Prepared for the U. S. Department of Energy
Assistant Secretary for Resource Applications
Grand Junction Office, Colorado

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McDERMITT AND WELLS 1°x2° NTMS AREAS, NEVADA

DATA REPORT

NATIONAL URANIUM RESOURCE EVALUATION PROGRAM

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE

P. L. JONES AND W. M. FAY

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ABSTRACT

This data report presents results of stream sediment reconnaissance in the National Topographic Map Series (NTMS) McDermitt and Wells 1° x 2° quadrangles. Stream sediment samples were collected for the Lawrence Livermore Laboratory. Samples were collected at 1089 sites in the McDermitt quadrangle and at 553 sites in the Wells quadrangle. Neutron activation analysis (NAA) results are given for uranium and 16 other elements. Analytical data (U, Th, Hf; Al, Ce, Fe, Mn, Sc, Na, Ti, V; and Dy, Eu, La, Lu, Sm, and Yb) are presented in tables on microfiche. Statistical summaries of data are given.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

MAPS **(In Pocket)**

DATA REPORT: McDERMITT AND WELLS 1° x 2° NTMS QUADRANGLES: NEVADA

INTRODUCTION

The National Uranium Resource Evaluation (NURE) program was established to evaluate domestic uranium resources in the continental United States and to identify areas favorable for uranium exploration. The Grand Junction Office (GJO) of the Department of Energy (DOE) is responsible for administering and coordinating NURE program efforts. The Savannah River Laboratory (SRL) has responsibility for hydrogeochemical and stream sediment reconnaissance (HSSR) of 3.9 million square kilometers (1,500,000 square miles) in 37 eastern and western states. Other DOE laboratories are responsible for similar reconnaissance in the rest of the continental United States including Alaska. The significance of the distribution of uranium in natural waters and stream sediments will be assessed as an indicator of areas favorable for the location of uranium deposits.

The principal objectives of the NURE program are:

- Increase geologic knowledge of U.S. uranium resources in regions where uranium ore bodies are known to exist and are candidate supplies under present and near-term market conditions.
- Complete assessment of lower cost potential uranium resources in the conterminous U.S. and Alaska.
- Improve reliability and validate resource estimates and increase confidence levels.
- Expand scope of uranium assessment to include higher cost and relatively unknown domestic resources that may be feasible uranium supply alternatives.
- Apply advanced technologies for detection and assessment of uranium resources.

DOE-GJO is responsible for administering and coordinating efforts to meet these objectives including distribution of reports.

Inputs to the NURE program come from DOE prime contractors, DOE-sponsored research and development, the uranium industry, U.S. Geological Survey, U.S. Bureau of Mines, other federal and state government agencies, and independent sources.

The NURE program consists of six parts:

1. Hydrogeochemical and Stream Sediment Reconnaissance Survey
2. Aerial Radiometric Survey
3. Intermediate Grade Resource Studies
4. World Class Geologic Studies
5. Subsurface Geologic Investigation
6. Technology Application

The data presented here are reconnaissance data intended for use in identifying broad areas for further study. While care has been taken to provide reliable sampling and analyses, verification of individual analyses is beyond the scope of this report. The data should be viewed statistically because "one-point anomalies" may be misleading. Regional trends, however, should be reliable. With careful consideration of regional geology, these data should provide reliable guides to areas warranting further study.

This report is one of a series presenting basic data obtained by Lawrence Livermore Laboratory reconnaissance sampling. The samples were analyzed at SRL by neutron activation analysis. In the interest of disseminating available data as soon as possible, only neutron activation analyses are reported here. A more complete report containing geology, hydrology, field data, neutron activation data, and supplementary analytical data for samples collected by SRL in these quadrangles will be issued later. All data will be available on magnetic tape from:

GJOIS Project
UCC-ND Computer Applications Department
4500 North Building
Oak Ridge National Laboratory
P.O. Box X
Oak Ridge, Tenn. 37830

A summary of the SRL development program in support of the reconnaissance program is available in SRL-NURE progress reports (SRL-138). SRL data reports (SRL-146) have been open-filed for other quadrangles (Figure 1).

Figure 2 summarizes the map codes used by SRL in this report.

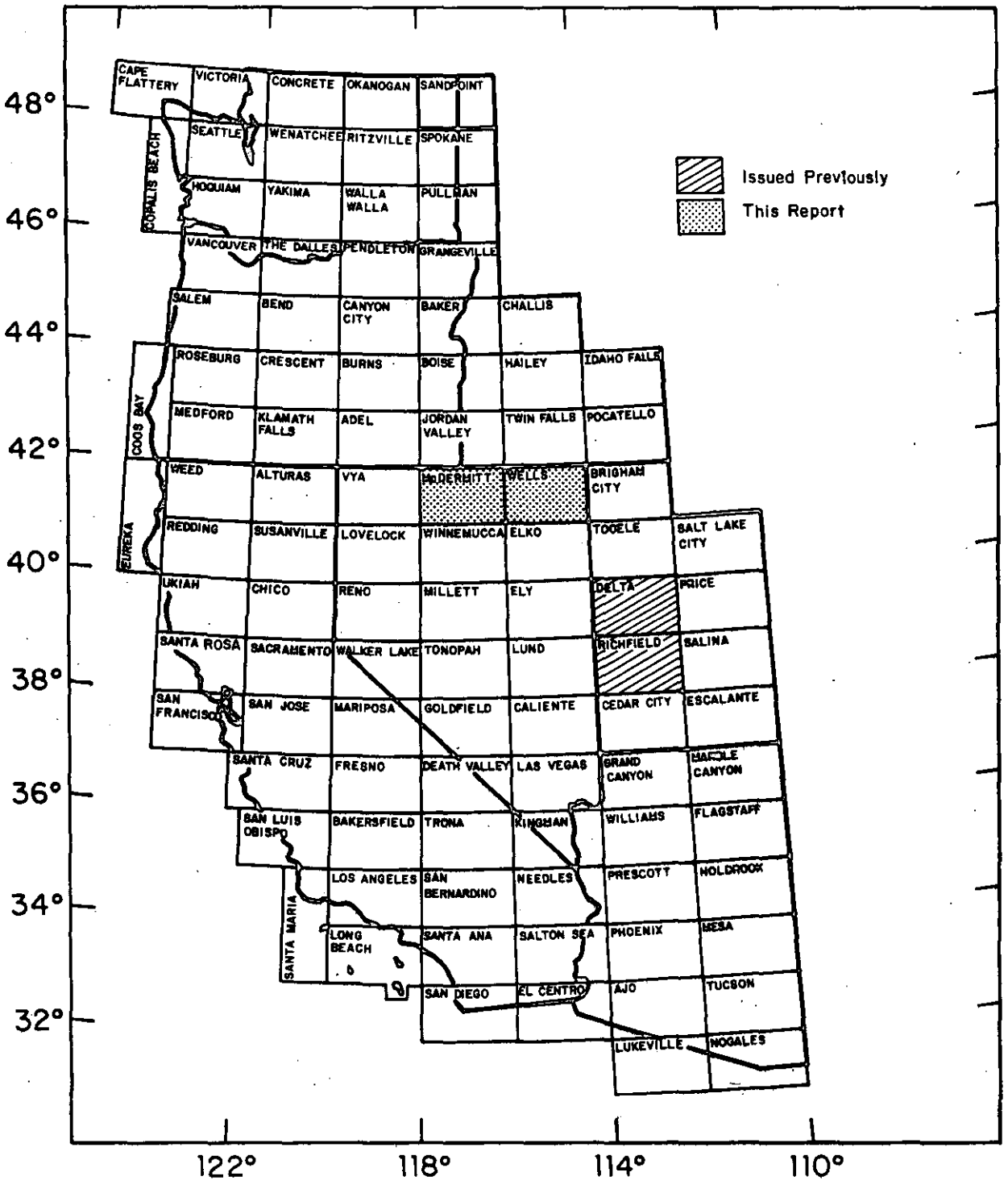
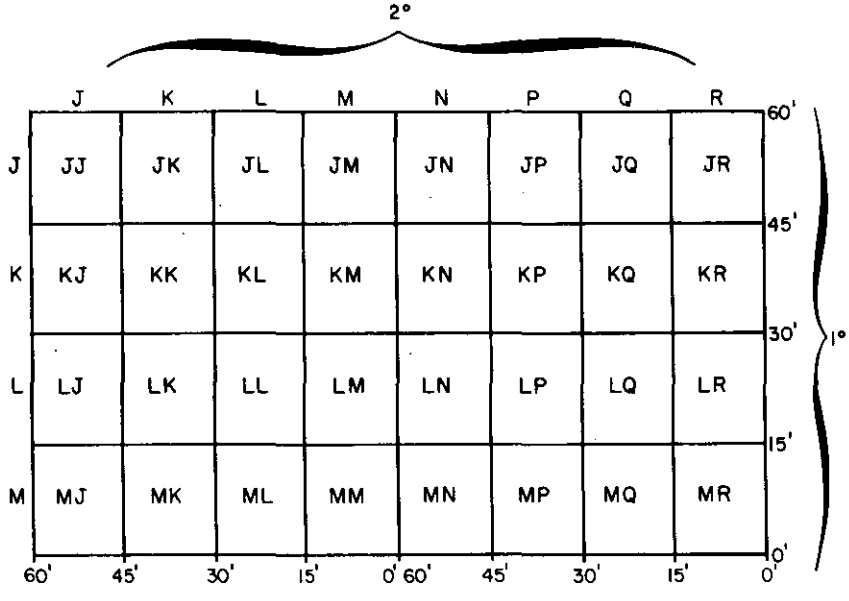


FIGURE 1. Location Map for the McDermitt and Wells 1° x 2° NTMS Quadrangles



Quadrangle Codes
MC = McDermitt
WL = Wells

FIGURE 2. Map Abbreviations for SRL Site Codes

FACTORS AFFECTING THE DATA

Stream sediment samples were collected by a subcontractor for Lawrence Livermore Laboratory (LLL). A description of LLL's sample collection methods is available [GJBX-77(77)]. The samples were prepared by an SRL subcontractor and analyzed at SRL by neutron activation analysis. Field data are not available for this report.

DATA PRESENTATION

In this report, reconnaissance data are presented in Appendices A and B on microfiche.

Plates 1 and 4 are 1:250,000 scale overlays of the McDermitt and Wells quadrangles, respectively. The overlays show surface sampling sites and SRL identification numbers. Areal distribution of uranium values (Plates 2 and 5) and thorium values (Plates 3 and 6) are also given on 1:250,000 scale overlays.

QUALITY ASSURANCE

Sediment Standards SRL 2.2, 3.1, and 4.1 were analyzed along with NURE sediment samples primarily to provide precision data and routine systems checks for the analytical equipment and software. Results for standards analyzed with sediment samples are presented in Tables 1, 2, and 3.

A statistical summary of sediment samples from the McDermitt quadrangle is given in Table 4. Table 5 presents a statistical summary of sediment samples from the Wells quadrangle.

TABLE 1

Precision of SRL 2.2 Analyses

Element	Number*	Mean, ppm	Standard Deviation, ±1	Coefficient of Variation, %
U	14	21.74	1.06	4.9**
Th	13	102.4	6.17	6.0**
Hf	14	123.0	6.5	5.2**
Ce	10	480	38.1	8.0**
Dy	14	24.2	9.2	38.1**
Ti	13	12,300	1700	13.9**
V	14	32.9	5.3	16.2†
Fe	10	6700	1250	18.8†
Mn	13	263	43	16.5†
Al	14	6420	520	8.0**
Sc	14	2.79	0.54	19.4†
La	14	249	31.8	12.7**
Sm	14	48.3	19.5	40.4†
Eu	4	3.28	0.6	18.6†
Yb	13	14.6	2.4	16.3**
Lu	13	2.23	0.17	7.6**
Na	13	122	23.5	19.2†

* Number of determinations.

** Precision is probably about the same for samples as for SRL 2.2 Standard.

† Precision is probably better for samples, because their concentrations are higher than those of SRL 2.2 Standard.

TABLE 2

Precision of SRL 3.1 Analyses

Element	Number*	Mean, ppm	Standard Deviation, ±1	Coefficient of Variation, %
U	14	42.4	2.20	5.2**
Th	11	136	4.8	3.5**
Hf	11	4.8	1.2	25.3†
Ce	10	720	66.5	9.2**
Dy	9	55.1	7.3	13.2**
Ti	9	5270	970	18.5†
V	11	46.1	8.6	18.5†
Fe	10	15,500	3250	20.9
Mn	10	240	26	11.2†
Al	11	31,800	710	2.2**
Sc	12	3.44	1.14	33.2†
La	10	420	53.8	12.8**
Sm	10	69.6	25.2	36.2†
Eu	24	4.33	1.03	23.9†
Yb	11	29.6	6.2	20.9**
Lu	10	4.01	0.54	13.5**
Na	10	838	101	12.1

* Number of determinations.

** Precision is probably about the same for samples as for SRL 3.1 Standard.

† Precision is probably better for samples, because their concentrations are higher than those of SRL 3.1 Standard.

TABLE 3

Precision of SRL 4.1 Analyses

Element	Number*	Mean, ppm	Standard Deviation, ±1	Coefficient of Variation, %
U	13	0.58	0.11	18.9†
Th	N.D			
Hf	7	2.96	1.42	47.9†
Ce	6	57.9	10.8	18.6†
Dy	N.D.			
Ti	12	25,200	4550	18.0**
V	12	263	45.6	17.3**
Fe	10	73,000	5000	6.9**
Mn	13	1790	350	19.6**
Al	12	58,600	2760	4.7**
Sc	13	14.9	2.73	18.3**
La	11	15.8	1.99	12.6†
Sm	10	2.77	0.8	28.7†
Eu	N.D.			
Yb	N.D.			
Lu	N.D.			
Na	10	18,700	3120	16.6**

* Number of determinations.

** Precision is probably about the same for samples as for SRL 4.1 Standard.

† Precision is probably better for samples, because their concentrations are higher than those of SRL 4.1 Standard.

N.D. Below detection units for that element.

TABLE 4

Statistical Summary of Elemental Analyses: Sediment, McDermitt Quadrangle

Element	n*	Measured Values Maximum**	Minimum†	Log Mean†† (Log_{10} x/n)	Log Std. Deviation
U	979	28.6	0.3	0.53	0.17
Th	523	71	3	0.96	0.21
Hf	401	45	3	0.71	0.23
Al	968	112,000	200	4.71	0.23
Ce	486	913	21	1.89	0.27
Fe	765	84,000	3400	4.30	0.24
Mn	918	17,500	30	2.74	0.42
Na	890	130,000	100	3.94	0.36
Sc	835	33.1	0.3	0.71	0.28
Ti	757	32,300	100	3.32	0.36
V	940	450	10	1.71	0.36
Dy	356	81.2	1.2	0.69	0.27
Eu	122	19.1	1.1	0.64	0.25
La	809	247	4	1.46	0.24
Lu	182	2.7	0.2	-0.26	0.22
Sm	723	42	1	0.69	0.26
Yb	96	103	2	0.79	0.25

* Number of observations.

** Elemental concentrations in ppm.

† Minimum or detection limit.

†† Mean of values above detection limit.

TABLE 5

Statistical Summary of Elemental Analyses: Sediment, Wells Quadrangle

Element	n*	Measured Values		Log Mean†† (ΣLog_{10} x/n)	Log Std. Deviation
		Maximum**	Minimum†		
U	522	140	0.3	0.51	0.20
Th	194	88	2	0.94	0.23
Hf	126	19	1	0.65	0.22
Al	317	116,000	1200	4.52	0.33
Ce	123	338	16	1.78	0.23
Fe	395	67,600	2800	4.08	0.24
Mn	346	1980	10	2.36	0.33
Na	351	30,900	100	3.63	0.48
Sc	423	14.4	0.5	0.52	0.26
Ti	263	20,000	100	3.01	0.34
V	296	300	10	1.54	0.37
Dy	118	51.8	0.5	0.50	0.29
Eu	43	11.4	1.7	0.59	0.18
La	412	104	3	1.34	0.25
Lu	11	1.4	0.3	-0.23	0.21
Sm	262	26	1	0.62	0.28
Yb	15	16.1	4.0	0.90	0.19

* Number of observations.

** Elemental concentrations in ppm.

† Minimum or detection limit.

†† Mean of values above detection limit.

REFERENCES

K. P. Puchlik, "Collection of Wet and Dry Stream Sediment Sampling," from proceedings of the **Symposium on Hydrogeochemical and Dry Stream Sediment Sampling** (Department of Energy, Grand Junction, Col., 1977), Lawrence Livermore Laboratory, Livermore, Calif., Preprint UCRL-79246 (1977). USDOE Report GJBX-77(77).*

SRL-138, **Savannah River Laboratory Quarterly and Semiannual Reports, Hydrogeochemical and Stream Sediment Reconnaissance, National Uranium Resource Evaluation Program:** E. I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, S.C.

No.	Period	SRL Doc. No.	DOE-GJO Doc. No.*
1	January-March 1975	DPST-75-138-1	GJBX-5(76)
2	April-June 1975	DPST-75-138-2	GJBX-6(76)
3	July-September 1975	DPST-75-138-3	GJBX-7(76)
4	October-December 1975	DPST-75-138-4	GJBX-8(76)
5	January-March 1976	DPST-76-138-1	GJBX-17(76)
6	April-June 1976	DPST-76-138-2	GJBX-27(76)
7	July-September 1976	DPST-76-138-3	GJBX-63(76)
8	October-December 1976	DPST-76-138-4	GJBX-6(77)
9	January-March 1977	DPST-77-138-1	GJBX-35(77)
10	April-June 1977	DPST-77-138-2	GJBX-55(77)
11	July-September 1977	DPST-77-138-3	GJBX-90(77)
12	October-December 1977	DPST-77-138-4	GJBX-37(78)
13	January-March 1978	DPST-78-138-1	GJBX-66(78)
14	April-September 1978	DPST-78-138-2	GJBX-13(79)
15	October 1978-March 1979	DPST-79-138-1	GJBX-86(79)
16	April-September 1979	DPST-79-138-2	GJBX-160(79)

SRL-146, **SRL-NURE Data Reports**, E. I. du Pont de Nemours & Co. Savannah River Laboratory, Aiken, S.C.

No.	NTMS 1° x 2° Quadrangle	SRL Doc. No.	DOE-GJO Doc. No.*
1	Winston-Salem†	DPST-77-146-1	GJBX-66(77)
2	Spartanburg	DPST-77-146-2	GJBX-09(78)
3	Charlotte	DPST-78-146-1	GJBX-40(78)
4	Greenville	DPST-78-146-2	GJBX-47(78)
5	Winston-Salem††	DPST-78-146-3	GJBX-58(78)
6	Greensboro	DPST-78-146-4	GJBX-74(78)
7	Knoxville	DPST-78-146-5	GJBX-75(79)
8	Scranton	DPST-78-146-6	GJBX-02(79)

9	Athens	DPST-78-146-7	GJBX-20(79)
10	Harrisburg	DPST-79-146-1	GJBX-31(79)
11	Portland	DPST-79-146-2	GJBX-28(79)
12	Glens Falls	DPST-79-146-3	GJBX-44(79)
13	Augusta	DPST-79-146-4	GJBX-45(79)
14	Dyersburg	DPST-79-146-5	GJBX-58(79)
15	Poplar Bluff	DPST-79-146-6	GJBX-63(79)
16	Hartford	DPST-79-146-7	GJBX-94(79)
17	Williamsport	DPST-79-146-8	GJBX-152(79)
18	Newark	DPST-79-146-9	(in process)
19	Albany	DPST-79-146-10	GJBX-140(79)
20	Atlanta	DPST-79-146-11	GJBX-129(79)
21	Delta, Richfield	DPST-79-146-12	GJBX-161(79)
22	Walker Lake	DPST-79-146-13	(in process)
23	McDermitt, Wells	DPST-79-146-14	(this report)

† Sediment only.

†† Ground water only.

* DOE-GJO reports are available on microfiche from the Grand Junction Office, DOE, for $6.00. Prepaid orders should be sent to: Bendix Field Engineering Corporation, Technical Library, P.O. Box 1569, Grand Junction, CO 81501. Checks or money orders should be made out to Bendix Field Engineering Corporation, the operations contractor for DOE's Grand Junction Office.