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

McDERMITT 1° x 2° NTMS AREA NEVADA

DATA REPORT (ABBREVIATED)

NATIONAL URANIUM RESOURCE EVALUATION PROGRAM

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE

P. A. THAYER AND J. R. COOK

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Savannah River Laboratory
Aiken, SC 29808

PREPARED FOR THE U. S. DEPARTMENT OF ENERGY UNDER CONTRACT DE-AC09-76SR00001

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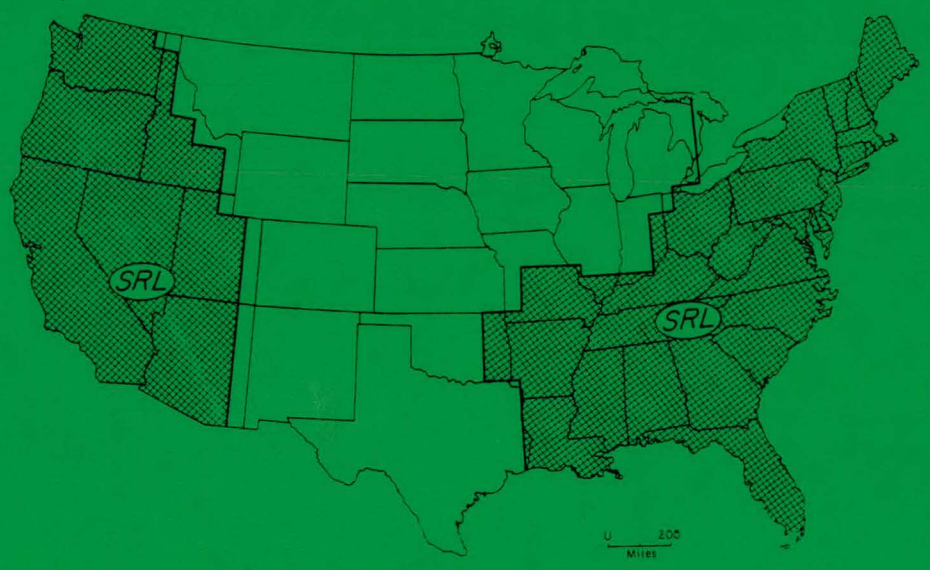

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by

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ABSTRACT

This abbreviated data report presents results of ground water and stream/surface sediment reconnaissance in the National Topographic Map Series (NTMS) McDermitt 1° x 2° quadrangle. Surface sediment samples were collected at 1337 sites, at a target sampling density of one site per 13 square kilometers (five square miles). Ground water samples were collected at 255 sites and surface water samples were collected at 41 sites. Neutron activation analysis (NAA) results are given for uranium and 16 other elements in sediments, and for uranium and 9 other elements in ground water and surface water. Mass spectrometry results are given for helium in ground water. Field measurements and observations are reported for each site. Analytical data and field measurements are presented in tables and maps.

Data from ground water and surface water sites (on microfiche in pocket) include (1) water chemistry measurements (pH, conductivity, and alkalinity), (2) physical measurements where applicable (water temperature, well description, and scintillometer reading), and (3) elemental analyses (U, Al, Br, Cl, Dy, F, Mg, Mn, Na, and V). He analyses are given for ground water.

Data from sediment sites (also on microfiche in pocket) include (1) stream water chemistry measurements from sites where water was available (pH, conductivity, and alkalinity), and (2) elemental analyses for sediment samples (U, Th, Hf, Al, Ce, Dy, Eu, Fe, La, Lu, Mn, Sc, Sm, Na, Ti, V, and Yb). Sample site descriptors (stream characteristics, vegetation, etc.) are also tabulated. Areal distribution maps, histograms, and cumulative frequency plots for most elements; U/Th, U/Hf, U/(Th+Hf), and U/La ratios; and scintillometer readings at sediment sample sites are included on the microfiche.

Uranium concentrations in sediments of the McDermitt quadrangle are relatively low, with a maximum value of 20.5 ppm. The mean of the logs of uranium values in sediments is 0.56, which corresponds to a value of about 3.6 ppm. Many of the highest uranium values occur in the Santa Rosa Range and in the Bull Run and Tuscarora Mountains (see areal distribution plots on microfiche). Most of the higher uranium values occur in areas underlain by tertiary-age granitic intrusive rocks and Tertiary felsic volcanic rocks. Ground water and stream water samples are too widely dispersed to allow for preliminary interpretation.

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Tabulated reconnaissance data and elemental concentrations in surface sediment samples, ground water samples, and stream water samples (Tables A-1, A-2, B-1, B-2, B-3, and C-1).

McDERMITT SEDIMENT PLOTS

Areal distribution maps, histograms, and cumulative frequency plots for elemental U, Th, Hf, La, Sm, Eu, Dy, Yb, Lu, Al, V, Ti, Mn, Fe, Sc, and Na; for conductivity, alkalinity, and pH; for log (U/Hf), log (U/Th), log (U/La), and log (U/Th + Hf) ratios; and for scintillometer readings at sediment sampling sites.

McDERMITT GROUND-WATER PLOTS

Areal distribution maps, histograms, and frequency distribution plots for elemental U, F, Na, Mg, Al, Cl, Mn, Br, Dy, V, and He; for conductivity, alkalinity, pH, and U x 1000/conductivity; and for scintillometer readings at ground water sampling sites.

SURFACE SAMPLE SITE LOCATIONS IN THE McDERMITT QUADRANGLE

GROUND WATER SAMPLE SITE LOCATIONS IN THE McDERMITT QUADRANGLE

USER'S GUIDE

DATA REPORT: McDERMITT 1° x 2° NTMS QUADRANGLE

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 the program. The Savannah River Laboratory (SRL) is responsible for hydrogeochemical and surface sediment reconnaissance (HSSR) of 3.9 million square kilometers (1,500,000 square miles) in 37 eastern and western states.

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.

This report is one of a series presenting data obtained by SRL reconnaissance. Additional analyses may be released in later **Supplemental Data Reports.** 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, TN 37830

Sampling procedures are described in a field manual assembled specifically for this program (Price and Jones, 1979). A summary of the SRL development program in support of the reconnaissance is available in SRL-NURE progress reports (SRL-138). SRL data reports (SRL-146) have been open-filed for other western quadrangles (Figure 1).

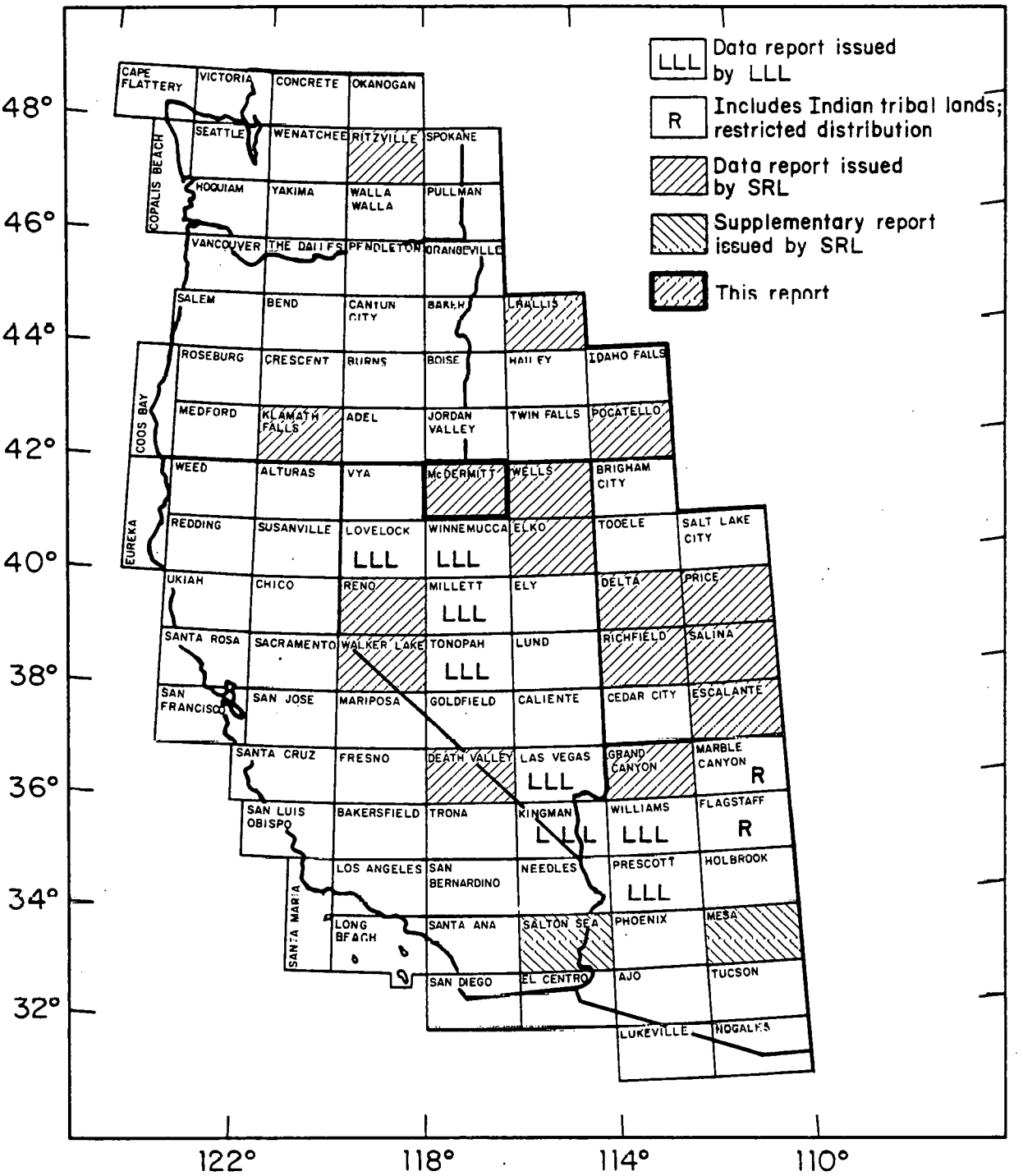


FIGURE 1. Location Map for the McDermitt 1° x 2° NTMS Quadrangle

SRL reports titled **Basic Data Report** or **Data Report** include geologic descriptions and a somewhat more complete description of the HSSR program. These reports and reports titled **Data Report (Abbreviated)** include neutron activation analyses (NAA) done at SRL. Reports titled **Supplemental Data Report** include analyses done by methods other than NAA. Not every quadrangle will be described in both **Data Reports** [or **Data Reports (Abbreviated)**] and **Supplemental Reports**.

FACTORS AFFECTING THE DATA

General

Sediment, stream water, and ground-water samples were collected during the summer of 1979. The lack of surface-water samples is due to the arid climate of the McDermitt quadrangle (NOAA, 1977). The scarcity of ground-water sites is due to both the aridity and the low population density of the area.

Quality Assurance

Sample Collection

Sampling teams marked each sampling site on an SRL-approved map and completed a field data form for every sample. An SRL subcontractor checked 134 sediment and 126 ground-water sampling sites during August and September 1977. No evidence was discovered of deliberate malfeasance by the sampling teams. Ninety-nine percent of the sites checked were found to be located within 800 m (0.5 mi) of the locations plotted on sample maps. Thus, the goals of a regional reconnaissance have not been compromised by map errors. Details of the quality assurance program are given elsewhere (SRL-138).

Analytical Standards

Sediment Standards SRL 2.2, 3.1, and 4.1 were analyzed along with NURE sediment samples. Analyses of these standards provide routine checks of the analytical equipment and software. Tables 1a, 1b, and 1c contain the results from the standards run during the same time period as the sediment samples. These results give a good estimate of the precision of the data and can be used in estimating bias between this and other SRL reports.

TABLE 1

Accuracy and Precision of Analyses of SRL Standards

a. SRL 2.2 Standard

Element	Number*	Mean, ppm	Standard Deviation	Coefficient of Variation, %	Nominal Value, ppm**
U	183	21.1	3.4	15.9	22.2
Th	174	106	15.9	15.0	125
Hf	165	134	29.9	22.4	173
Al	183	8300	4000	48.8	6500
Ce	159	499	83	16.5	614
Fe	172	7300	2200	29.6	6700
Mn	179	262	116	44.3	300
Sc	175	3.1	2.8	90.5	3.9
Na	178	147	101	69.2	145
Ti	180	11,800	2800	24.1	13,200
V	182	31.8	5.8	18.2	34.7
Dy	179	23.5	9.7	41.1	<22
Eu	115	2.5	1.7	68.5	2.5
La	174	284	81.9	28.7	301
Lu	162	2.3	0.4	18.7	2.9
Sm	164	37.2	14.9	40.2	51.3
Yb	158	15.2	3.59	23.1	18.2

* Number of determinations.

** See Reference SRL-138, No. 16 [GJBX-160(79)], pp. 20-22.

TABLE 1

b. SRL 3.1 Standard

Element	Number*	Mean, ppm	Standard Deviation	Coefficient of Variation, %	Nominal Value, ppm**
U	175	41.1	4.7	11.5	41.3
Th	167	142	22.9	16.2	162
Hf	64	6.1	3.4	56.4	7.4
Al	174	39,400	5700	14.5	30,600
Ce	149	772	126	16.3	903
Fe	167	15,300	3700	24.4	15,200
Mn	17	273	202	73.8	289
Sc	169	4.0	1.2	30.2	4.2
Na	169	932	180	19.6	901
Ti	136	5300	1100	20.4	6100
V	170	45.3	7.9	17.4	54.4
Dy	162	51.2	19.7	38.4	50†
Eu	138	3.8	1.6	42.3	3.9
La	168	414	69.7	16.9	443.
Lu	152	4.0	0.8	19.2	4.4
Sm	158	63.8	29.9	46.8	69.2
Yb	157	28.7	5.28	18.2	29.9

* Number of determinations.

** See Reference SRL-138, No. 16 [GJBX-160(79)], pp. 20-22.

† Only one laboratory reported a value for dysprosium.

TABLE 1

c. SRL 4.1 Standard

Element	Number*	Mean, ppm	Standard Deviation	Coefficient of Variation, %	Nominal Value, ppm**
U	179	0.53	0.08	15.6	0.58
Th	77	2.8	1.2	43.8	2.1
Hf	121	3.0	1.3	43.6	4.4
Al	180	73,000	11,100	15.2	66,700
Ce	100	48.4	16.2	33.4	44
Fe	172	75,700	11,300	14.9	87,300
Mn	175	1760	290	16.8	1970
Sc	172	15.4	4.3	27.9	21
Na	177	16,900	2600	15.5	15,100
Ti	162	23,100	5500	23.9	25,200
V	177	240	41.8	17.1	273
Dy	34	3.9	3.1	80.4	<22
Eu	81	1.4	0.9	63.4	1.2
La	151	15.8	4.20	26.5	18.6
Lu	87	0.24	0.12	51.5	0.28
Sm	143	3.1	1.8	59.19	4.2
Yb	32	2.6	1.4	54.68	1.6

* Number of determinations.

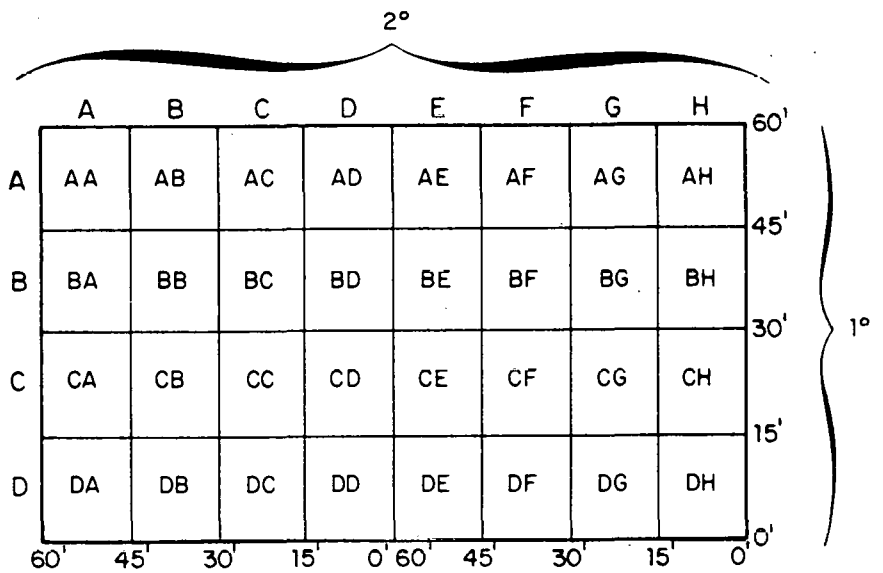
** See Reference SRL-138, No. 16 [GJBX-160(79)], pp. 20-22.

Periodically, DOE intersite comparison standards are analyzed. An independent quality assurance program based on these standards is conducted for DOE by Ames (Iowa) Laboratory (D'Silva, et al.).

DESCRIPTION OF DATA TABLES

This section of the report summarizes the type of data tabulated on microfiche. Ground-water analyses and site descriptions are tabulated in Tables A-1 and A-2, both of which can be found on the microfiche titled **McDERMITT TABLES.** Sediment analyses and site descriptions are tabulated in Tables B-1, B-2, and B-3, which are also on the microfiche titled **McDERMITT TABLES.** Surface-water analyses and site descriptions are tabulated in Table C-1 on the microfiche titled **McDERMITT TABLES.**

Table A-1 begins with the sample's SRL identification number, which is composed of four letters and a three-digit number. The first two letters identify the quadrangle. MT is the two-letter designator for the McDermitt 1° x 2° NTMS quadrangle. The third and fourth letters define which 15-minute quadrangle contains the sampling site (see chart below).



Numbers from 001 to 499 designate surface sites. Numbers from 501 to 999 designate ground-water sites. The first sediment sample, therefore, taken from the extreme northeastern portion of the McDermitt 1° x 2° NTMS quadrangle would be MTAH001.

Other entries on Table A-1 include a DOE identification number; pH, conductivity, alkalinity, and scintillometer readings; analyses for U, Br, Cl, F, He, Mn, Na, and V; and the ratio of uranium-to-conductivity (multiplied by 1000 for convenience; U x 1000/cond.). All entries are self-explanatory except those noted below (see also the **USER'S GUIDE**).

DOE ID is a 28-digit number that includes the following parts:

Digit Number	
1-2	State (See Table 1 in the **USER'S GUIDE**)
4-10	Latitude of site
12-19	Longitude of site
21	Laboratory code (4 = SRL)
23-24	Sample type (See Table 2 in the **USER'S GUIDE**).
26-28	Replication code. Generally only original samples (-000) are reported in the Data Reports.

Table A-2 shows SRL identification number; concentrations of Al, Dy, and Mg; sampling date; sample collection team number; and the following characteristics of the well or spring that was sampled:

WATRTEMP	Water Temperature, in °C.
WELDEPTH	Depth of well in feet.
DPTHCONF	Confidence in depth measurement.*
WELCLASS	Classification of well use.*

* Definitions of entries under these headings are detailed in the **USER'S GUIDE**.

SMPPOINT	Point in plumbing system where water was taken.*
WELLODOR	Presence of hydrogen sulfide or other odor.

Sediment analyses and site descriptions are tabulated in Tables B-1, B-2, and B-3, which are on the microfiche labeled **McDERMITT TABLES**.

Table B-1 includes SRL and DOE identification numbers similar to those described above for ground-water sites. Table B-1 also includes scintillometer readings, pH, conductivity, and alkalinity of stream water, plus elemental concentrations of U, Th, Hf, Ce, Fe, Mn, Na, Sc, Ti, and V.

Table B-2 (Supplementary Data - Sediments) includes the SRL identification number and concentrations of Al, Dy, Eu, La, Sm, Yb, and Lu.

Table B-3 (Supplementary Data - Sediments) includes the SRL identification number of the following entries:

SAMPTYPE	Type of soil, sediment, etc., sampled (See Table 2 in the **USER'S GUIDE**).
ROCKTYPE	Type of rock underlying sampling site.*
SEDSIZE	Dominant size of particles in sediment at site.*
STRWIDTH STRDEPTH STRFLOW STRLEVEL	Size and flow rate of stream at sampling site.*
VECTYPE	Dominant type of vegetation at site.*
VEGDENS	Vegetation density at site.*
RELIEF	Local relief at site.*
COMPOSIT	Number of subsamples blended into sample.

* Definitions of entries under these headings are detailed in the **USER'S GUIDE**.

CONTAMN1 CONTAMN2 CONTAMN3 CONTAMN4	Activities or contaminants that may affect the material sampled.*
FRMATION	The rock formation that underlies the site.*
ODOR	Odors detected in sampled material.*
WATRTEMP	Water temperature in °C.
SAMPDATE	Date sample was collected.
TEAM	Numerical designator of sample collection team.

Further details of how the field data are recorded can be found in the **USER'S GUIDE** and in Price and Jones (1979).

Elemental Analyses

Concentrations of each element are reported in parts per million (ppm) by weight for sediments, and in parts per billion (ppb) for water. Values have been rounded to appropriate significant figures. Note that elemental (not oxide) concentrations are quoted in this table. Values below detection limits are indicated by a minus (-). For example, -3 means that the sample contains less than 3 ppm of that element. If background is high, a period (.) is used to indicate that the element was not detected, and that the detection limit is not estimated for that element. Missing data are indicated by "M". All analytical results are missing when there was insufficient sample for analysis.

* Definitions of entries under these headings are detailed in the **USER'S GUIDE**.

BIBLIOGRAPHY

D'Silva, A. P., Floyd, M. A., and Haas, W. J., Jr., **Multilaboratory Analytical Quality Control for the Hydrogeochemical and Stream Sediment Reconnaissance:** Iowa State University, Ames Laboratory, Ames, Ia. A series of monthly reports sponsored by USDOE. Available from NTIS, Springfield, Va.

NOAA, 1977, **Records of Annual Precipitation,** U.S. Department of Commerce, National Climatic Center, Asheville, N.C.

Price, V., and Jones, P. L., 1979, **Training Manual for Water and Sediment Geochemical Reconnaissance:** SRL Internal Doc. DPST-79-219, E. I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, S.C.

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)
17	October 1979-March 1980	DPST-80-138-1	(in process)

* 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 91501. Checks or money orders should be made out to Bendix Field Engineering Corp., the operations contractor for DOE's Grand Junction Office.

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-6(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	GJBX-128(80)
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	GJBX-107(80)
23	McDermitt, Wells††††	DPST-79-146-14	GJBX-117(80)
24	Reno	DPST-79-146-15	GJBX-108(80)
25	Death Valley	DPST-79-146-16	GJBX-135(80)
26	Flagstaff†††††	DPST-79-146-17	(in process)
27	Marble Canyon	DPST-79-146-18	(in process)
28	Grand Canyon	DPST-79-146-19	(in process)
29	Pocatello	DPST-79-146-20	(in process)
30	Mesa	DPST-80-146-1S	GJBX-81(80)
31	Salton Sea	DPST-80-146-2S	GJBX-113(80)
32	Ritzville	DPST-80-146-3	(in process)
33	Elko	DPST-80-146-4	(in process)
34	Challis	DPST-80-146-5	GJBX-91(80)
35	Klamath Falls	DPST-80-146-6	(in process)
36	Salina	DPST-80-146-7	(in process)
37	Escalante	DPST-80-146-8	(in process)
38	Price	DPST-80-146-9	(in process)
39	McDermitt	DPST-80-146-10	(this report)

† Sediment only.
†† Ground water only.
††† SRL analyses of samples collected by Lawrence Livermore Laboratory.
†††† Abbreviated report; geology, hydrology, and data discussion sections are omitted.
S Supplemental Data Reports.