

I-804 #44



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August 27, 1990

HUB —

Mr. David Wheeler
US Department of Energy
Nevada Operations Office
PO Box 98518
Las Vegas, NV 89193-8518

Dear Mr Wheeler:

We have successfully analyzed 29 of 30 samples of human urine furnished to us by BNL and indicated as BNL #1 through 30.

Two of the 29 samples (Table 1) showed definite evidence of ²³⁹Pu, BNL 16 and 29; both were analyzed twice.

None of the other 27 samples exceeded the detection limit (2σ), which for irradiation R 28 was 73 tracks, about equivalent to 40 aCi/liter. For our background we used 6 control urine samples from young adult males living in Salt Lake City, Utah, all of whom were born after 1962-4, the years of maximum global fallout with ²³⁹Pu at which time young adults in New York City inhaled and retained systemically about 2x10⁶ aCi.

Each sample was eluted in two fractions about 100 μl each (see Table 3); more ²³⁹Pu is eluted in the first fraction than the second, which allows us a quality control check against contamination. Both BNL 16 and 29 showed the elution pattern expected for ²³⁹Pu but not for U contamination. Our provisional calibration factor is 1.76 tracks/aCi. The variation in results for BNL 16 between R 28 (247 tracks) and R 24 (166 tracks) is most likely due to yield variation. If we use the results from the R 28 irradiation and a mean control urine background of 35 ± 13 tracks the ²³⁹Pu content of BNL 16 is estimated at 120 aCi. Sample BNL 29 had too much ²³⁹Pu to be accurately counted. Our best count was 5240 tracks, equivalent to about 3000 aCi.

The data upon which these results are based is enclosed. The summary data is expressed as net tracks which refers to the sum of the tracks in the first 2 drops less two times the lexan slide background counted on the same slide.

I hope this will be sufficient to initiate the processing of the next 20 samples.

Sincerely,

McDonald E. Wrenn, Ph.D.
Professor and Director

encl.
MEW/ls

Harry Brown W

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TABLE 1:

8-27-90

Results for BNL Samples
(Net* Number of Tracks per 200 ml Urine Sample)

BNL Sample #ID	Net Number of tracks	
	R 28	R 24
#1	41	
#2	52	
#3	46	
#4	43	
#5		19
#6	63	
#7	67	
#8	72	36
#9	49	40
#10		51
#11	62	
#12	65	
#13	63	
#14	65	
#15		58
#16	247	166
#17		56
#18		37
#19		43
#20		21
#21	61	
#22	32	
#23	45	
#24	Lost**	
#25	43	
#26		46
#27	71	
#28	37	
#29	5240	>2000
#30	44	

* "Net" means total tracks in the first two elution drops minus 2 x the track background on the same lexan slide. No control urine backgrounds have been subtracted.

** "Lost" refers to a sample processing accident such as a broken beaker or sample slide dropped on the floor.

Results for Control Urines* (200 ml) and Reagent Blanks**

Net Number of Tracks

ID #	R28	ID #	R26	ID #	R24
RB1	34	RB1	31	RB1	29
RB2	26	RB2	46	RB2	46
RB3	45	RB3	41	RB3	37
RB4	26	RB4	Lost	RB4	12
		RB5	a/n***		
		RB6	37		
FUB13	41	FUB1	35	No acceptable Results.	
FUB14	23	FUB2	61		
FUB15	33	FUB3	35		
		FUB4	49		
KUB11	26	JUB1	56		
KUB12	27	JUB2	64		
KUB13	59	JUB3	54		
		JUB4	159		
		WUB1	47		
		WUB2	Lost		
		WUB3	34		
		WUB4	50		

Mean \pm 1s

RB	33 \pm 9	39 \pm 6	31 \pm 14
UB	35 \pm 13	56 \pm 34	
UB+RB	34 \pm 11	53 \pm 31	

* UB= control Urine

**RB= Reagent Blank

*** Analysis did not meet acceptance criteria.

TABLE 3: Results for BNL Samples in detail

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CODE	1st drop	2nd drop	Blank	2 drops (Total)	2 drops (Net)
R 28					
BNL#1	40	31	15	71	41
BNL#2	48	20	8	68	52
BNL#3	31	37	13	68	46
BNL#4	33	26	8	59	43
BNL#6	47	30	7	77	63
BNL#7	63	40	18	103	67
BNL#8	59	49	18	108	72
BNL#9	38	31	10	69	49
BNL#11	36	50	12	86	62
BNL#12	44	33	6	77	65
BNL#13	46	39	11	85	63
BNL#14	47	42	12	89	65
BNL#16	217	62	16	279	247
BNL#21	56	31	13	87	61
BNL#22	23	27	9	50	32
BNL#23	41	28	12	69	45
BNL#25	39	28	12	67	43
BNL#27	57	34	10	91	71
BNL#28	52	33	24	85	37
BNL#29	3800	1286	23	5286	5240
BNL#30	43	29	14	72	44
R 24.					
BNL#5	30	21	16	51	19
BNL#8	31	31	13	62	36
BNL#9	38	20	9	58	40
BNL#10	50	13	6	63	51
BNL#15	58	20	10	78	58
BNL#16	128	38		166	
BNL#17	50	32	13	82	56
BNL#18	30	15	4	45	37
BNL#19	24	29	5	53	43
BNL#20	26	17	11	43	21
BNL#26	19	35	4	54	46
BNL#29	858	998		>2000	