DISPOSITION FORM

FILE NO.	SUBJECT
CMLRD-ND-NC	Determination of Thorium in Urine Samples

TO: Health Physics Office, NDL

FROM: Dr. Walter Naegele, Nuclear Chemistry Div, NDL

DATE: 8 December 61

COMMENT NO. 1

NAEGELE/mcb/6147

In connection with a spill of radioactive material in Lab 7, Bldg 716, containing Th^{228}, a radiochemical determination of thorium in urine samples from some persons involved in the accident was run. Controls to determine the activity in normal drinking water and distilled water and in the reagents used for the procedure were made.

The procedure used is one described by the Los Alamos Industrial Hygiene Group (LA - 1858, 2nd. Edition, 1958): "The Determination of Thorium - 230 in Urine".

Urine samples are ashed with repeated addition of nitric acid, heavy elements are carried down by coprecipitation with bismuth phosphate and upon dissolution in hydrochloric acid and addition of a small amount of lanthanum nitrate solution the thorium is coprecipitated by adding hydrofluoric acid to form lanthanum fluoride which is slurried down on counting planchets and dried with subsequent heating to ensure absolute dryness. The thickness of the layer is so small that practically no selfabsorption of alpha particles occurs. Counting is done in counters with high efficiency in the alpha-region. The detectors used were the Nuclear Chicago D 47 proportional type flow counter with ultra thin windows and the Tracerlab Automatic Flow Counter SC - 50E. Calibration of counter efficiency was done with a calibrated uranium standard, giving an approximate value for the conversion of count-rates to activity. Efficiencies given were 35.6% and 49% for the D 47 and SC - 50 B respectively.

The following table shows the results from our determinations together with one control using drinking water and treated in exactly the same manner and another control on the reagents used in this procedure. The count-rates obtained from the blank on the reagents were subtracted from the net counts to get the true sample count-rate listed in Column 10. For comparison a value for the gross-alpha-activity in Bldg 716, Lab 9, drinking water (taken during an Environmental Monitoring Test in January 1961) will be given: The specific activity was determined to be 3.8×10^{-9} uC/ml.

FOR THE COMMANDER:

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as

DR. WALTER NAEGELE
Nuclear Chemistry Division

DD FORM 1 FEB 50 96 REPLACES AME FORM 96, 1 OCT 48, WHICH MAY BE USED

Incl 6

Sample	Vol.	Total Counts	Counter	Counting	Count	Sec.	
I Alumni 17 November 1860	1000	58	D 47	0.75	77.5	1.0	76.5
I "	1000	91	SC - 50B	1.0	91.0	1.4	89.6
II Alumni 20 November	500	27	D 47	0.75	36.0	1.0	35.0
II "	500	61	SC - 50B	1.0	61.0	1.4	59.6
III V. Antwerp	1000	87	SC - 50B	1.0	87	1.0	86.0
Control Drinking Water	1000	94	D 47	1.0	94	0.8	93.2
Control Reagents		30	D 47	1.0	30	0.8	29.2
"		41	SC - 50B	1.0	41	1.4	39.6