

42-6-57

# PETROTOMICS COMPANY

TIDEWATER OIL COMPANY • MANAGING PARTNER  
P. O. BOX 3500  
Casper, Wyoming

March 15, 1963

Mr. R. Lowenstein, Director  
Division of Licensing and Regulation  
U. S. Atomic Energy Commission  
Washington 25, D. C.

Dear Mr. Lowenstein:

Attached is the report covering radiation safety survey results which is due for this quarter.

Sincerely,

PETROTOMICS COMPANY

By D. S. Hutchinson  
Radiologist

DSH:afn

Enclosure

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PDR FDIA  
BURR85-229 PDR

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Petrotomics Company

Air-borne Radioactivity

A tabulation of the results of our air-borne radioactivity surveys for the quarter is included on an attached sheet. On this same sheet is an eleven month to-date figure which shows the average concentration since our start-up on April 1, 1962. The comparison of these figures with the latest quarter shows that there has been almost no increase in the air-borne radioactivity recently. In fact, almost all areas show a decrease, particularly the critical packaging and precipitation areas.

During the months of December, January and February, there occurred two fourteen-day periods (December 5-18 and January 16-29) when one Packaging Operator and Two Precipitation Operators worked 120 hours; their MPC's were lowered to  $3.2 \times 10^{-11}$  uc/ml respectively. The attached Job Exposure sheets show that none of these men were over-exposed during these or any other periods.

Only the two above mentioned operators, Precipitation and Packaging, work at any time in areas in which dust concentrations reached MPC or approached MPC levels.

It was found, upon sampling the dryer discharge stack and applying diffusion equations, that no reasonable concentration levels could be reached for an unrestricted area. Therefore, environmental samples were taken downwind from the dryer stack, outside the restricted area. These samples were taken with an MSA FIXT-FLO air sampler. All samples were taken for one hour at 50 ft. <sup>3</sup>/min. to get enough samples for accurate detection. Wind velocities were determined with a Dwyer Wind Meter. In no case did the concentration of these areas exceed 5% MPC considering 100% occupancy time.

A more extensive environmental survey program is pending the arrival of new equipment and filter media. This program will include sampling stations at varying distances from the restricted area.

External Radioactivity

Film badges worn by various mill personnel have shown no measurable gamma radiation for this thirteen-week period. Maximum beta reading for this period was 42 mrem, received by D. J. Plummer, a precipitation operator. Only two of the sixteen badged employees have received measurable amounts of beta during these thirteen weeks.

Water Surveys

The results of the water surveys for December, January and February show that all samples were well below the MPC.

The average per cent MPC for the potable water after twelve months' operation stands at 87%. The month of January, 1963, was the highest per cent MPC for this quarter, which was 90% MPC.

A copy of a chart showing month by month variations of potable water assays and the twelve month average is also attached.

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GENERAL AIR SAMPLES  
Dec., 1962, thru Feb., 1963 - 11 Month Comparison

<u>Area</u>	<u>Building</u>	<u>No. of Surveys</u>	<u>(uc/mlx10<sup>-11</sup>)</u>		<u>Avg.</u>	<u>11 Month Average</u>
			<u>High</u>	<u>Low</u>		
Feeder Floor		3	.12	.06	.07	.16
Crusher Floor		3	.34	.07	.18	.29
Pit		3	.41	.20	.27	.87
Screen Floor	Secondary	3	.06	Nil	.03	.13
Impactor Floor		3	.59	.22	.44	.27
Ground Floor		3	.14	.09	.11	.15
Tripper Floor	Fine Ore	3	.41	.06	.19	.15
Sample Prep.		3	.08	.01	.03	.03
Feeder Floor		3	.06	.01	.03	.06
Grind	Mill	3	.06	.02	.04	.13
Leach	Mill	3	.13	.03	.06	.10
Precipitation	Mill (Mezzanine)	3	.10	Nil	.04	.35
Precipitation	Mill (Main Floor)	3	.10	.03	.07	.25
Packaging Room	Mill	7	3.0	.37	1.23	4.30
Drying Room	Mill	6	4.9	.20	2.27	3.10
CCD Walk		3	.02	Nil	.01	.01
CCD Tunnel		3	.05	Nil	.02	.02
Tails Pump House		3	.13	Nil	.05	.05
S.X. Lab	S.X.	3	.04	Nil	.01	.02
S.X. Deck	S.X.	3	.21	Nil	.08	.05
Shift Office	Mill	3	.03	Nil	.02	.24
Change Room	Mill	3	.11	Nil	.04	.19
Supt. Office	Mill	3	.19	Nil	.07	.97
Met. Office	Mill	3	.37	.02	.14	.21

# ENVIRONMENTAL AIR-BORNE SURVEY

(Samples taken downwind for dryer stack)

<u>Location</u>	<u>No. of Samples</u>	<u>uc/ml Average</u>	<u>Wind Velocity</u>
Due east of mill at fence line	2	$1.2 \times 10^{-14}$	--
Rear of Cafeteria	1	$1.1 \times 10^{-14}$	2.3 mph
Between Cafeteria and Office	1	$1.4 \times 10^{-14}$	4.0 mph
By southeast gate	2	$2.0 \times 10^{-15}$	4.2 mph

POTABLE WATER ANALYSIS

	Ra 226	Th 230	U308
	<u>uc/ml</u>	<u>uc/ml</u>	<u>uc/ml</u>
December, 1962	$1.9 \times 10^{-9}$	$< 5 \times 10^{-9}$	$7.3 \times 10^{-7}$
January, 1963	$8.7 \times 10^{-9}$	$9 \times 10^{-9}$	$7 \times 10^{-7}$
February, 1963	$1.1 \times 10^{-9}$	$< 5 \times 10^{-9}$	$7 \times 10^{-7}$

NATURAL WATER SOURCES BELOW TAILINGS DAM

December, 1962			
RTH #1:	$1.8 \times 10^{-9}$	$< 5 \times 10^{-9}$	$< 1 \times 10^{-8}$
RTH #2:	$6 \times 10^{-10}$	$< 5 \times 10^{-9}$	$1 \times 10^{-8}$
RTH #3:	$1.6 \times 10^{-9}$	$< 5 \times 10^{-9}$	$< 1 \times 10^{-8}$
Creek Below Dam:	$2.1 \times 10^{-9}$	$< 5 \times 10^{-9}$	$6 \times 10^{-8}$
January, 1963			
RTH #1:	$3 \times 10^{-10}$	$< 5 \times 10^{-9}$	$< 1 \times 10^{-8}$
RTH #2:	$6 \times 10^{-10}$	$< 5 \times 10^{-9}$	$< 1 \times 10^{-8}$
RTH #3:	$2.1 \times 10^{-9}$	$7.7 \times 10^{-9}$	$< 1 \times 10^{-8}$
Creek Below Dam:	$2.9 \times 10^{-10}$	$< 5 \times 10^{-9}$	$1.1 \times 10^{-7}$
Secondary Pond:	$7 \times 10^{-9}$	$5.2 \times 10^{-6}$	$5.5 \times 10^{-6}$
February, 1963			
RTH #1:	$8 \times 10^{-10}$	$< 5 \times 10^{-9}$	$< 1 \times 10^{-8}$
RTH #2:	$6 \times 10^{-10}$	$6 \times 10^{-9}$	$< 1 \times 10^{-8}$
RTH #3:	$3 \times 10^{-10}$	$5 \times 10^{-9}$	$1 \times 10^{-8}$
Creek Below Dam:	$6 \times 10^{-10}$	$1.25 \times 10^{-8}$	$1.1 \times 10^{-7}$
Secondary Pond	$3.7 \times 10^{-9}$	$5 \times 10^{-7}$	$8.9 \times 10^{-7}$



# PETROTONOMICS COMPANY

## JOB EXPOSURE EVALUATION

Survey Period Dec. 1962

BUILDING Mill PROCESS AREA Precipitation

OPERATOR Precip. 1 men/shift 2 shift/day 2 men/day

Operation or Operating Area	Time Per Oper.	Oper. Per Shift	Time Per Shift (T)	Sample No.	Concentration <del>XXXXXX</del> uc/ml x 10 <sup>-11</sup>				TXC
					High	Low	Avg.	(C)	
Precip. Mezzanine			440	184			Nil		
Precip. Main Floor			162	178			.03		5.00
Dryer Room:									
By Temp. Gauges			24	186			7.69		184.60
Cleaning Grates			24	187			4.94		118.30
Shift Office			40	176			Nil		
Change Room			30	177			Nil		

$\Sigma(T)$  720

$\Sigma(TXC)$  307.90

$$\frac{\Sigma(TXC)}{\Sigma(T)} = \frac{0.43 \text{ uc/ml x } 10^{-11}}{720} =$$

0.08\*

MPC

\*0.11 MPC during period Dec. 5-18

MPC (Normal) = 5.7 uc/ml x 10<sup>-11</sup> (42 hrs.)  
MPC (Dec. 5-18) = 4.0 uc/ml x 10<sup>-11</sup> (120 hrs.)  
(per 14 days)

# PETROTOMICS COMPANY

## JOB EXPOSURE EVALUATION

Survey Period Jan. 1963

BUILDING Mill PROCESS AREA Precipitation

OPERATOR Precip. 1 men/shift 2 shift/day 2 men/day

Operation or Operating Area	Time Per Oper.	Oper. Per Shift	Time Per Shift (T)	Sample No.	Concentration <del>XXXXXX</del> uc/ml x 10 <sup>-11</sup>			TxC
					High	Low	Avg. (C)	
Precip. Mezzanine			440	217			.10	44.00
Precip. Main Floor			162	211			.07	11.40
Dryer Room:								
By Temp. Gauges			24	234			1.21	29.00
Cleaning Grates			24	233			.68	17.00
Shift Office			40	213			.02	0.80
Change Room			30	212			.05	1.50

$\Sigma(T)$  720

$\Sigma(TxC)$  103.70

$$\frac{\Sigma(TxC)}{\Sigma(T)} = 0.15 \quad \frac{\text{uc/ml} \times 10^{-11}}{\text{XXXXXX}} =$$

0.03\*

MPC

\*0.04 MPC during period Jan. 16-29

MPC(Normal) = 5.7 uc/ml x 10<sup>-11</sup> (42 hrs.)  
MPC(Jan. 16-29) = 4.0 uc/ml x 10<sup>-11</sup> (120 hrs.)  
(per 14 days)

42.6659



# PETROTOMICS COMPANY

## JOB EXPOSURE EVALUATION

Survey Period Feb., 1963

BUILDING Mill PROCESS AREA Precipitation

OPERATOR Precip. 1 men/shift 2 shift/day 2 men/day

Operation or Operating Area	Time Per Oper.	Oper. Per Shift	Time Per Shift (T)	Sample No.	Concentration <del>XXXXX</del> uc/ml x 10 <sup>-11</sup>				TXC
					High	Low	Avg.	(C)	
Precip. Mezzanine			440	217			.10		44.00
Precip. Main Floor			162	211			.07		11.40
Dryer Room:									
By Temp. Gauges			24	236			5.43		130.20
Cleaning Grates			24	246			6.10		146.10
Shift Office			40	213			.02		0.80
Change Room			30	212			.05		1.50

$\Sigma(T) = 720$

$\Sigma(TXC) = 334.00$

$$\frac{\Sigma(TXC)}{\Sigma(T)} = 0.46 \quad \frac{\text{uc/ml} \times 10^{-11}}{\text{XXXXX}} =$$

$0.08$

MPC

MPC = 5.7 uc/ml x 10<sup>-11</sup> (42 hrs.)

# PETROTOMICS COMPANY

## JOB EXPOSURE EVALUATION

Survey Period Dec., 1962

BUILDING Mill PROCESS AREA Final Product Packaging

OPERATOR Packaging 1 men/shift 1 shift/day 1 men/day

Operation or Operating Area	Time Per Oper.	Oper. Per Shift	Time Per Shift (T)	Sample No.	Concentration <del>uc/ml</del> uc/ml x 10 <sup>-11</sup>			TNC
					High	Low	Avg. (C)	
Packaging Room:								
Painting & Labeling	10	3	30	194			0.37	11.10
Shaking & Changing	9	3	27	192			1.38	37.26
Weighing	5	6	30	193			4.60	138.00
Sampling	6	3	18	191			4.32	77.76
Sampling Table			60	190			0.68	40.80
Clean-up			60	188			0.38	22.80
Mill Floor - Clean-up of General Area			165	155			.10	16.50
Shifter Office			50	145			.03	1.50
Change Room			40	148 (a)			.11	4.40
Bucking Room			240	161			.08	19.20

$\Sigma(T)$  720

$\Sigma(TNC)$  359.32

$$\Sigma(TNC) = 0.50 \quad \frac{\text{uc/ml} \times 10^{-11}}{\Sigma(T)} = \boxed{0.11*} \quad \text{MPC}$$

\*0.16 MPC during period Dec. 5-18

MPC(Normal) = 4.60 uc/ml x 10<sup>-11</sup> (42 hrs.)  
MPC(Dec. 5-18) = 3.2 uc/ml x 10<sup>-11</sup> (120 hrs. )  
(per 14 days)

# PETROTOMICS COMPANY

## JOB EXPOSURE EVALUATION

Survey Period Jan., 1963

BUILDING Mill PROCESS AREA Final Product Packaging

OPERATOR Packaging 1 men/shift 1 shift/day 1 men/day

Operation or Operating Area	Time Per Oper.	Oper. Per Shift	Time Per Shift (T)	Sample No.	Concentration <del>XXXXXX</del> uc/ml x 10 <sup>-11</sup>				TxC
					High	Low	Avg.	(C)	
Packaging Room:									
Painting & Labeling	10	3	30	198			2.82		84.60
Shaking & Changing	9	3	27	195			1.21		32.67
Weighing	5	6	30	197			0.09		2.70
Sampling	6	3	18	196			0.80		14.40
Sample Table			60	199			1.38		82.80
Clean-up			60	188			0.38		22.80
Mill Floor - General									
Clean-up			165	178			.03		4.95
Shifter Office			50	176			Nil		
Change Room			40	177			Nil		
Bucking Room			240	208			.01		2.40

$\Sigma(T) = 720$

$\Sigma(TxC) = 247.32$

$$\Sigma(TxC) = 0.343 \frac{\text{uc/ml} \times 10^{-11}}{\Sigma(T)} = \boxed{0.07*} \text{ MPC}$$

\*0.11 MPC during period Jan. 16-29

MPC(Normal) = 4.60 uc/ml x 10<sup>-11</sup> (42 hrs.)  
MPC(Jan. 16-29) = 3.2 uc/ml x 10<sup>-11</sup> (120 hrs. )  
(per. 14 days)

# PETROATOMICS COMPANY

## JOB EXPOSURE EVALUATION

Survey Period Feb., 1963

BUILDING Mill PROCESS AREA Final Product Packaging

OPERATOR Packaging 1 men/shift 1 shift/day 1 men/day

Operation or Operating Area	Time Per Oper.	Oper. Per Shift	Time Per Shift (T)	Sample No.	Concentration <del>XXXXXX</del> uc/ml x 10 <sup>-11</sup>			TxC
					High	Low	Avg. (C)	
Packaging Room:								
Painting & Labeling	10	3	30	243, 248	0.50	0.39	0.45	13.50
Shaking & Changing	9	3	27	240, 245	2.10	0.90	1.60	43.20
Weighing	5	6	30	237, 239	1.60	0.53	1.07	32.10
Sampling	6	3	18	238, 244	5.30	0.79	3.05	54.90
Sample Table			60	241, 242	0.90	0.82	0.86	51.60
Clean-up			60	241			0.90	54.00
Main Floor - General								
Clean-up			165	211			.07	11.55
Shifter Office			50	213			.02	1.00
Change Room			40	212			.05	2.00
Bucking Room			240	232			.02	4.80

$\Sigma(T)$  720

$\Sigma(TxC)$  268.65

$$\frac{\Sigma(TxC)}{\Sigma(T)} = 0.372$$

uc/ml x 10<sup>-11</sup>  
~~XXXXXX~~ =

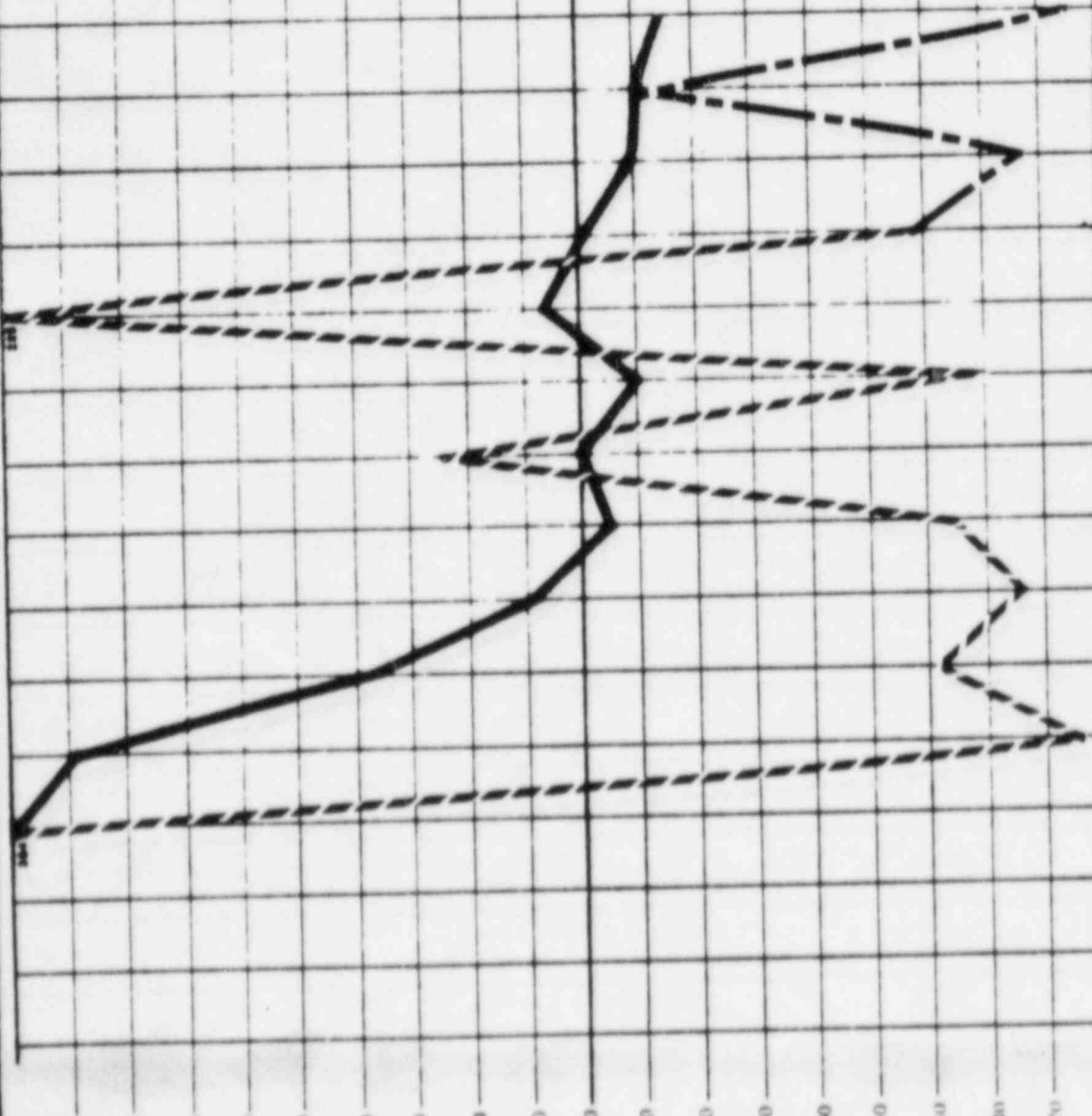
0.08

MPC

MPC(Normal) = 4.60 uc/ml x 10<sup>-11</sup> (42 hrs.)

7. MPC

190  
180  
170  
160  
150  
140  
130  
120  
110  
100  
90  
80  
70  
60  
50  
40  
30  
20  
10



POTABLE WATER ANALYSIS  
Sta 226, Th 230, 1238)  
Month  
Average  
1963-1963

DEC - JAN - FEB - MAR - APR - MAY - JUN - JUL - AUG - SEP - OCT - NOV - DEC - JAN - FEB - MAR - APR - MAY - JUN - JUL - AUG - SEP - OCT - NOV - DEC

FROM: <b>Protectors Company</b> Arlon, Virginia		DATE OF DOCUMENT: <b>3-15-63</b>		DATE REC'D <b>3-19-63</b>		NO.: <b>2073</b>	
		LTR. <b>x 4 encls.</b>		MEMO:		REPORT:	
		OTHER:					
TO: <b>S. Lowenstein</b> <b>A. L. H.</b>		ORIG.: <b>X</b>		CC:		OTHER:	
		ACTION NECESSARY <input type="checkbox"/>		CONCURRENCE <input type="checkbox"/>		DATE ANSWERED:	
		NO ACTION NECESSARY <input type="checkbox"/>		COMMENT <input type="checkbox"/>		BY:	
CLASSIF.: POST OFFICE		FILE CODE: <b>40-6659</b>					
REG. NO:							
DESCRIPTION: (Must Be Unclassified)		REFERRED TO		DATE		RECEIVED BY	
<b>Ltr. trans:</b>		<b>MUSACILLET:</b>		<b>3-19-63</b>			
		<b>w/file cv.</b>					
		<b>1-compliance cv.</b>					
ENCLOSURES: (1 encl. rec'd of 4a.)							
Radiation Survey Report for two quarters							
for exposure evaluations							
at Lake Water Analysis							
REMARKS:							
Mail box distribution:							
1-encl. cv.							
w/hold pending S.L. review							

**U.S. ATOMIC ENERGY COMMISSION MAIL CONTROL FORM FORM AEC-3265 (8-60)**