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## **Appendix A**

### **Summary of Unreported Soil Sampling Results**

## Appendix A

### Summary of Unreported Soil Sampling Results

Additional results were found in historical records for the locations and years listed below. None of these previously unreported results was noted to be extraordinary.

#### A.1 Summary of Unreported Soil Sampling Results for 1970

A. Samples were collected northeast of the Jersey Nuclear uranium fuel manufacturing plant (currently, Siemens Power Corporation) on November 17, 1970. Samples were analyzed for total Pu (photographic film-track method) and U at U.S. Testing Co., Inc.

1. Sample No. 1: Pu =  $<0.5$  d/m per 5 g; U = 1.26 ug per 5 g
2. Sample No. 2: Pu =  $<0.5$  d/m per 5 g; U = 1.03 ug per 5 g  
(Detection limits: Pu = 0.5 d/m; U = 3.0 E-3 ug)

Note: d/m = nuclear disintegrations (film-tracks) per minute, 2.22 d/m = 1 pCi.

B. Composite samples were collected jointly with the Atomic Energy Commission (AEC) Division of Compliance, Region V, on November 18 and 19, 1970 and analyzed by alpha spectrometry at the AEC Idaho Health Services Laboratory. Five individual surface soil samples, 4 inches (10 cm) in diameter and 1.5 inches (3.8 cm) deep, were combined to form a composite sample for analysis. The samples were dried and passed through a 35 mesh screen before analysis:

1. Junction Byers Landing spillway and Road 68  
Pu-239,240 =  $0.058 \pm 0.005$  d/m per g
2. 700 ft east of sample number 1 (toward Byers Landing 614 Building);  
Pu-239,240 =  $0.063 \pm 0.005$  d/m per g
3. 1400 ft east of sample number 2  
Pu-239,240 =  $0.006 \pm 0.002$  d/m per g
4. Byers Landing 614 Building (air sampling station)  
Pu-239,240 =  $0.047 \pm 0.004$  d/m per g
5. Composite background sample (North Richland, Ringold, Berg Ranch, 3.3 miles west of Yakima Barricade, and Benton City)  
Pu-239,240 =  $0.040 \pm 0.004$  d/m per g

Note: d/m = nuclear disintegrations per minute, 2.22 d/m = 1 pCi

These results, and results obtained by PNNL and U.S. Testing Co., Inc. were compared and reported to the AEC and Hanford Site contractors in the spring of 1971.<sup>(a)</sup> The PNNL and U.S. Testing Co., Inc. results were also reported at the Los Alamos symposium (Corley et al. 1971).

## A.2 Summary of Unreported Soil Sampling Results for 1971

- A. Samples collected as part of a pre-operational survey at FFTF included ten soil samples from four locations. Soil was collected at each location from the surface 0.5 inch (sample "A") and the next 0.5 inch (sample "B") on February 8, 1971. The samples were analyzed by U.S. Testing Co., Inc. for Sr-90 and total Pu (photographic film-track method).

Sample 1-A: Sr-90 = 1.36 E-1 pCi/g (dry wt); Pu = <0.0025 pCi/g (dry wt)

Sample 1-B: Sr-90 = <3.8 E-3 pCi/g (dry wt); Pu = 0.004 pCi/g (dry wt)

Sample 2-A: Sr-90 = 1.59 E-1 pCi/g (dry wt); Pu = 0.005 pCi/g (dry wt)

Sample 2-B: Sr-90 = 1.05 E-1 pCi/g (dry wt); Pu = 0.030 pCi/g (dry wt)

Sample 3-A: Sr-90 = 3.92 E-1 pCi/g (dry wt); Pu = 0.024 pCi/g (dry wt)

Sample 3-A: (repeat sample collected 4-11-71) Pu = 0.034 pCi/g (dry wt)

Sample 3-A: (repeat sample collected 4-11-71) Pu = 0.050 pCi/g (dry wt)

Sample 3-B: Sr-90 = 1.79 E-1 pCi/g (dry wt); Pu = 0.100 pCi/g (dry wt)

Sample 4-A: Sr-90 = 1.43 E-1 pCi/g (dry wt); Pu = 0.015 pCi/g (dry wt)

Sample 4-B: Sr-90 = <2.3 E-2 pCi/g (dry wt); Pu = 0.012 pCi/g (dry wt)

Sample 4-B: (duplicate aliquot) Pu = 0.008 pCi/g (dry wt)

Note E-1: an exponent notation where 1.36 E-1 equals 0.136

- B. Samples collected as part of a pre-operational survey at the 331 Building included soil samples collected from three locations. The samples were collected on February 17, 1971 and submitted to U.S. Testing Co., Inc. for total Sr, total Pu (photographic film-track method), and U analyses.

Sample #1: Total Sr = 8.70 E-1 pCi/g (dry wt)

Pu = 4.80 E-1 pCi/g (dry wt)

U = 3.50 E+0 ug/5g (dry wt)

Sample #1: (repeat sample 4-11-71)

Pu = <2.81 E-3 pCi/g (dry wt)

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(a) PNNL Letters, from J. P. Corley to AEC, ARHCO, WADCO, and DUN, *Plutonium in Soil Results - November 1970, April and May 1971.*

Sample #2: Total Sr = 3.64 E-1 pCi/g (dry wt)  
Pu = <1.03 E-2 pCi/g (dry wt)  
U = 3.35 E+0 ug/5g (dry wt)

Sample #3: Total Sr = 1.12 E-1 pCi/g (dry wt)  
Pu = <7.33 E-3 pCi/g (dry wt)  
U = 1.95 E+0 ug/5g (dry wt)

- C. A sample from the Wahluke Slope was delivered to U.S. Testing Co., Inc. on August 20, 1971 for gamma scan (Cs-137), Sr-90, and Pu (photographic film-track method) analyses. The sample was made up from a composite of four samples collected from the "Wahluke Slope across the River from 100-K and 100-N Areas." Records did not indicate if results were based on dry weight, but results usually were reported on a dry weight basis.

Wahluke Slope Sample; Cs-137 = 9.34 E-1 pCi/g  
Sr-90 = 9.53 E-1 pCi/g  
Pu = 1.63 E-1 pCi/g

- D. Five additional offsite soil samples were collected in September 1971 and submitted to U.S. Testing Co., Inc. for gamma scan (Cs-137), Sr-90, and Pu analyses. Pu analyses either were not completed or results were not recorded in the historical record. Records did not indicate if the results listed below were based on dry weight, but results usually were reported on a dry weight basis.

Berg Ranch (near air sample station)  
Cs-137 = 1.69 pCi/g  
Sr-90 = 0.51 pCi/g

West Intersection of State Route 24 and Plant Boundary  
Cs-137 = 0.22 pCi/g  
Sr-90 = 0.75 pCi/g

North Side Vernita Bridge  
Cs-137 = 0.36 pCi/g  
Sr-90 = 0.17 pCi/g

FFTF Soil Sampling Location No. 4  
Cs-137 = 0.21 pCi/g  
Sr-90 = 0.09 pCi/g

331 Building Soil Sampling Location No. 1  
Cs-137 = 0.67 pCi/g  
Sr-90 = 1.06 pCi/g

### A.3 Summary of Unreported Soil Sampling Results for 1972

A. A trip log dated April 6, 1972 and a U.S. Testing Co., Inc. Environmental Monitoring Analysis Report (results report) indicated the collection and analysis of the samples listed below. Analytical techniques were not recorded in the historical record. However, alpha spectrometry must have been used because plutonium isotopes were reported. Results are probably on a dry sample weight basis.

#### 100-F River Bank

Cs-137 = 1.78 E-1 pCi/g; Sr-90 = 9.11 E-2 pCi/g  
Pu-238 = 6.00 E-3 pCi/g; Pu-239,240 = 2.00 E-3 pCi/g

#### Berg Ranch

Cs-137 = 9.61 E-1 pCi/g; Sr-90 = 5.00 E-1 pCi/g  
Pu-238 = 2.00 E-3 pCi/g; Pu-239,240 = 9.00 E-3 pCi/g

#### Vernita (Bridge)

Cs-137 = 1.71 E-1 pCi/g; Sr-90 = 8.66 E-2 pCi/g  
Pu-238 = 1.00 E-3 pCi/g; Pu-239,240 = 0.00 E-3 pCi/g

#### Above Savage Island

Cs-137 = 1.58 E-1 pCi/g; Sr-90 = 2.65 E-1 pCi/g  
Pu-238 = 2.00 E-3 pCi/g; Pu-239,240 = 8.00 E-3 pCi/g

#### Hanford (townsite) River Bank

Cs-137 = 5.68 E-1 pCi/g; Sr-90 = 1.48 E-1 pCi/g  
Pu-238 = 3.00 E-3 pCi/g; Pu-239,240 = 6.00 E-3 pCi/g

#### Hanford (townsite) 1/4 Mile Upstream

Cs-137 = 0.00 E-0 pCi/g; Sr-90 = 1.37 E-1 pCi/g  
Pu-238 = 4.00 E-3 pCi/g; Pu-239,240 = 0.00 E-3 pCi/g

#### 100-F Flat

Cs-137 = 2.01 E-0 pCi/g; Sr-90 = 1.03 E-0 pCi/g  
Pu-238 = 5.00 E-3 pCi/g; Pu-239,240 = 2.20 E-2 pCi/g

#### C.P. 21 (approx. 3 miles west of Berg Ranch at wasteway)

Cs-137 = 2.53 E-1 pCi/g; Sr-90 = 1.72 E-1 pCi/g  
Pu-238 = 2.00 E-3 pCi/g; Pu-239,240 = 5.00 E-3 pCi/g

#### C.P. 24 (Wahluke Slope approx. 3 miles north of Hanford townsite)

Cs-137 = 9.65 E-1 pCi/g; Sr-90 = 5.70 E-1 pCi/g  
Pu-238 = 4.00 E-3 pCi/g; Pu-239,240 = 1.20 E-2 pCi/g

Wash (location unknown)

Cs-137 = 1.15 E-0 pCi/g; Sr-90 = 7.48 E-1 pCi/g  
Pu-238 = 5.00 E-3 pCi/g; Pu-239,240 = 1.20 E-2 pCi/g

South End of Locke Island

Cs-137 = 9.97 E-1 pCi/g; Sr-90 = 3.27 E-1 pCi/g  
Pu-238 = 1.00 E-3 pCi/g; Pu-239,240 = 5.00 E-3 pCi/g

- B. A copy of a results sheet from U.S. Testing Co., Inc. dated May 30, 1972, showed data for three soil samples and one mud sample from "Honey Hill Pond" (a.k.a. West Lake). Although instructions to U.S. Testing Co., Inc. indicated a gamma scan (Cs-137), Sr-90, and Pu analyses, all results were not located in the historical record. Neither the cover letter nor the results sheet indicated if the data were on a dry weight basis. However, results were usually reported on a dry weight basis.

1. 1/4 mile E of Honey Hill Pond

Cs-137 = 7.56 E-1 pCi/g; Sr-90 = (no record)  
Pu-238 = 1.2 E-3 pCi/g; Pu-239,240 = 1.57 E-2 pCi/g

2. Midway Between 200-E Area and Honey Hill Pond

Cs-137 = 2.04 E-0 pCi/g; Sr-90 = (no record)  
Pu-238 = 2.6 E-3 pCi/g; Pu-239,240 = 3.72 E-2 pCi/g

3. Honey Hill Bank Soil Composite

Cs-137 = 6.85 E-1 pCi/g; Sr-90 = (no record)  
Pu-238 = 1.1 E-3 pCi/g; Pu-239,240 = 1.05 E-2 pCi/g

4. Honey Hill Mud

Cs-137 = 1.49 E-0 pCi/g; Sr-90 = 1.69 E-1 pCi/g  
Pu-238 = (no record); Pu-239,240 = (no record)

- C. Three soil samples were submitted to U.S. Testing Co., Inc. for gamma scan (Cs-137) and Sr-90 analyses on November 8, 1972. Neither the cover letter nor the result sheet indicated if the data were on a dry weight basis. However, results were usually reported on a dry weight basis.

1. Intersection of Highway 4S and Highway 11A

Cs-137 = 2.02 E-0 pCi/g; Sr-90 = 4.47 E-1 pCi/g

2. North of 200 ENC (200-East Area, North Central)

Cs-137 = 1.43 E-0 pCi/g; Sr-90 = 1.28 E-1 pCi/g

3. At Test well 699-31-53B (across Highway 4S, south of 200-E Area)

Cs-137 = 6.96 E-0 pCi/g; Sr-90 = 1.68 E+1 pCi/g