Abandoned	--	--
6	Abandoned	--	--
7	Abandoned	--	--
8	Abandoned	--	--
9	23.6	1.7	38.9
10	Abandoned	--	--
11	28.34	5.4	152.8
12	22.4	5.0	112.5
13	16.76	6.1	102.9
14	20.83	5.3	110.8
15	24.10	3.0	71.3
16	19.50	6.1	119.3
17	19.50	6.4	124.2
18	22.20	4.5	99.0
19	31.46	3.3	104.5
20	29.0	4.6	134.3
21	21.0	4.9	103.5
TOTAL	320.09		1340.3

POND ELEVATIONS

Pond No.	Elevation, Ft.	Elevation Change, Ft.
1	7012.69	+ 0.32
2	6979.20	+ 0.23
3	6923.23	+ 0.03
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	6919.95	- 0.08
10	-	-
11	6937.89	+ 1.52
12	6929.02	- 0.18
13	6923.64	+ 0.41
14	6916.82	+ 1.49
15	6907.96	- 0.49
16	6902.12	- 0.43
17	6896.87	+ 0.69
18	6890.96	- 0.45
19	6883.82	- 0.43
20	6878.13	+ 0.18
21	6902.93	- 0.02

RELATIVE EVAPORATION RATE

Evaporation	.5769 ft.
Precipitation	.0925 ft.
Relative Evaporation	.4844 ft.

OBSERVATION WELLS - WATER ELEVATION

Well	Collar Elevations	Elevation - Ft.	Change - Ft.
A-1	6920.7	Destroyed	--
B-2	6923.4	6917.78	- 0.03
C-3	6927.8	6918.02	- 0.33
D-4	6929.4	6912.82	- 3.75
E-5	6923.2	6914.95	+ 0.11
44	6922.5	6816.79	- 0.17

OBSERVATION WELLS - SOLUTION ASSAYS

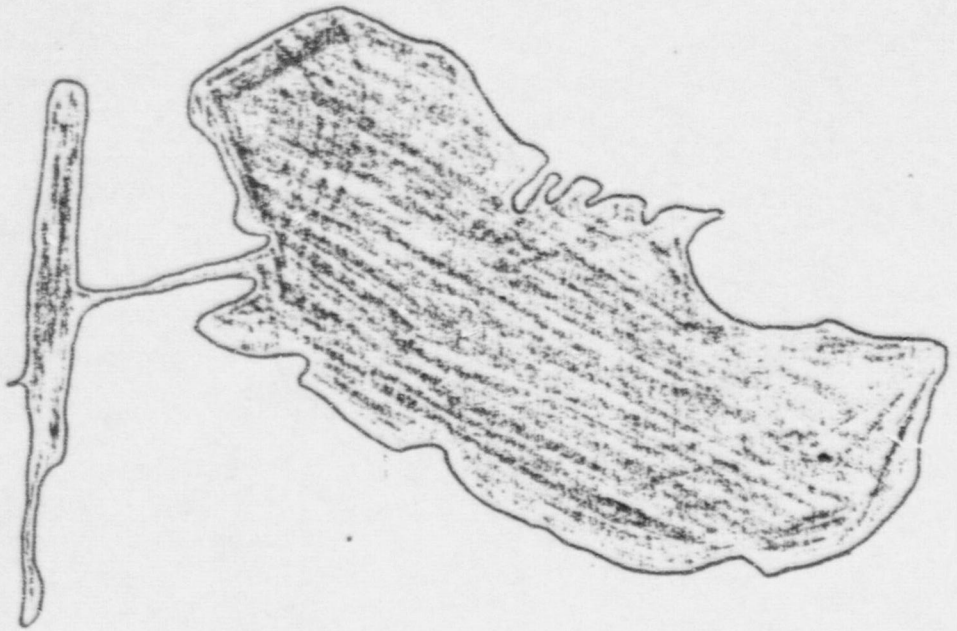
Well	U, mg/l	Cl, mg/l	TDS, mg/l	pH	Radium, pCi/l
A-1	--	--	--	--	--
B-2	<.07	3652.4	11226	3.67	4.36
C-3	<.07	2333.3	8075	3.80	11.06
D-4	<.07	3106.3	6733	4.23	17.30
E-5	<.07	2088.6	9012	7.14	3.08
44	<.07	21.3	2465	7.70	2.16
Decant Pond	10.7	2503.5	33218	1.83	969.6

KERR-McGEE NUCLEAR - POND #1

Solution Elevation	7012.69
Average Depth	1.5
Solution Area	19.3
Solution Volume	29.0

Date 4/2/84

Z-1

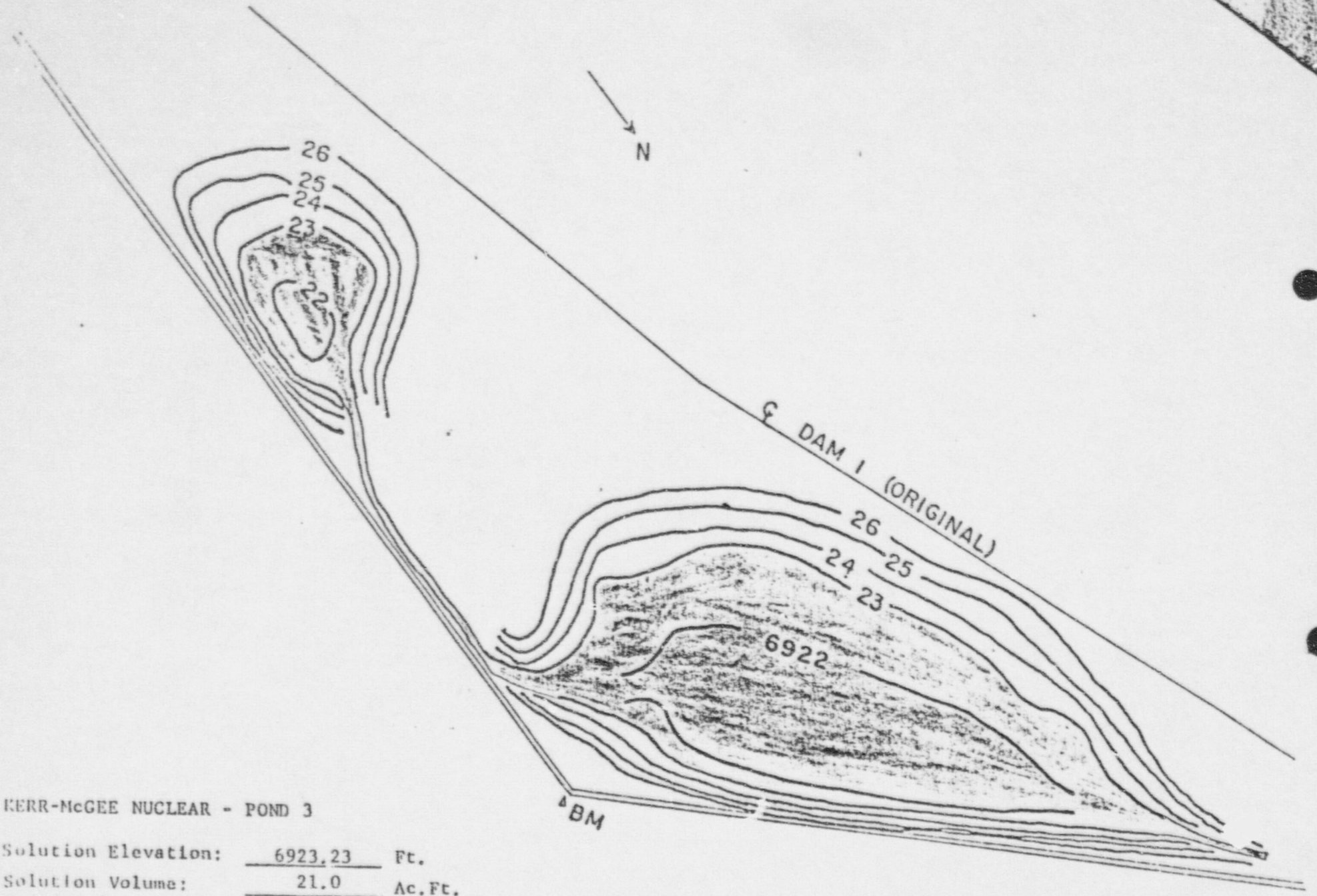


KERR-McGEE NUCLEAR - POND #2

Solution Elevation	6979.20
Average Depth	1.7
Solution Area	9.6
Solution Volume	16.3

Date April 2, 1984

(27)

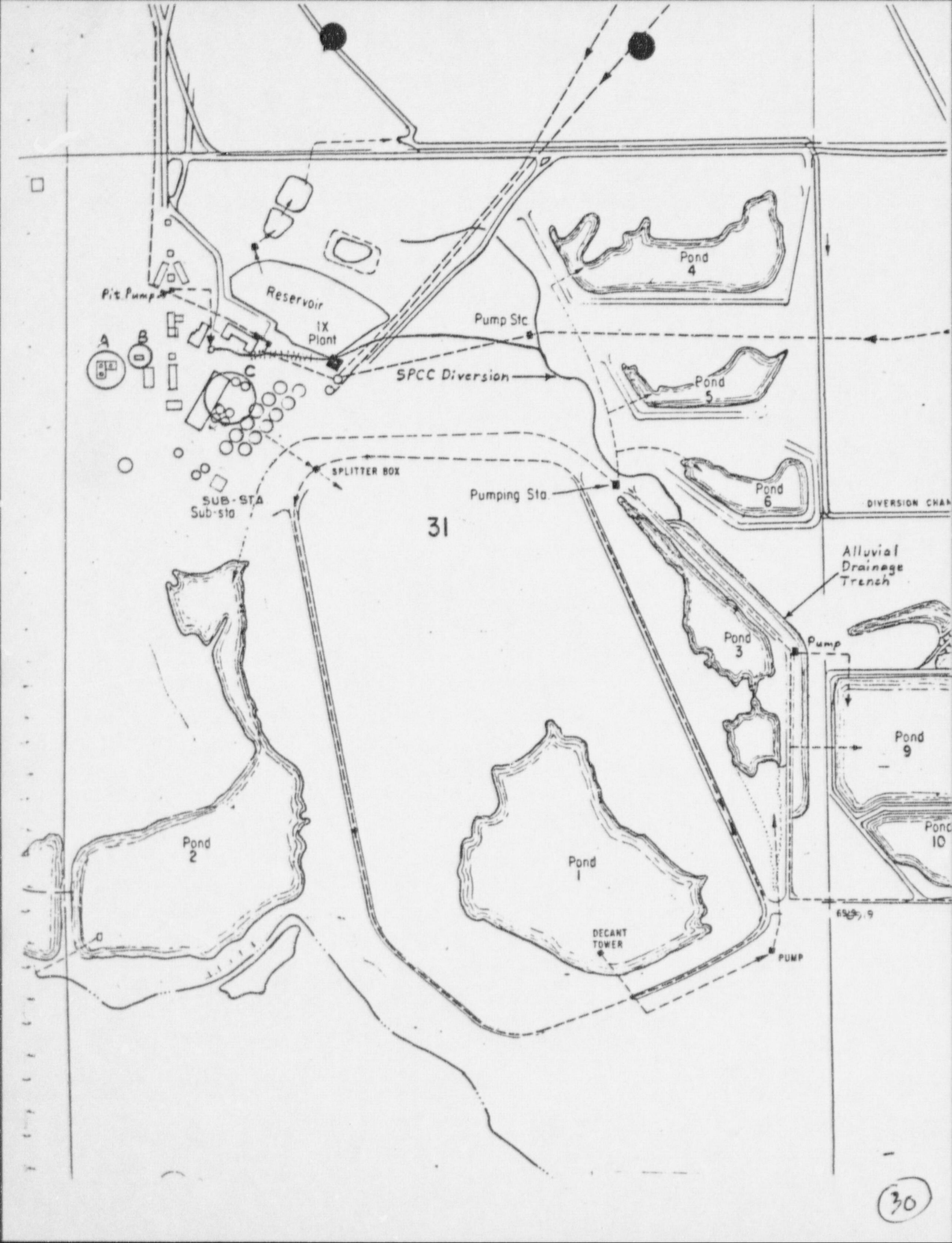


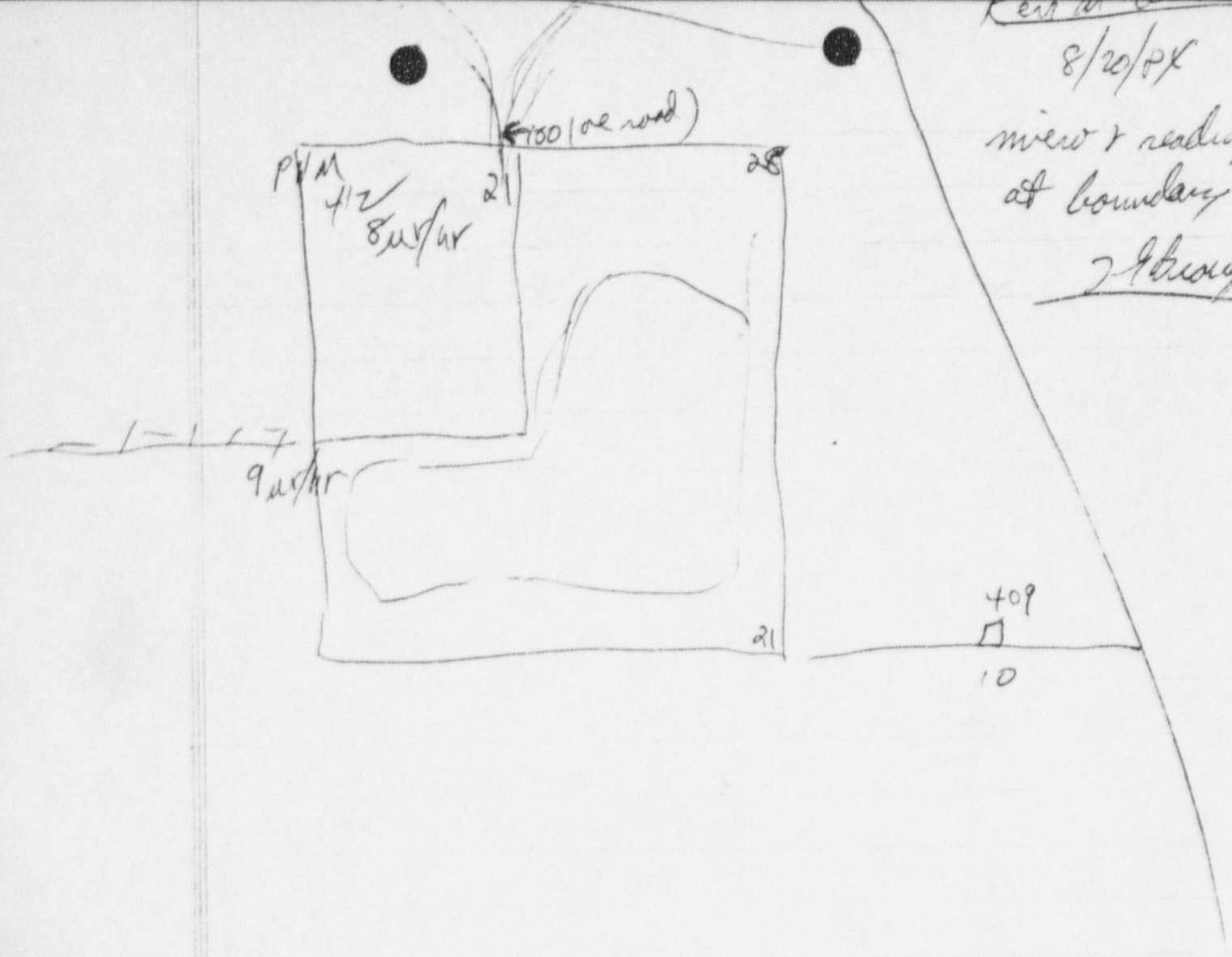
KERR-McGEE NUCLEAR - POND 3

Solution Elevation:	6923.23	Ft.
Solution Volume:	21.0	Ac.Ft.
Evaporation Area:	12.5	Ac.

Date: 4/2/84

(82)


Pond 4
Pit Pump
Reservoir
tX Plant
Pump Stc
A
B
C
SPCC Diversion
Pond 5
Pond 6
SPLITTER BOX
Pumping Sta
SUB-STA
Sub-sta
31
Alluvial Drainage Trench
Pond 3
Pump
Pond 9
Pond 10
Pond 2
Pond 1
DECANT TOWER
PUMP


8/20/PX
mics + readings at boundary
2 people
700 (one road)
PM
4/2
8 µr/hr
21
28
9 µr/hr
21
409
10

8/02/84

Kerr-McGee (Quivira)
Pre-inspection Meeting Summary

1. The ULS representative mentioned two up-coming ~~~~ licensed additions:
   a) an IX plant for Churchrock mine (an amendment or a new license?)
   b) a method of disposing of damaged or unusable barrels.

   c) Kerr-McGees sampling schedule and data for both occupational sampling (MPC and TLD sampling) and Environmental sampling has never been made a specific part of the license. What is the schedule as it now exists? should the schedule be made part of the license and should submission of the data to EID be a license requirement?
   d) The respirator program should also be part of the license. What is being done now and should it become a license amendment?
2. Is it sufficient to inspect against regulations (eg. is data on hand to demonstrate part 4 and RPR requirements or should specific items concerning records kept be made part of the license?: by amendment or an expansion of an item in the licensed application (470 s.)

(32)

Should
Certain items concerning uses of specific equipment (driers, hoods) or specific techniques (fluorometric or radiometric) and laboratory practices be licensed amendments or letters supplementary to the 1970 license application? We should get tables showing what their practices are. (I realize they are probably in the new license application).

3. Sampling Schedule
   a) SAS personnel will take the following samples during the inspection:
      A. 6-8 WL samples side by-side with licensee at various appropriate sites inside.
      B. 6-8 swipe samples at various eating, dressing and laboratory sites.
      C. Soil, water, air samples if required to pin down a possible source of contam. at the perimeter or in an occupational location can can be scheduled for a later time (and so noted in the inspection report).
      D. Particulate and Radon samples are being taken on an annual basis and have been so done by SAS & MM the past. This data should be summarized by SAS for inclusion as part of the inspection report. Data coming later can be added later.

E. occupational exposures such as TLD badge data, MPC calculations and Bio-assays shall be perused by the inspector and copies of this data shall be requested by the inspector for further analysis by SAS.

F. Certain water quality data (wells, etc.) is being collected by E.C. Should we require that this data be submitted to EC (both water quality and radiation). Should this be a licensed amendment?

KERR McGEE MILL INSPECTION

AUGUST 1984

DATA REPORT AND COMMENTS

SURVEILLANCE AND ASSESSMENT SECTION

(1) Alpha readings (taken with AC-3 probe, PRM6 meter) and wipe samples. Collected on August 7, 1984.

	(CPM)	WIPE (DPM/100 cm^2)
1. Primary Crusher	233	51
2. Mens Changing Room	100	24
3. Tripper Deck	250	0
4. Rod Mill (OP. STA.)	100	87
5. Leach Building (LAB)	20	2.5
6. Yellowcake Packing (Mens Changing Room)	200	68
7. Yellowcake Packing (Locker Handle)	Not Taken	51

All these values are well below the recommended maxmimum level of 1000 dpm/100 cm^2. The value of 0 DPM on the tripper deck reflects the non-removable nature of the contamination which was detecable using an alpha probe.

(2) Working levels were taken using an instant working level meter (MDA Model 811). These were taken on August 7, 1984 and at the same time as Kerr McGee samples.

Location	Time	BKGND	WL(EID)	WL(KM)
Tripper Deck	9:08 a.m.	0.08	0.06	0.07
Primary Crusher	9:50 a.m.	0.09	0.05	0.05
Belt Picking Sta.	10:10 a.m.	0.07	0.02	0.00
Sample Tower (MID)	10:21 a.m.	-	0.01	0.00
Rod Mill (OP. STA)	10:45 a.m.	0.07	0.02	0.03
Leach Bldg. (LAB)	11:05 a.m.	0.01	0.02	0.01

These values do not exceed the standard of 0.33 WL and indicate that the ventilation system is effective in keeping working levels low.

(3) Use of WLM1 - (Working Level Monitor)

A WLM1 was placed on the tripper deck at a height of 6'. 18 hours worth of data were collected. The enclosed graph shows the working levels plotted against time. Two instant working level values taken by Kerr McGee are both 3 times higher than values on the graph.

(4) Air samples were taken on August 8, 1984 with a Bendix portable Hi-Volume air sampler. Radon daughter components were allowed to decay before counting the

filters.

The data obtained was counted by two separate methods, both of which required an area correction factor. *(1.34 for method 1, 13 for method 2) In the future, a spiked filter of known value will be used to obtain a calibration factor, thus eliminating the need for unsubstantiated correction factors.

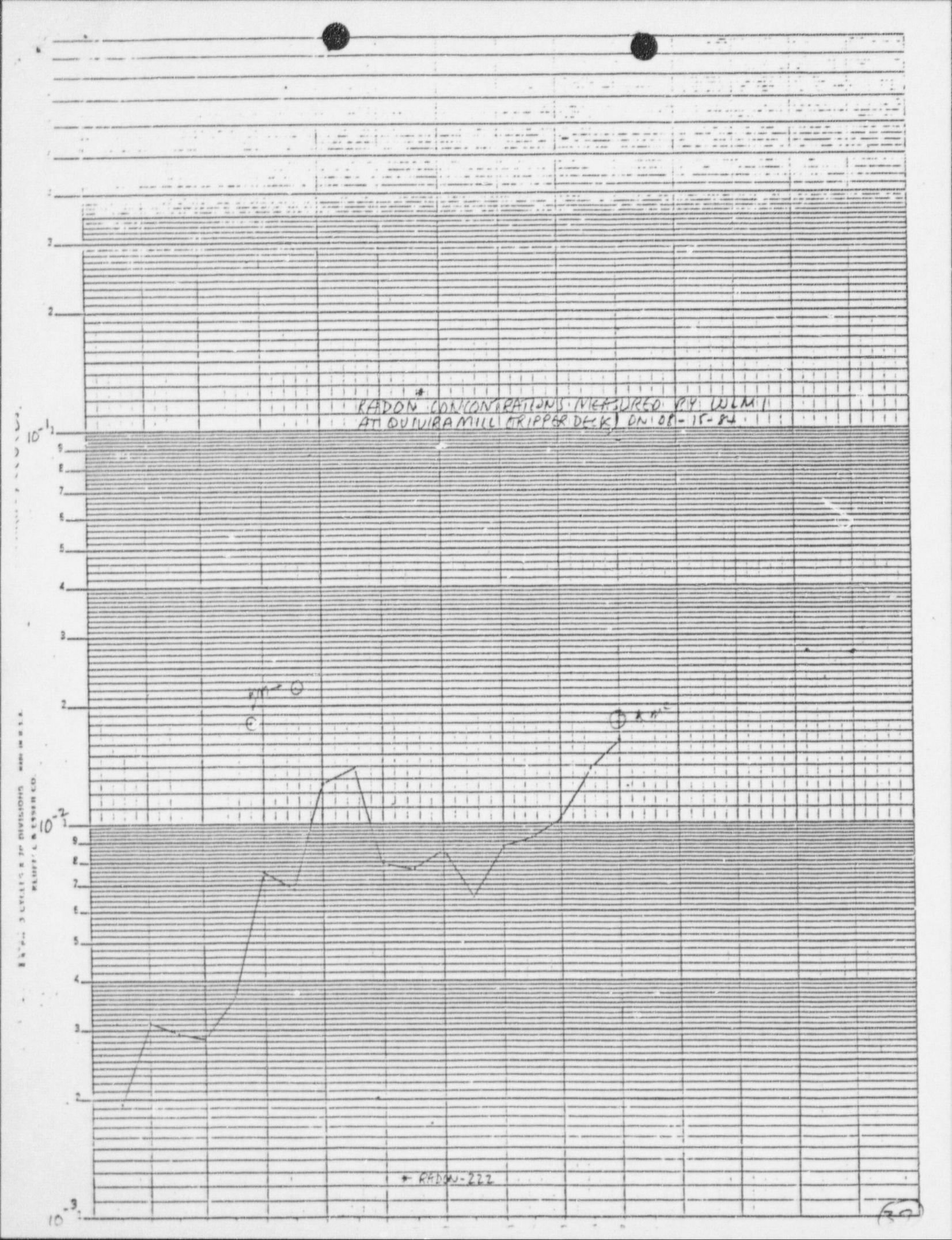
The data appears as % of the MPC for that particular radionuclide. By assuming secular equilibrium, percentage composition was estimated and the results given accordingly. The MPC values are as follows:

Natural Uranium	1x10-10 uCi/ml
Radium 226	5x10-11 "
Thorium 230	1x10-11 "
Polonium 210	2x10-10 "

		Method 1	Method 2
	Radionuclide	% MPC	% MPC
Primary Crusher	Uranium (nat)	0.185	0.199
	Radium 226	0.185	0.199
	Thorium 230	0.925	0.995
	Polonium 210	0.046	0.050
Belt Picking Station	U (nat)	0.312	0.079
	Ra 226	0.312	0.079
	Th 230	0.156	0.395
	Po 210	0.008	0.020
Tripper Deck	U (nat)	0.051	0.042
	Ra 226	0.051	0.042
	Th 230	0.253	0.212
	Po 210	0.013	0.011
Yellow-cake Pkg.	U (nat)	1.164	1.604

Method 1 used a hand held alpha probe HP210, Method 2 used a smaller 2.5 cm dia probe (alpha). The two methods gave comparable results except for the Belt Picking Station.

Hi-volume samples taken in the future will use Gelman Type A/E membrane filters, instead of using fibre filters to reduce self absumption problems. For a counting method that will provide a more standard counting geometry, the filter will be "sandwiched" with ZnS paper, placed on a PM tube and counted by a scaler. On intermitent occasion the filters will be analyzed radiochemically to justify the assumptions of the equilibrium of the component radionuclides used in this analysis.


RADON CONCENTRATIONS MEASURED BY WLM I
AT OVIVIRA MILL (TRIPPER DECK) ON 08-15-84
10^-1
10^-2
10^-3
* RADON-222

WIPES, WORKING LEVEL SAMPLING, AIR + SOIL SAMPLING, ETC.

DATA SHEET FOR EXPERIMENT

ipment _____ Date _____

_____ Experimenters _____

_____

_____

Bath = 1.3 CPM SPA-1 : Eff = .293 x 13 90 MPC

SAMPLE	TIME	FL RATE	X 28.32 L/CF / LITERS	COUNTS / 10 NET CPM	dpm pCi/l	DET. AREA DT pCi/l		
V.C. PACK.	15 m	20.15 CFM	8559.72	699/10 68.6	234.12 .0123	0.160		
[illegible]	[illegible]	[illegible]	[illegible]	79/10 6.6	22.52 .0035	0.0455		
[illegible]	5 m	19 CFM	2690.4	40/10 2.7	9.22 .00154	0.0201		
[illegible]	5 m	20 CFM	2832	57/10 4.4	15.02 .00239	0.0311		
			RATIO	CAL Shi	= .165			
		BACK SH/5				quad conv = 1.34 x		
SAMPLE	TIME	FL. RATE	X 28.32 L/CF / LITERS	COUNTS / 5 NET CPM	dpm pCi/l	DET AREA DT pCi/l		
V.C. PAC.	15 m	20.15 CFM	8559.72	1406/5 270.4	1632.78 .0262	.1156		
[illegible]	5 m	20 CFM	2832	233/5 35.8	216.99 .0345	.0462		
[illegible]	5 m	19 CFM	2690.4	84/5 6.0	36.36 .0060	.00816	(COUNT EFF = .0032	
[illegible]	5 m	20 CFM	2832	103/5 9.8	59.39 .0094	.0127	= 39%)	
							.0032	
							cont Em =	25.6%

(38)

WIPES, WORKING LEVEL SAMPLING, AIR

DATA SHEET FOR EXPERIMENT

Equipment S

Date 08-07-84

Experimenters UFO/TSB

KERR-McGee wipes

C

C/S

SAMPLE #	C/S BCKGND.	C/S.	NET CPM	DPM/100 CM²		WIPE/#	
2	56/5	183/5	25.4	50.8		7	
3	31/5	92/5	12.2	24.4		2	MEN'S CHANGE RM
4	68/5	152/5	—	—		3	TRIPPER DECK STA
5	49/5	218/5	33.8	67.6		6	M.C. MEN'S CHANGE RM
2	94/5	100/5	1.2	2.4		5	REACH OPER.
3	33/5	251/5	43.6	87.2		4	CRUSHER-AUX HILL OPR
4	167/5	295/5	25.6	51.2		1	GRIZZLY OPER STA
5	92/5	92/5	0	0		3	TRIPPER DECK

					MPC	
1)	ON HI VOL	9.47. 9.52	VOL (20CFM x 5min) =	UNDER GRIZZLY - Primary Crusher. .36	(0.60 0.56)	.52
2)	BELT PICKING STA	10.08	(19 LFM x 5 Min) =	.14	(0.23 0.30)	.17
3)	TRIPPER STA.		(5MIN X 20CFM.) =	.16	(0.27 0.40)	.10

Data to be added when x readings done.

		KMC		K-M
4)	Y.C. BARRELS (CHANGE BARRELS + CHANGE TOPS) (15 min)	.79	(1.20 1.61)	.99

If Bath is included: (54/5 min) for AC-3 in 2nd & count above, Total should be 0.43, 0.11, 0.19, 1.55 (for 0.56, 0.30, 0.40, 1.61 respectively)

If Bath for SPA-1 Item is 1.3 instead of 1.0 as before, the readings become:

0.45, 0.19, 0.31, 1.60 resp.

Instead of 0.60, 0.23, 0.27, 1.20 as before

The av. of the two: 0.44, 0.15, 0.25, 1.58

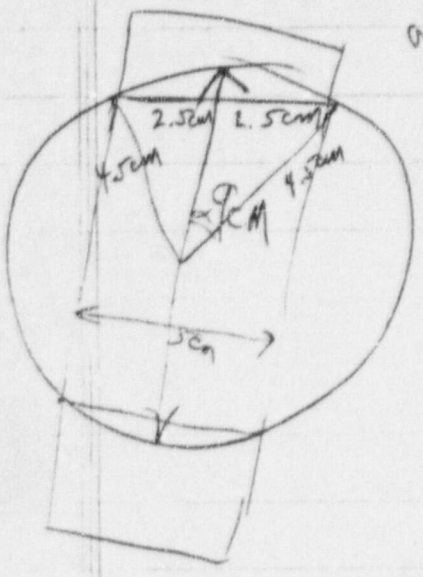
Removable WIPES

		∝ dpm	① WL	∝ dpm/100cm²
~~FB~~	(GRIZZLY OPERATOR STA) #1.		~~.05~~	51.2
~~#2~~	(MENS CHANGING ROOM) #2			24.4
~~0~~	(TOP OF FINE ORE BINS OPERATOR STAT. #3 (TRIPPER DECK.)	∝ 250 CPM.	~~.06~~	0
~~1 Blank~~	(CRUSHER ROD AREA OP. STA. #4	∝ 100 CPM	.02	87.2
	(LEACH OPERATOR BUILDING STA #5	< 20 CPM ∝		2.4
Y2.	(MENS SHOWER ROOM 4/C AREA #6	200 CPM		67.6
Y2.	(LOCKER CONTAMINATION SHOWER 4/C AREA #7			

Date	Time	WL	Location	BKG	KM dpm
08/08/84	9:08	0.04	Tripper sta.	0.08	0.07 / 0.04*
"	9:50	0.05	Grizzly - Pri Crusher	0.09	0.05
"	10.11	0.02	Belt Pick Sta.	0.07	0.0
"	10.21	0.01	Midway Sample Tower.	—	0.0
"	10.45	0.02	Rod Mill	~~0.07~~	0.3
"	11.05	0.02	Lab in Leach Control Room	0.10	0.01.

* TWO READINGS TAKEN

α



Area, incl circle = 11.89 cm²

area of triangle = $\frac{1}{2} \times 3.75$

= 9.38 cm²

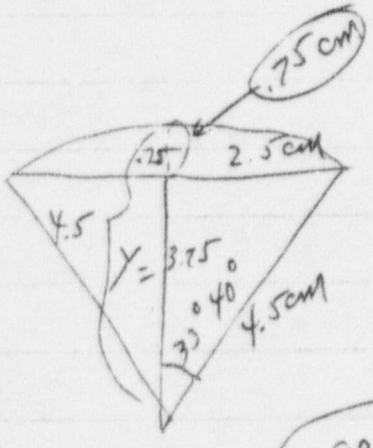
area of sq = 2.51 cm² × 2 = 5.00 cm²

37.5 cm²
10.0 cm²
47.5 cm²

area of filter = $\frac{(9)^2 \pi}{4}$ $\frac{81 \times 3.14}{4}$ = 63.59 cm²

area of α probe = 75 cm² -

.187 ×



66° 80' = 67° 20'

67.3
360

67.20
360

7.5

7.50 × 5 =

37.5
5
42.5 cm²

sin α = opp/hyp. = .5555 = 33°40'

11.89 cm²

Area seen .187 × 63.59 =

sin α = α = 33°40'

cos α = adj/hyp =

.5555

2.5/4.5 = = 33°40'

1/2 5 × 3.75 =

33°40'

Cos 33°40' = y/4.5

y = 4.5 × Cos 33°40'

4.5 × .8323 =

3.75

42

WIPES, WORKING LEVEL SAMPLING, AIR + SOIL SAMPLING, ETC

DATA SHEET FOR EXPERIMENT

$U_Y = \frac{1 \times 10^{-10}}{5 \times 10} = 1 \times 10^{-12}$ uCi/ml

Equipment Hi Vol sampler - Bendix
SPA-1 PROBE(α) + LUDLUM SCALAR
COUNTING
K-MC MILL 0CC SAMPLES

Date 08/9/84

Experimenters BROUGH
BROWN

SPA-1 Eff = $\frac{4899}{16720} = .293$

Bak = 1 CPM

SAMPLE	TIME	FLOW RATE	(X28.32 L/CF) LITERS	COUNT/10 CPM	dpm pci/l	DET AREA	FILTER AREA	Eff. pCi
					(Eff = .293)	$\frac{(2.5)^2\pi}{4}$ =	$\frac{(9.0)^2\pi}{4}$ =	
						6.15 π/4	=1 π/4	
						13 x DET =	FILTER COUNT	
Yc. Mtk	15 m	20.15 CFM	~~570.5 x~~ 8559.72 L	619/10 = 61.9 Net = 62.9	233.56 = ~~.1887~~ ~~=.188 fCi/l~~			
					X13 = ~~2.44 fCi/l~~	X 10^{-9} uCi/ml		~~0.263~~
					X13 = 1397/8559 =	0.163×10^{-9}		0.263
UNDER OFFICE	5 m	20 CFM	2832 L	79/10 = 7.9	2696 = .00439			
				Net: 6.9	X13 = .0557 X 10^{-9}	uCi/ml		0.557
						= .161 X 10^{-9} uCi/ml		
BELT PIPE	5 m	19 CFM	2690.4 L	40/10 = 4.0	13.65 = .00229			
				Net: 3.0	X13 = .0297 X	10^{-9} uCi/ml		0.297
TRIPPER FA	5 m	20 CFM	2832 L	57/10 = 5.7	19.45 = .00309			
				Net: 4.7	X13 = .04022	X 10^{-9} uCi/ml		.4022

WIPES, WORKING LEVEL SAMPLING, AIR & SOIL SAMPLING, ETC.

DATA SHEET FOR EXPERIMENT

Equipment PASCAL
& Scint 027.

Window = 0.1
Thresh = 0.3
H.V. = 1150
Chess switch to GROSS
Eff = .165
Bark = 2 CPM

Date 08/09/84 .174 .26 .3 .19 .8

Experimenters

α counter, Calib:

SAMPLE	TIME	FL R. LITERS	COUNTS / Bark =	3XX CPM / 2.2 = CPM		2809/10720	Bark (repeat)
						3229/10720	top
S. PARK	15 m	20 L 855.12	1466 1324	296.8	[illegible]		
	120		Bark = 142		[illegible]	2X4 6/11 720	middle
	vs 1.61					2906 1.720	middle
WINDER	5 m	20 2832 L	233 312.7	[illegible]	[illegible]		
GRIZZLY			Bark = 54	62.44	[illegible]		
	60				[illegible] 5 X 1.5 = 7.5 cm²		
	vs .557				area of probe used	= 47.5 cm²	
					area of circle =	63.59 cm²	
UPPER PARK	5 m	19 2690 XL	84 109.2	21.84 = .0276	[illegible] cm factor = 63.59/47.5 =		1.34 X
SITE			Bark = 54				
	.226						
	vs .297						
	5 m	20 2832 L	+25				
TAWAYA SEA			103 132.4	27.6 = .0266	[illegible]		
(MOUTH RECEIVER)			Bark = 54				
	.266						
	vs .402						

(24)

Sta	Method (1) SPA-1 RASCAL		Method (2) RASCAL SPA-1	
Y.C. Pond .1156 pCi/L .160 > 104/L SPA-1	U nat	1.156	1.60	
	~~Ra 226~~			
	~~Th 230~~			
	~~Pol 210~~			
Under Canopy .0402 .0465	U nat	0.185	0.186	
	Ra 226	0.185	0.186	
	Th 230	~~0.927~~	0.930	
	Po 210	0.0462	0.0465	
Bell Pich Sta .00816 .0201	U nat	0.0326 ~~0.326~~	0.0804	2 Sigma = 78%
	Ra 226	0.0326 ~~0.326~~	0.0804	
	Th 230	0.163 ~~0.163~~	0.402	
	Po 210	0.0082 ~~0.0082~~	0.0201	
TRIPPER .0127 .0311	U nat	0.0508 (.0735)	~~0.0622~~ 0.1244	2 Sigma = 51%
	Ra 226	0.0508 (.0735)	~~0.0622~~ 0.1244	
	Th 230	0.254 (.3680)	0.622	
	Po 210	0.0127 (.0184)	0.0311	

.0184 ↓ Comm = 125

using 1st Comm

40 U
20 Th
20 Ra
20 Pb

KMC
TOP OF MINE ORE STOR.

AUG.15,84
1440
WLM # 000-000
DATA PERIOD:
AUG.14 TO AUG.15,84
AVERAGE WL:
+9.41E-02 +/- 0.82 %
% THORON = 4

DATA IN WL
BKG = +7.36E-05
AUG.14,84
1600 +1.92E-02
1700 +3.12E-02
1800 +2.95E-02
1900 +2.86E-02
2000 +3.64E-02
2100 +7.54E-02
2200 +6.82E-02
2300 +1.27E-01
AUG.15,84
0000 +1.39E-01
0100 +8.00E-02
0200 +7.70E-02
0300 +8.58E-02
0400 +6.55E-02
0500 +8.72E-02
0600 +8.18E-02
0700 +1.03E-01
0800 +1.39E-01
0900 +1.62E-01 =.16 .12

TAIL DATA:
AUG.15,84
1000 +1.12E-01
1100 +3.55E-02
1200 +9.84E-03
1300 +3.14E-03

08/15/84 - K MC - recalc
0843 - .18
1002 - .24