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HANFORD ATOMIC PRODUCTS OPERATION - RICHLAND, WASHINGTON

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TITLE

Radioisotopic Analysis of Aluminum Control Rods

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Radiological Analysis Operation

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SD-7600-056 (10-62) ARC-GE RICHLAND, WASH.

ANALYTICAL REPORT			
HL RADIOLOGICAL ANALYSIS			
REQUESTOR'S SAMPLE NO.		ANALYSIS NO.	
SAMPLE DESIGNATION			
SAMPLE SITE			
REQUESTED BY	AREA	BLDG.	PHONE
DATE - TIME SAMPLED	DATE RECEIVED	DATE COMPLETED	
ANALYSIS DESIRED			

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SD-7600-056 (10-62) AEC-GE RICHLAND, WASH.

ANALYTICAL REPORT HL RADIOLOGICAL ANALYSIS			
REQUESTOR'S SAMPLE NO.		ANALYSIS NO.	
SAMPLE DESIGNATION			
SAMPLE SITE			
REQUESTED BY	AREA	BLDG.	PHONE
DATE - TIME SAMPLED	DATE RECEIVED	DATE COMPLETED	
ANALYSIS DESIRED			

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FIFTY DOLLAR BILLION OF (10¹¹) PRODUCTS IN 1960
 100 DOLLAR BILLION IN 1962
 100 DOLLAR BILLION IN 1963
 100 DOLLAR BILLION IN 1964
 100 DOLLAR BILLION IN 1965
 100 DOLLAR BILLION IN 1966
 100 DOLLAR BILLION IN 1967
 100 DOLLAR BILLION IN 1968
 100 DOLLAR BILLION IN 1969
 100 DOLLAR BILLION IN 1970

Journal of Management Education 30(6)

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RD-7600-056 (10-62) AEC-GE RICHLAND, WASH.

HWT 82764 - RD		ANALYTICAL REPORT		PAGE 2	
REQUESTOR'S SAMPLE NO. RD C-444		ANALYSIS NO. 6493			
SAMPLE DESIGNATION F AREA ACRES					
SAMPLE SITE					
REQUESTED BY K.B. BIVLER		AREA 100-F 700		BLDG. 760	
DATE - TIME SAMPLED 4/20/64		DATE RECEIVED 4/24/64		PHONE 6-5186	
ANALYSIS DESIRED		DATE COMPLETED 5/27/64			
MAJOR RADIONUCLIDES CONTRIBUTING TO DOSE RATE					

Sample No.	D/m Zn^{65} gm Sample	Contribution To Total Dose Rate	D/m Cs^{60} gm Sample	Contribution to Total Dose Rate
HCR A-1A	1.0×10^8	26.3 %	5.6×10^7	73.7 %
-2A	1.1×10^8	26.7 %	5.8×10^8	73.3 %
-3A	9.2×10^8	26.6 %	4.9×10^8	73.4 %
-1B	2.8×10^8	5.3 %	1.0×10^9	94.7 %
-2B	2.7×10^8	5.2 %	9.5×10^8	94.8 %
-3B	2.9×10^8	4.7 %	1.1×10^9	95.3 %
HCR B-1A	3.4×10^8	26.5 %	1.8×10^8	73.5 %
2A	3.0×10^8	26.8 %	1.6×10^8	73.2 %
3A	3.0×10^8	26.7 %	1.6×10^8	73.3 %
1B	1.1×10^7	4.1 %	4.9×10^7	95.9 %
2B	8.7×10^7	7.7 %	2.0×10^8	92.3 %
3B	6.5×10^6	2.6 %	4.6×10^7	91.4 %
HCR C-1A	3.6×10^8	26.6 %	1.9×10^8	73.4 %
2A	4.3×10^8	27.9 %	2.1×10^8	72.1 %
3A	4.4×10^8	28.0 %	2.2×10^8	72.0 %
1B	5.5×10^7	11.4 %	8.3×10^7	88.6 %
2B	1.4×10^8	7.7 %	3.3×10^8	92.3 %
3B	4.8×10^7	9.6 %	8.7×10^7	90.4 %
HCR D-1A	9.5×10^4	1.2 %	1.5×10^6	98.8 %
2A	4.1×10^5	1.9 %	4.1×10^6	98.1 %
3A	5.6×10^5	1.9 %	5.6×10^6	98.1 %
1B	Zn^{65} ACTIVITY NEGLIGIBLE		1.8×10^6	100.0 %
2B	2.0×10^5	2.6 %	1.4×10^6	97.4 %
3B	3.4×10^4	0.4 %	1.6×10^6	99.6 %
V-1	Zn^{65} ACTIVITY NEGLIGIBLE		6.5×10^6	100.0 %

Notes: A. ACTIVITY FROM Zn^{65} AND Cs^{60}

K. B. DYLER	700	71.2	10-5 184
DATE - TIME SAMPLED 4/20/64	DATE RECEIVED 4/24/64	DATE COMPLETED 5/27/64	
ANALYSIS DESIRED MAJOR RADIONUCLIDES CONTRIBUTING TO DOSE RATE			

Sample No.	D/M Zn^{65} gm Sample	Contribution To Total Dose Rate	D/M Co^{60} gm Sample	Contribution to Total Dose Rate
HCR A-1A	1.0×10^8	26.3 %	5.6×10^7	73.7 %
-2A	1.1×10^8	26.7 %	5.8×10^8	73.3 %
-3A	9.2×10^8	26.6 %	4.9×10^8	73.4 %
-1B	2.8×10^8	5.3 %	1.0×10^9	94.7 %
-2B	2.7×10^8	5.2 %	9.5×10^8	94.8 %
-3B	2.9×10^8	4.7 %	1.1×10^9	95.3 %
HCR B-1A	3.4×10^8	26.5 %	1.8×10^8	73.5 %
2A	3.0×10^8	26.8 %	1.6×10^8	73.2 %
3A	3.0×10^8	26.7 %	1.6×10^8	73.3 %
1B	1.1×10^7	7.1 %	4.9×10^7	95.9 %
2B	8.7×10^7	7.7 %	2.0×10^8	92.3 %
3B	6.5×10^6	2.4 %	4.6×10^7	91.4 %
HCR C-1A	3.6×10^8	26.4 %	1.9×10^8	73.4 %
2A	4.3×10^8	27.9 %	2.1×10^8	72.1 %
3A	4.4×10^8	28.0 %	2.2×10^8	72.0 %
1B	5.5×10^7	11.4 %	8.3×10^7	88.6 %
2B	1.4×10^8	7.7 %	3.3×10^8	92.3 %
3B	4.8×10^7	9.4 %	8.7×10^7	90.4 %
HCR D-1A	9.5×10^4	1.2 %	1.5×10^6	98.8 %
2A	4.1×10^5	1.9 %	4.1×10^6	98.1 %
3A	5.6×10^5	1.9 %	5.6×10^6	98.1 %
1B	Zn^{65} ACTIVITY NEGLIGIBLE		1.8×10^6	100.0 %
2B	2.0×10^5	2.4 %	1.4×10^6	97.4 %
3B	3.4×10^4	0.4 %	1.6×10^6	99.6 %
V-1	Zn^{65} ACTIVITY NEGLIGIBLE		6.5×10^6	100.0 %

NOTES: All activity from Zn^{65} and Co^{60} was measured at 1.1 Mev and 2.5 Mev respectively on a MULTICHANNEL γ ENERGY ANALYZER.

RELATIVE DOSE RATES FOR RADIONUCLIDES PRESENT WERE COMPUTED AS OF 11/19/64, USING "RADIATION DOSIMETRY" BY G. HINE AND G. BROWNELL, PAGE 7571

CC: WJ GROBER - 327
J M FOX - 1761-14
P A HUTTON - 762
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SD-7800-056 (10-62) AEC-GE RICHLAND, WASH.

HWT 82764 RD		ANALYTICAL REPORT		Page 2
HL RADIOLOGICAL ANALYSIS				
REQUESTOR'S SAMPLE NO. RD C-444		ANALYSIS NO. 6493		
SAMPLE DESIGNATION F AREA ACR'S				
SAMPLE SITE 100-F				
REQUESTED BY RB BIVLER	AREA 700	BLDG. 712	PHONE 6-5186	
DATE - TIME SAMPLED 4/20/64	DATE RECEIVED 4/24/64	DATE COMPLETED 5/27/64		
ANALYSIS DESIRED MAJOR RADIONUCLIDES CONTRIBUTING TO DOSE RATE				

SAMPLE No.	D/M Zn ⁶⁵ gm Sample	CONTRIBUTION TO Total Dose Rate	D/M Cs ⁶⁰ gm Sample	CONTRIBUTION TO Total Dose Rate
HORA-1A	1.0 x 10 ⁸	26.3 %	5.6 x 10 ⁷	73.7 %
-2A	1.1 x 10 ⁷	26.7 %	5.8 x 10 ⁸	73.3 %
-3A	9.2 x 10 ⁸	26.6 %	4.9 x 10 ⁸	73.4 %
-1B	2.8 x 10 ⁸	5.3 %	1.0 x 10 ⁹	94.7 %
-2B	2.7 x 10 ⁸	5.2 %	9.5 x 10 ⁸	94.8 %
-3B	2.9 x 10 ⁸	4.7 %	1.1 x 10 ⁹	95.3 %
ACR B-1A	3.4 x 10 ⁸	26.5 %	1.8 x 10 ⁸	73.5 %
2A	3.0 x 10 ⁸	26.8 %	1.6 x 10 ⁸	73.2 %
3A	3.0 x 10 ⁸	26.7 %	1.6 x 10 ⁸	73.3 %
1B	1.1 x 10 ⁷	4.1 %	4.9 x 10 ⁷	95.9 %
2B	8.7 x 10 ⁷	7.7 %	2.0 x 10 ⁸	92.3 %
3B	6.5 x 10 ⁶	2.6 %	4.6 x 10 ⁷	91.4 %
ACR C-1A	3.6 x 10 ⁸	26.6 %	1.9 x 10 ⁸	73.4 %
2A	4.3 x 10 ⁸	27.9 %	2.1 x 10 ⁸	72.1 %
3A	4.4 x 10 ⁸	28.0 %	3.2 x 10 ⁸	72.0 %
1B	5.5 x 10 ⁷	11.4 %	8.3 x 10 ⁷	88.6 %
2B	1.4 x 10 ⁸	7.7 %	3.3 x 10 ⁸	92.3 %
3B	4.8 x 10 ⁷	9.6 %	8.7 x 10 ⁷	90.4 %
ACR D-1A	9.5 x 10 ⁴	1.2 %	1.5 x 10 ⁶	98.8 %
2A	4.1 x 10 ⁵	1.9 %	4.1 x 10 ⁶	98.1 %
3A	5.6 x 10 ⁵	1.9 %	5.6 x 10 ⁶	98.1 %
1B	Zn ⁶⁵ ACTIVITY NEGLIGIBLE		1.8 x 10 ⁶	100.0 %
2B	2.0 x 10 ⁵	2.6 %	1.4 x 10 ⁶	97.4 %
3B	3.4 x 10 ⁴	0.4 %	1.6 x 10 ⁶	99.6 %
V-1	Zn ⁶⁵ ACTIVITY NEGLIGIBLE		6.5 x 10 ⁶	100.0 %

RB BIVLER	700	710	PHONE 6-5186
DATE - TIME SAMPLED 4/20/64	DATE RECEIVED 4/24/64	DATE COMPLETED 5/27/64	
ANALYSIS DESIRED MAJOR RADIONUCLIDES CONTRIBUTING TO DOSE RATE			

SAMPLE No.	DIM Zn^{65} gm Sample	Contribution To Total Dose Rate	DIM Co^{60} gm Sample	Contribution to Total Dose Rate
HORA-1A	1.0×10^8	26.3 %	5.8×10^7	73.7 %
-2A	1.1×10^8	26.7 %	5.8×10^8	73.3 %
-3A	9.2×10^8	26.6 %	4.9×10^8	73.4 %
1B	2.8×10^8	5.3 %	1.0×10^9	94.7 %
-2B	2.7×10^8	5.2 %	9.5×10^8	94.8 %
-3B	2.9×10^8	4.7 %	1.1×10^9	95.3 %
HCRB-1A	3.4×10^8	26.5 %	1.8×10^8	73.5 %
2A	3.0×10^8	26.8 %	1.6×10^8	73.2 %
3A	3.0×10^8	26.7 %	1.6×10^8	73.3 %
1B	1.1×10^7	4.1 %	4.9×10^7	95.9 %
2B	8.7×10^7	7.7 %	2.0×10^8	92.3 %
3B	6.5×10^6	2.6 %	4.6×10^7	97.4 %
HCR C-1A	3.6×10^8	26.6 %	1.9×10^8	73.4 %
2A	4.3×10^8	27.9 %	2.1×10^8	72.1 %
3A	4.4×10^8	28.0 %	3.2×10^8	72.0 %
1B	5.5×10^7	11.4 %	8.3×10^7	88.6 %
2B	1.4×10^8	7.7 %	3.3×10^8	92.3 %
3B	4.8×10^7	9.4 %	8.7×10^7	90.4 %
HCR D-1A	9.5×10^4	1.2 %	1.5×10^6	98.8 %
2A	4.1×10^5	1.9 %	4.1×10^6	98.1 %
3A	5.6×10^5	1.9 %	5.6×10^6	98.1 %
1B	Zn^{65} ACTIVITY NEGLIGIBLE		1.8×10^6	100.0 %
2B	2.0×10^5	2.6 %	1.4×10^6	97.4 %
3B	3.4×10^4	0.4 %	1.6×10^6	99.6 %
V-1	Zn^{65} ACTIVITY NEGLIGIBLE		6.5×10^6	100.0 %

NOTES: All activity from Zn^{65} and Co^{60} was measured at 1.1 Mev and 2.5 Mev respectively on a multichannel γ energy analyzer.

RELATIVE DOSE RATES FOR RADIONUCLIDES PRESENT WERE COMPUTED AS OF 1964, USING "RADIATION DOSIMETRY" BY G. HINE AND G. BROWNELL, PAGE 7571

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RD-7600-056 (10-62) AEC-GE RICHLAND, WASH.

ANALYTICAL REPORT		PAGE 2	
HL RADIOLOGICAL ANALYSIS			
REQUESTOR'S SAMPLE NO. RM C-444		ANALYSIS NO. 6493	
SAMPLE DESIGNATION F AREA ACR'S			
SAMPLE SITE 100-F			
REQUESTED BY RB BIVLER	AREA 700	BLDG. 760	PHONE 6-5186
DATE - TIME SAMPLED 4/20/64	DATE RECEIVED 4/24/64	DATE COMPLETED 5/27/64	
ANALYSIS DESIRED MAJOR RADIO NUCLEIDES CONTRIBUTING TO DOSE RATE			

SAMPLE No.	D/M Zn ⁶⁵ gm Sample	CONTRIBUTION TO Total Dose Rate	D/M Cs ⁶⁰ gm Sample	Contribution to Total Dose Rate
HORA-1A	1.0 x 10 ⁸	26.3 %	5.8 x 10 ⁷	73.7 %
-2A	1.1 x 10 ⁹	26.7 %	5.8 x 10 ⁸	73.9 %
-3A	9.2 x 10 ⁸	26.6 %	4.9 x 10 ⁸	73.4 %
-1B	2.8 x 10 ⁸	5.3 %	1.0 x 10 ⁹	94.7 %
-2B	2.7 x 10 ⁸	5.2 %	9.5 x 10 ⁸	94.8 %
-3B	2.9 x 10 ⁸	4.7 %	1.1 x 10 ⁹	95.3 %
HCRB-1A	3.4 x 10 ⁸	26.5 %	1.8 x 10 ⁸	73.5 %
2A	3.0 x 10 ⁸	26.8 %	1.6 x 10 ⁸	73.2 %
3A	3.0 x 10 ⁸	26.7 %	1.6 x 10 ⁸	73.3 %
1B	1.1 x 10 ⁷	7.1 %	4.9 x 10 ⁷	95.9 %
2B	8.7 x 10 ⁷	7.7 %	2.0 x 10 ⁸	92.3 %
3B	6.5 x 10 ⁶	2.6 %	4.6 x 10 ⁷	97.4 %
ACRC-1A	3.6 x 10 ⁸	26.4 %	1.9 x 10 ⁸	73.4 %
2A	4.3 x 10 ⁸	27.9 %	2.1 x 10 ⁸	72.1 %
3A	4.4 x 10 ⁸	28.0 %	3.2 x 10 ⁸	72.8 %
1B	5.5 x 10 ⁷	11.4 %	8.3 x 10 ⁷	88.6 %
2B	1.4 x 10 ⁸	7.7 %	3.3 x 10 ⁸	92.3 %
3B	4.8 x 10 ⁷	9.6 %	8.7 x 10 ⁷	90.4 %
ACRD-1A	7.5 x 10 ⁴	1.2 %	1.5 x 10 ⁶	98.8 %
2A	4.1 x 10 ⁵	1.9 %	4.1 x 10 ⁶	98.1 %
3A	5.6 x 10 ⁵	1.9 %	5.6 x 10 ⁶	98.1 %
1B	Zn ⁶⁵ ACTIVITY NEGLIGIBLE		1.8 x 10 ⁶	100.0 %
2B	2.0 x 10 ⁵	2.6 %	1.4 x 10 ⁶	97.4 %
3B	3.4 x 10 ⁴	0.4 %	1.6 x 10 ⁶	99.6 %
V-1	Zn ⁶⁵ ACTIVITY NEGLIGIBLE		6.5 x 10 ⁶	100.0 %

RB DYLER	700	762	6-5186
DATE - TIME SAMPLED 4/20/64	DATE RECEIVED 4/24/64	DATE COMPLETED 5/27/64	
ANALYSIS DESIRED MAJOR RADIONUCLIDES CONTRIBUTING TO DOSE RATE			

SAMPLE No.	D/M Zn^{65} gm Sample	CONTRIBUTION TO Total Dose Rate	D/M Co^{60} gm Sample	Contribution to Total Dose Rate
HORA-1A	1.0×10^8	26.3 %	5.8×10^7	73.7 %
-2A	1.1×10^7	26.7 %	5.8×10^8	73.3 %
-3A	9.2×10^8	26.6 %	4.9×10^8	73.4 %
-1B	2.8×10^8	5.3 %	1.0×10^9	94.7 %
-2B	2.7×10^8	5.2 %	7.5×10^8	94.8 %
-3B	2.9×10^8	4.7 %	1.1×10^9	95.3 %
HCR B-1A	3.4×10^8	26.5 %	1.8×10^8	73.5 %
2A	3.0×10^8	26.8 %	1.6×10^8	73.2 %
3A	3.0×10^8	26.7 %	1.6×10^8	73.3 %
1B	1.1×10^7	7.1 %	4.9×10^7	95.9 %
2B	8.7×10^7	7.7 %	2.0×10^8	92.3 %
3B	6.5×10^6	2.6 %	4.6×10^7	97.4 %
HCR C-1A	3.6×10^8	26.6 %	1.9×10^8	73.4 %
2A	4.3×10^8	27.9 %	2.1×10^8	72.1 %
3A	4.4×10^8	28.0 %	3.2×10^8	72.0 %
1B	5.5×10^7	11.4 %	8.3×10^7	88.6 %
2B	1.4×10^8	7.7 %	3.3×10^8	92.3 %
3B	4.8×10^7	9.6 %	8.7×10^7	90.4 %
HCR D-1A	7.5×10^4	1.2 %	1.5×10^6	98.8 %
2A	4.1×10^5	1.9 %	4.1×10^6	98.1 %
3A	5.6×10^5	1.9 %	5.6×10^6	98.1 %
1B	Zn^{65} ACTIVITY NEGLIGIBLE		1.8×10^6	100.0 %
2B	2.0×10^5	2.6 %	1.4×10^6	97.4 %
3B	3.4×10^4	0.4 %	1.6×10^6	99.6 %
V-1	Zn^{65} ACTIVITY NEGLIGIBLE		6.5×10^6	100.0 %

NOTES: ALL ACTIVITY FROM Zn^{65} AND Co^{60} WAS MEASURED AT 1.1 MeV AND 2.5 MeV RESPECTIVELY ON A MULTICHANNEL γ ENERGY ANALYZER.

RELATIVE DOSE RATES FOR RADIONUCLIDES PRESENT WERE COMPUTED AS OF 1964, USING "RADIATION DOSIMETRY" BY G. HINE AND G. BROWNELL, PAGE 751.

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