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Formerly Utilized Sites Remedial Action Program (FUSRAP)
Contract No. DE-AC05-81OR20722

ST. LOUIS AIRPORT STORAGE SITE (SLAPSS) ENVIRONMENTAL MONITORING SUMMARY

St. Louis, Missouri

Calendar Year 1983

February 1985

Bechtel National, Inc.
Advanced Technology Division

25932

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MAR 8 1985

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ATTN: J. F. Wing, Project Engineer
Technical Services Division

SUBJECT: Bechtel Job No. 14501, FUSRAP Project
DOE Contract No. DE-AC05-81OR20722
SLAPSS Environmental Monitoring Summary
File No. 148-153K

Dear Mr. Wing:

Responding to your letter of March 5, we have finalized the subject document and are transmitting 50 copies. Please notify us if you need additional copies.

Very truly yours,

George P. Crotwell
Project Manager -
FUSRAP

TSW:daw

Attachments: As Stated

cc: E. L. Keller
S. S. Stief
G. A. Newtown

Received by
MAR 8 1985
FUSRAP PDCC

CONCURRENCE
TSW BK

DOE/OR/20722-30

ST. LOUIS AIRPORT STORAGE SITE (SLAPSS)
ENVIRONMENTAL MONITORING SUMMARY
CALENDAR YEAR 1983

FEBRUARY 1985

Prepared for

UNITED STATES DEPARTMENT OF ENERGY

OAK RIDGE OPERATIONS OFFICE

Under Contract No. DE-AC05-81OR20722

By

Bechtel National, Inc.

Advanced Technology Division

Oak Ridge, Tennessee

Bechtel Job No. 14501

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1.0 INTRODUCTION

The St. Louis Airport Storage Site (SLAPSS) is an 8.8-ha (21.7-acre) area located north of the St. Louis, Missouri airport. The site is shown in Figure 1. From 1948 to 1966, the site was used by the Atomic Energy Commission (AEC) for storage of radioactive materials, equipment, and residues. Most of these materials were removed in 1966 and 1967, and ownership of the site was transferred to the City of St. Louis (Lambert Airport) in 1972.

Radiological surveys conducted in 1976 and 1978 by Oak Ridge National Laboratory (ORNL) determined that SLAPSS and the drainage ditches north and south of McDonnell Boulevard (see Figure 1) were radioactively contaminated above remedial action program guidelines. The ditches have been designated for remedial action consideration under the U.S. Department of Energy's (DOE) Formerly Utilized Sites Remedial Action Program (FUSRAP), a DOE effort to identify, clean up, or otherwise control sites where low-level radioactive contamination (exceeding current guidelines) remains from the early years of the nation's atomic energy program. The SLAPSS property has not yet been designated for consideration for remedial action under FUSRAP. However, limited radiological monitoring of the site has been authorized. The monitoring program is carried out by Bechtel National, Inc. (BNI), Project Management Contractor for FUSRAP.

2.0 ENVIRONMENTAL MONITORING SUMMARY

The routine environmental monitoring program for SLAPSS and the off-site ditches is focused on six monitoring wells within the site boundary, and on Coldwater Creek to the west of the site, as shown in Figure 1. BNI began sampling Coldwater Creek in March 1983 (Ref. 1). The on-site well monitoring program, which BNI began performing in October 1983, is a continuation of the program formerly conducted by ORNL (Ref. 2). Off-site surface water and sediment sampling is conducted semi-annually. Coldwater Creek is sampled approximately 50 feet downstream of the ditch that runs along McDonnell Boulevard (Location 1) and at the intersection of the creek and Interstate 70 (Location 2). Location 2 is upstream of SLAPSS and provides the background concentrations for water and sediment.

Surface water samples consisted of nominal 1 liter grab samples to fill a 4-liter container. Sediment samples were 500 g composites. Monitoring wells were sampled with a peristalic pump, following the procedures used previously by ORNL (Ref. 2). Samples were analyzed for radium-226, total uranium, and isotopic uranium.

Radium-226 concentrations are determined by precipitating with barium sulfate, dissolving the resulting Ba-Ra sulfate, and transferring it to an emanation tube where the radon is allowed to come to equilibrium. The radon-222 is then counted by alpha scintillation. Total uranium is determined by a fluorometric method. Isotopic uranium is determined using alpha spectrometry, where the uranium has been leached and organically extracted and electroplated on a metal substrate.

Results of all analyses performed during the 1983 monitoring periods are presented in Tables 1 through 3. The container with the third quarter surface water sample from Location 2 was lost during shipment to the laboratory. Fourth quarter 1983 surface water and sediment samples could not be collected because the stream was frozen throughout the scheduled sample period.

Table 1 shows the concentrations of both uranium and radium-226 measured in the water in Coldwater Creek. Radium-226 concentrations ranged from 0.1 pCi/l to 0.2 pCi/l, with the higher value occurring upstream. Total uranium concentrations ranged from 3.3 pCi/l to 45 pCi/l. Uranium and radium-226 concentrations in sediment in Coldwater Creek are provided in Table 2.

During the first sampling period, the radium-226 concentrations in water and uranium concentrations in sediments showed higher levels upstream of SLAPSS than downstream (Tables 1 and 2, respectively). This occurrence will be monitored and evaluated in future sampling.

The results of analyses for uranium and radium-226 in groundwater beneath SLAPSS are presented in Table 3. Radium-226 concentrations in groundwater ranged from 0.1 pCi/l to 0.5 pCi/l. Total uranium concentrations ranged from 13 pCi/l to 3740 pCi/l. The 1983 results are consistent with the radium-226 and uranium concentrations identified during previous sampling by ORNL (Ref. 2).

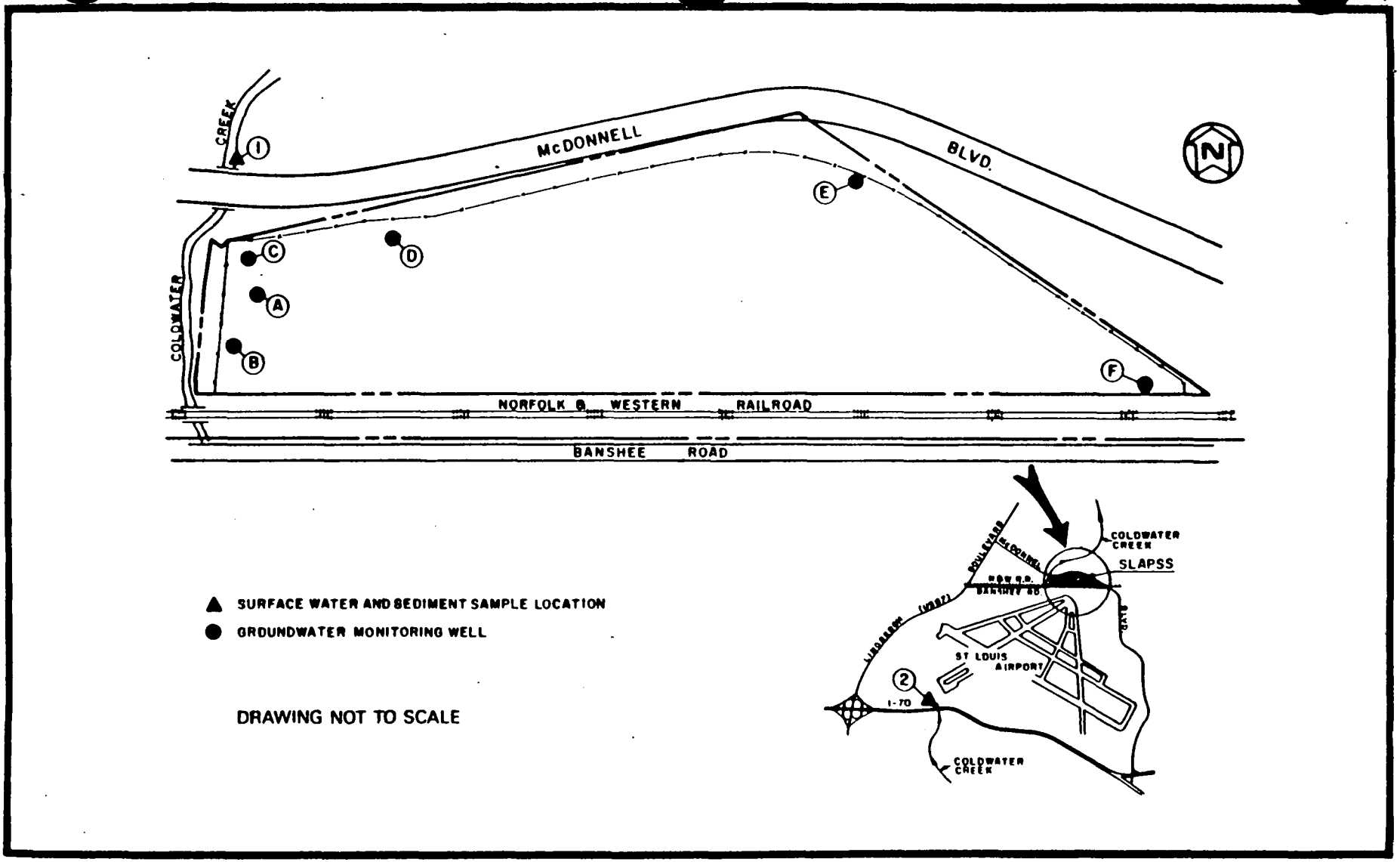

FIGURE 1 LOCATION OF THE ST. LOUIS AIRPORT STORAGE SITE (SLAPSS) AND THE ENVIRONMENTAL MONITORING LOCATIONS

TABLE 1

TOTAL URANIUM AND RADIUM-226 CONCENTRATIONS
IN SURFACE WATER, COLDWATER CREEK

Sampling Location[a]	1st Quarter 1983 3/31/83		3rd Quarter 1983 10/13/83	
	Ra-226 (pCi/l)[b]	Total U (pCi/l)[b]	Ra-226 (pCi/l)[b]	Total U (pCi/l)[b]
1	0.1 ± 0.1	45	0.2 ± 0.1	3.3
2	0.2 ± 0.1	3.3	c	c

(a) Locations are shown in Figure 1. Location 1 is downstream and Location 2 is upstream of SLAPSS.

(b) Neither SLAPSS nor the ditches are currently being radiologically controlled or regulated by DOE or NRC. However, for purposes of general orientation, the radium and uranium concentrations reported above might be compared to the following regulatory limits or guidelines:

1. DOE Order 5480.1A off-site guidelines for dissolved radium and uranium are 30 pCi/l and 600 pCi/l. For conversions, 1 mg uranium equals 667 pCi of total activity.

2. NRC's 10 CFR 20 regulations for licensees specify off-site limits for radium and uranium at 30 pCi/l and 20,000 pCi/l, respectively.

3. EPA's interim drinking water standard for radium is 5 pCi/l.

(c) Sample lost in transit.

TABLE 2

URANIUM AND RADIUM-226 CONCENTRATIONS IN SEDIMENTS
COLDWATER CREEK (pCi/g DRY)

Radionuclides	1st Quarter 1983: 3/31/83 Location 1	1st Quarter 1983: 3/31/83 Location 2	3rd Quarter 1983: 10/13/83 Location 1	3rd Quarter 1983: 10/13/83 Location 2
Ra-226[b]	1.57 ± 0.24	1.63 ± 0.35	1.3 ± 0.4	1.8 ± 0.5
U-234	0.8 ± 0.1	1.5 ± 0.1	1.8 ± 0.5	0.7 ± 0.2
U-235	0.04 ± 0.02	0.08 ± 0.03	0.1 ± 0.1	0.1 ± 0.1
U-238	1.0 ± 0.1	1.6 ± 0.1	1.7 ± 0.5	0.7 ± 0.2
Total U	1.84	3.18	3.6	1.5

(a) Locations are shown in Figure 1. Location 1 is downstream and Location 2 is upstream.

(b) There are no specific limits for radium in sediment. For comparative purposes, however, the DOE FUSRAP proposed guideline for cleanup for radium in soil is currently 5 pCi/g in the upper 6 inches, 15 pCi/g below the upper 6 inches.

TABLE 3

RADIUM AND URANIUM CONCENTRATIONS IN MONITORING WELLS AT SLAPSS

Well Location[a]	1st Quarter 1983 03/31/83		3rd Quarter 1983 10/13/83	
	Ra-226 (pCi/l)[b]	Total U (pCi/l)[b]	Ra-226 (pCi/l)[b]	Total U (pCi/l)[b]
A	0.2 ± 0.1	670	0.1 ± 0.1	670
B	0.2 ± 0.1	3740	0.1	3540
C	0.5 ± 0.2	13	0.4 ± 0.1	21
D	0.1 ± 0.1	300	0.5 ± 0.1	206
E	0.3 ± 0.1	64	0.5 ± 0.1	63
F	0.1	50	0.1	113

Note: All samples were filtered and preserved with HNO_3.

(a) Locations are shown on Figure 1.

(b) Neither SLAPSS nor the ditches are currently being radiologically controlled or regulated by DOE or NRC. However, for purposes of general orientation, the radium and uranium concentrations reported above might be compared to the following regulatory limits or guidelines:

1. DOE Order 5480.1A off-site guidelines for dissolved radium and uranium are 30 pCi/l and 600 pCi/l. For conversions, 1 mg uranium equals 667 pCi of total activity.

2. NRC's 10 CFR 20 regulations for licensees specify off-site limits for radium and uranium at 30 pCi/l and 20,000 pCi/l, respectively.

3. EPA's interim drinking water standard for radium is 5 pCi/l.

REFERENCES

1. Bechtel National, Inc. St. Louis Airport Storage Site (SLAPSS) Semiannual Environmental Sampling Report, June 1983.

2. Clark, C. and B. A. Berven. Results of the Groundwater Monitoring Program Performed at the Former St. Louis Airport Storage Site for the Period of January 1981 through January 1983, ORNL/TM-8879, March 1984.