K/UR-46

ORGDP

OAK
RIDGE
GASEOUS
DIFFUSION
PLANT

UNION CARBIDE

URANIUM RESOURCE EVALUATION PROJECT QUALITY ASSURANCE EVALUATION

J. G. Grimes

February 28, 1981

OPERATED BY
UNION CARBIDE CORPORATION
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

Date of Issue: February 28, 1981 Report Number: K/UR-46

Subject Category: UC-51, Nuclear Raw Materials

URANIUM RESOURCE EVALUATION PROJECT
QUALITY ASSURANCE EVALUATION

J. G. Grimes

Quality Assurance Coordinator
Uranium Resource Evaluation Project

Union Carbide Corporation, Nuclear Division
Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee

Prepared for the U. S. Department of Energy
Grand Junction Office, Colorado
under U. S. Government Contract W-7405-eng 26

PREFACE TO 1980 EDITION

This evaluation was conducted over an eight-month period from February 4 through October 1, 1980. During this time, field sampling was suspended for an indefinite time period while the National Uranium Resource Evaluation (NURE) Program underwent restructuring. In addition, the Uranium Resource Evaluation (URE) Project archives are being restructured. Since it is difficult to evaluate quality assurance needs of a program that is undergoing drastic change and because sections of the evaluation were well along before these changes were announced, this evaluation reflects the situation as it was during February 1980.

When changes to the archives have been completed, that section should be reevaluated to replace the current study. Also, when URE Project's role in the restructured NURE Program is determined, this evaluation should be reviewed with appropriate additions, deletions, and/or modifications.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

The Uranium Resource Evaluation (URE) Project at Union Carbide Corporation, Nuclear Division (UCC-ND) was established during the spring of 1975 at the request of the U. S. Energy Research and Development Administration, now the U. S. Department of Energy (DOE). The URE Project is part of the National Uranium Resource Evaluation (NURE) Program which is administered by the Grand Junction Office (GJO) of DOE. UCC-ND was given the responsibility of conducting a Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) survey in the Central United States (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, North Dakota, Oklahoma, Texas, South Dakota, and Wisconsin). Wide-spaced HSSR sampling was conducted in portions of Texas during 1976 and 1977. Close-spaced HSSR sampling was conducted in portions of the Central United States between 1976 and 1980. During 1979 and 1980, 13 detailed surveys were conducted by the URE Project in the Central and Western United States to characterize the hydrogeochemistry, stream sediment geochemistry, and/or radiometric patterns of known or potential uranium occurrences. Beginning in 1980, the HSSR surveys were modified to the Regional Hydrogeochemical and Stream Sediment (RHSS) surveys.

PREVIOUS QUALITY ASSURANCE RELATED PROGRAMS

In 1975, an orientation survey was conducted in Karnes County, Texas. The survey was used to provide the initial sample material for setting up analytical laboratory equipment and procedures. It was determined that the laboratory methods yielded adequate sensitivities for the material collected. The survey also provided information on how samples should be taken and what steps were necessary for sample preservation.

During 1976, eight pilot surveys were conducted in Texas, Oklahoma, Kansas, Wisconsin, Michigan, Minnesota, and the Dakotas. These surveys provided information on what sample type, treatment, and spacing would be the most useful in the Central United States.

Between 1976 and 1980, four base stations were located in Texas. These areas were sampled on a regular basis to obtain information on seasonal variations in stream water and stream sediment samples.

In 1978, the Geochemical Reconnaissance Variability Assessment (GRVA) Program was conducted in the Austin, Ashland, Pratt, Wichita, and Joplin Quadrangles to assess the variability associated with reconnaissance sampling.

CONTINUING QUALITY ASSURANCE RELATED PROGRAMS

The following quality assurance related programs are continuing to date:

1. Periodic checks of field sampling procedures by the Supervising Field Geologist and the Director of Field Operations.

2. Verification of field form information and laboratory analytical data verification for all geochemical surveys.

3. URE Project laboratory quality control program (all elements routinely analyzed).

4. Ames interlaboratory quality control program (uranium only).

QUALITY ASSURANCE EVALUATION

EVALUATION OUTLINE

To conduct a quality assurance evaluation of the URE Project, the process involved in the production of a geochemical survey report (see Figure 1) was divided into six sections. These sections and the portion of effort involved in each section are as follows:

1. Planning: from *notification of area to be sampled* to *transportation of materials, vehicles, and personnel to area to be sampled.**

2. Sampling: from *transportation of materials, vehicles, and personnel to area to be sampled* to *shipment of samples to 9720-6* and *maps, field forms, and other materials to K-1570A/C.*

3. Laboratory: from *shipment of samples to 9720-6* to *program setup group at K-1007.*

4. Data Management: from *program setup group at K-1007* to *Master File.*

5. Reporting: from *shipment of maps, field forms, and other materials to K-1570A/C* to *distribution of reports* and *owner notification letters.*

6. Archives: sample and report archives.

From two to four persons familiar with the work being done in each of the six stages of a geochemical survey were assigned to evaluate each section (see Table 1). These evaluations were then combined.

QUALITY ASSURANCE REPORT OUTLINE

Results of the quality assurance evaluation of the URE Project are reported as follows:

1. Flow of data for a geochemical survey report (excluding laboratory and data management).

2. Laboratory.

---

*Italized words refer to box titles in Figure 1.

3. Data management.

4. Archives.

5. Personnel.

6. Protection of sensitive information.

The laboratory and data management sections are separated from the flow of data as these services are not under the direct supervision of the URE Project office at the Oak Ridge Gaseous Diffusion Plant (ORGDP). Each section contains a Quality Assurance Assessment and a Quality Assurance Plan.

A listing of the codes used in the "RATIONALE FOR CLASSIFICATION" in the quality assurance assessments is given in Table 2.

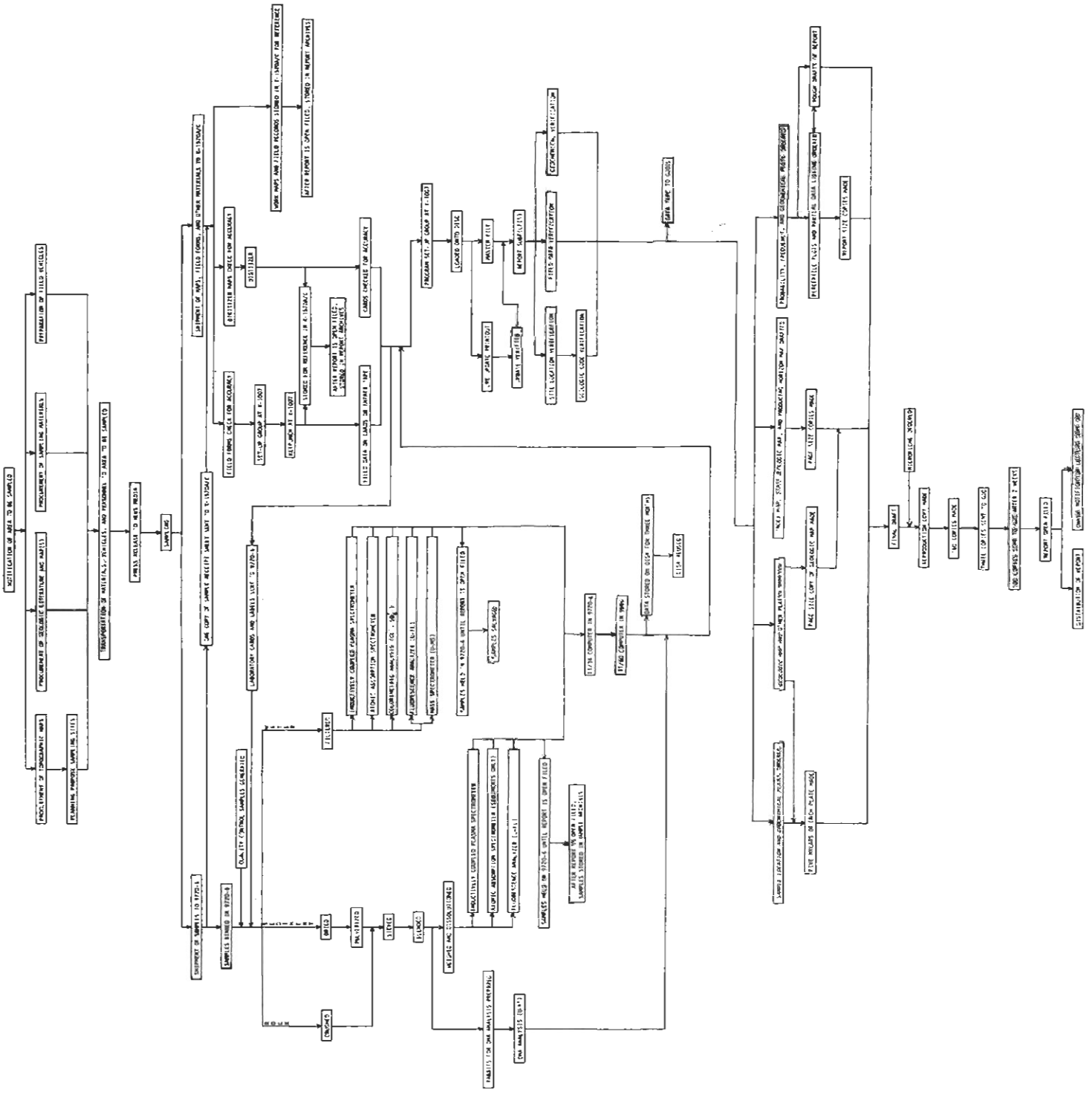

Figure 1

FLOW OF DATA FOR A URANIUM RESOURCE EVALUATION PROJECT GEOCHEMICAL SURVEY REPORT

Table 1

PERSONNEL INVOLVED IN THE
QUALITY ASSURANCE EVALUATION

Planning:	F. G. Karraker
	P. M. Pritz
	*M. A. Wieckowski
Sampling:	*P. M. Pritz
	R. E. White
Laboratory:	*J. G. Dorsey
	R. W. Morrow
	J. Switek
	L. E. White
Data Management:	C. L. Begovich
	R. N. Helgerson
	*V. E. Kane
	D. S. Wichmann
Reporting:	C. S. Bard
	*J. D. Joyner
	S. C. Walker
Archives:	J. G. Dorsey
	*R. N. Helgerson
	J. D. Joyner
	P. M. Pritz

*Section Chairperson

Table 2

CODES FOR "RATIONALE OF CLASSIFICATION"

1. Limited previous experience with method or process.
2. Reliability data readily available.
3. Reliability data not readily available.
4. Low maintenance likely from past history.
5. Maintainability a major concern.
6. Failure will not cause delay in meeting project objectives.
7. Failure could cause moderate to significant delay in attaining project objectives.
8. An established method will be used.
9. No established reliable method exists.
10. History of low failure frequency.
11. Failure causes loss of capability to detect abnormal operating conditions.
12. Standard "off-the-shelf" equipment.
13. Failure could cause moderate damage to equipment.
14. Standard actions (inspection, test, standard procedures) are adequate to mitigate failure.
15. Handling, storage, and/or shipping likely to be complex.
16. Backup system or procedure available.
17. No backup system or procedure available.
18. Environmental insult unlikely.
19. Failure could result in unacceptable risk to personnel health and safety.
20. Personnel readily available.
21. Personnel not readily available.
22. Conflict of interest could arise.
23. Deviation from normal procedure will unnecessarily increase cost.
24. Deviation from normal procedure will unnecessarily increase time required.
25. Acquisition likely to be a problem.
26. Necessary for next step.
27. Necessary to be completed by this time.

Table 2, Continued

28. All materials must be locked up until released to public.
29. All materials to be archived have been released to public.
30. Legal problems could arise.
31. See Quality Assurance plan for explanation.

FLOW OF DATA FOR A GEOCHEMICAL SURVEY REPORT

This division evaluates the flow of data in the preparation and release of a URE Project geochemical survey report. It excludes the flow of data during laboratory analysis and data management, which will be discussed later.

This division is under the direct supervision of the URE Project office at ORGDP except for the following:

1. Keypunch and Digitizing services are through the Computer Sciences Division.

2. Drafting, Photography, Opti-Copy, and Reproduction are under the Finance, Materials, and Services Division.

Sampling procedures have been documented in the following reports:

1. *URE Project Field Procedures Manual* (K/UR-25).

2. *Procedures Manual for Groundwater Reconnaissance Sampling* (K/UR-12).

3. *Procedures Manual for Stream Sediment Reconnaissance Sampling* (K/UR-13).

In addition, the URE Project procedures have been documented in *Hydrogeochemical and Stream Sediment Reconnaissance Procedures of the Uranium Resource Evaluation Project* (K/UR-100).

3-3

QUALITY ASSURANCE ASSESSMENT: FLOW OF DATA

JOB ELEMENT NO.	BRIEF DESCRIPTION	POTENTIAL FOR PROBLEM	
		YES	NO
1	Notification of area to be sampled	X	
2	Procurement of topographic maps	X	
3	Procurement of geologic literature and map(s)	X	
4	Procurement of sampling materials	X	
5	Planning sampling sites	X	
6	Preparation of field vehicles	X	
7	Sampling personnel	X	
8	Transportation of materials, vehicles, and personnel to sampling area	X	
9	Verification of arrival in area to be sampled	X	
10	Press release to news media	X	
11	Geologic field orientation	X	
12	Public relations and/or request for access	X	
13	Collection of samples	X	
14	Field communication	X	
15	Shipment of samples to 9720-6	X	
16	Shipment of maps, field forms, and other materials to K-1570A/C	X	
17	Keypunch	X	
18	Digitizer	X	
19	Verification	X	
20	Data tape to GJOIS		X
21	Drafting	X	

JOB ELEMENT NO.	BRIEF DESCRIPTION	POTENTIAL FOR PROBLEM	
		YES	NO
22	Photography	X	
23	Opti-Copy	X	
24	OS-6 typing	X	
25	Report writing	X	
26	Review process	X	
27	Reproduction	X	
28	Open filing process		X

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
1. Notification of area to be sampled										
1.1 Time period between notification and proposed report deadline	C	X				X		X		23, 24, 26
2. Procurement of topographic maps										
2.1 By office	P	X				X			X	1, 16, 23, 24, 25
2.2 In field	P	X				X		X		1, 25, 26
3. Procurement of geologic literature and map(s)										
3.1 By office	P	X			X				X	1, 23, 25
3.2 In field	P	X			X				X	25
4. Procurement of sampling materials										
4.1 By office	P	X				X		X		1, 16, 23, 24, 25, 26, 31
4.2 In field	P		X				X	X		1, 25, 26
4.3 Quantity	P	X				X		X		1, 23, 24, 25, 27

SECTIONS: P - PLANNING, S - SAMPLING, L - ANALYSIS, D - DATA MANAGEMENT, R - REPORTING, A - ARCHIVES, C - QA COORDINATOR

L - LOW, H - HIGH, U - UNKNOWN, I - INSIGNIFICANT, S - SIGNIFICANT

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
4.4 Operational condition	P	X				X		X		1, 24, 26
5. Planning sampling sites										
5.1 In office										
5.1.1 For contract sampling	P	X					X	X		1
5.1.2 Reconnaissance	P	X				X			X	1, 16, 23, 24
5.1.3 Detailed survey	P	X				X		X		1, 16, 23, 24
5.2 In field										
5.2.1 For contract sampling	P	X					X	X		1, 27
5.2.2 Reconnaissance	P	X					X	X		1, 27
5.2.3 Detailed survey	P	X					X	X		1, 27
6. Preparation of field vehicles										
6.1 Procurement										
6.1.1 From office	P	X				X		X		1, 16, 23, 24, 26

SECTIONS: P - PLANNING; S - SAMPLING; L - ANALYSIS; D - DATA MANAGEMENT; R - REPORTING; A - ARCHIVES; C - QA COORDINATOR

L - LOW; H - HIGH; U - UNKNOWN; I - INSIGNIFICANT; S - SIGNIFICANT

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
6.1.2 Another sampling area	P	X				X		X		1, 16, 23, 24, 26
6.1.3 Rental vehicles	P	X					X	X		1, 25
6.2 Operational Condition	P	X				X		X		5, 16, 23, 24, 26
6.3 Properly supplied	P	X				X		X		23, 24, 25, 26
7. Sampling personnel										
7.1 Quantity	P	X				X		X		1, 24, 26
7.2 Adaptability	P	X				X			X	1
7.3 Travel arrangements	P	X					X	X		1, 23, 24, 26, 27
8. Transportation of materials, vehicles, and personnel to sampling area										
8.1 Maps										
8.1.1 Mailed	P	X			X				X	1, 16, 23, 24, 26
8.1.2 Carried	P	X			X			X		1, 23, 24

SECTIONS: P - PLANNING, S - SAMPLING, L - ANALYSIS, D - DATA MANAGEMENT, R - REPORTING, A - ARCHIVES, C - QA COORDINATOR

L - LOW, H - HIGH, U - UNKNOWN, I - INSIGNIFICANT, S - SIGNIFICANT

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
8.2 Sampling materials										
8.2.1 Mailed	P	X				X			X	1, 16, 23, 24, 31
8.2.2 Carried	P	X				X		X		1, 23, 24, 31
8.3 Personnel										
8.3.1 Fly	P	X				X		X		1, 23, 24, 26, 27
8.3.2 Drive	P	X				X			X	1, 16, 23
9. Verification of arrival in area to be sampled										
9.1 Maps	P	X				X		X		1, 16, 23, 24, 26, 27
9.2 Sampling materials	P	X				X		X		1, 16, 23, 24, 26, 27
9.3 Personnel	P	X				X		X		1, 23, 24, 26, 27
9.4 Vehicles	P	X				X		X		1, 16, 23, 24, 26, 27
10. Press release to news media	S	X			X				X	1, 6

SECTIONS: P - PLANNING, S - SAMPLING, L - ANALYSIS, D - DATA MANAGEMENT, R - REPORTING, A - ARCHIVES, C - QA COORDINATOR

L - LOW, H - HIGH, U - UNKNOWN, I - INSIGNIFICANT, S - SIGNIFICANT

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
11. Geologic field orientation	S	X			X				X	6
12. Public relations and/or request for access										
12.1 News media interviews	S	X			X				X	1, 6
12.2 Landowner contact	S		X			X		X		19, 22, 30
12.3 Law enforcement agencies	S		X		X				X	6, 30
12.4 Federal and state agencies	S		X		X				X	6, 30
13. Collection of samples										
13.1 Stream water and/or sediment	S	X				X		X		7
13.2 Groundwater	S	X				X		X		7
13.3 Other sample types	S	X				X		X		7
13.4 Quality control resampling and field checks	S	X					X		X	6
13.5 Recording of field data	S	X				X		X		1, 7
14. Field communication										

SECTIONS: P - PLANNING
S - SAMPLING
L - ANALYSIS
D - DATA MANAGEMENT
R - REPORTING
A - ARCHIVES
C - QA COORDINATOR

L - LOW
H - HIGH
U - UNKNOWN
I - INSIGNIFICANT
S - SIGNIFICANT

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
14.1 From the field to the office	S	X				X		X		16, 7
14.2 From the office to the field	S	X				X		X		16, 7
15. Shipment of samples to 9720-6										
15.1 Packing samples for shipment	S	X				X		X		1, 7, 23
15.2 Shipment of samples	S	X				X		X		1, 7, 23, 26
16. Shipment of maps, field forms, and other materials to K-1570A/C	C	X				X		X		1, 7, 26
17. Keypunch	R	X				X		X		7, 17
18. Digitizer	R	X				X		X		7, 17
19. Verification	R	X				X		X		7
20. Data tape to GJOIS	C	X				X		X		7
21. Drafting	R	X				X		X		4, 7
22. Photography	R	X				X		X		4, 7
23. Opti-Copy	R	X				X		X		4, 7

SECTIONS: P - PLANNING
S - SAMPLING
L - ANALYSIS
D - DATA MANAGEMENT
R - REPORTING
A - ARCHIVES
C - QA COORDINATOR

L - LOW
H - HIGH
U - UNKNOWN
I - INSIGNIFICANT
S - SIGNIFICANT

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	U	U	I	S	U	YES	NO	
24. OS-6 typing	R	X				X		X		1, 3, 7, 13, 14, 21
25. Report writing	R	X				X		X		3, 7
26. Review process	C	X				X		X		11, 14
27. Reproduction	R	X				X		X		3, 7
28. Open-filing process	C	X					X		X	14

SECTIONS: P - PLANNING
S - SAMPLING
L - ANALYSIS
D - DATA MANAGEMENT
R - REPORTING
A - ARCHIVES
C - QA COORDINATOR

L - LOW
H - HIGH
U - UNKNOWN

I - INSIGNIFICANT
S - SIGNIFICANT

QUALITY ASSURANCE PLAN: FLOW OF DATA

1. NOTIFICATION OF AREA TO BE SAMPLED

1.1 TIME PERIOD BETWEEN NOTIFICATION AND PROPOSED REPORT DEADLINE

Rationale: The various steps in preparing a report require that a limited amount of time be available for report completion.

Recommendation: Although the time required for any one report will vary, the following is the "average" time for the various parts of a report.

Preparation for sampling: Two to three months, depending on such things as location of area, availability of maps, and other necessary information.

Sampling: Five to ten samples per day per sampler, depending on area, type of work to be done, and weather.

Laboratory Analysis and Data Verification: One to three months depending on workload and personnel.

Report Preparation: One to two months, depending on workload and personnel.

Printing: Two weeks.

Responsibility: Project Manager.

2. PROCUREMENT OF TOPOGRAPHIC MAPS

Rationale: The priority of maps to be purchased is the following: (1) 7.5-minute topographic, (2) 15-minute topographic, (3) AFC (After Field Check) topographic, (4) BFC (Before Field Check) topographic, (5) orthophotos, (6) county highway maps, and (7) areal photos. The standard procedure for purchasing maps is to place an order with the U. S. Geological Survey (USGS). Failure to purchase maps according to standard procedure may result in the following:

1. Increase in cost. Each map costs $0.87 when ordered through the USGS versus at least $1.25 when purchased from other distributors.

2. Difficulties in acquisition. Certain types of maps are available only through the USGS.

Recommendation: Whenever possible, maps should be purchased from the USGS. Maps covering the Central United States are purchased from deposit accounts with the Mid-Continent and Rocky Mountain National Cartographic Information Centers. The time involved is usually three to four weeks. Orders for maps covering areas outside the jurisdiction of the two centers must be prepaid, and the time involved is usually six to eight weeks.

Responsibility: Director of Field Operations.

3. PROCUREMENT OF GEOLOGIC LITERATURE AND MAP(S)

Rationale: Although not necessary to meet GJO requirements, the information is necessary for completion of standard UCC-ND information.

Recommendation: Although the geologic codes could be assigned during verification, a more accurate assignment of codes can be done if the geologic map(s) and literature are available during sampling. The procurement of geologic literature should continue until the report writing is started.

Responsibility: Report Coordinator.

4. PROCUREMENT OF SAMPLING MATERIALS

Rationale: Sampling materials and equipment include UA-3 Uranium Analyzers, spectrometers, scintillometers, Horiba U-7 Water Analyzers, alkalinity kits, sediment bags, water bottles, field forms, and first aid supplies. This material must meet previously prescribed specifications and should be purchased prior to commencement of field work. Failure to procure this material will result in the following:

1. Loss of at least some field data.

2. Possible contamination of samples.

3. Delay in sampling.

Recommendation: Adequate stocks should be maintained at ORGDP to ensure that the proper quantities of materials are available. Instruments should be checked periodically for satisfactory performance and accuracy.

Responsibility: Director of Field Operations.

5. PLANNING SAMPLING SITES

Rationale: Preparing maps for sampling includes locating stream basins and well nodes according to established procedures. Failure to prepare the maps properly will result in the following:

1. Postponement of scheduled sampling and possible increase in cost (employee's travel costs, if planned in field).

2. Samples not being collected in accordance with procedures.

Recommendation: The following should be accomplished in the office:

1. Allow two weeks to properly prepare the maps.

2. Assign two to three qualified personnel to prepare the maps.

Highest priority should be given to areas that have been contracted to ensure proper planning.

Responsibility: Director of Field Operations and Report Coordinator.

6. PREPARATION OF FIELD VEHICLES

Rationale: Field vehicles should be inspected to ensure that they are in proper operating condition and are properly supplied.

Recommendation: To ensure that no delay in sampling is caused by the condition of the field vehicles, the following should be accomplished:

1. Standard maintenance should be performed between sampling periods, when possible, and should be in accordance with the owner's manual and the guidelines outlined in the Field Procedures Manual (K/UR-25).

2. When the sampling of an area is finished, a complete inventory of each vehicle should be taken and the necessary supplies acquired in preparation for sampling the next area.

Responsibility: Director of Field Operations.

7. SAMPLING PERSONNEL

Rationale: The scheduling of the proper number of personnel and the preparation of travel arrangements are necessary to ensure that sampling is completed on schedule.

Recommendation: To ensure sampling is completed as near on schedule as possible, the following should be accomplished:

1. Travel arrangements should be made as far in advance as is practicable.

2. Tickets and reservations should be checked when picked up.

3. Regular communications between field and office should be maintained during sampling to ensure that the schedule is being met.

Responsibility: Director of Field Operations.

8. TRANSPORATION OF MATERIALS, VEHICLES, AND PERSONNEL TO SAMPLING AREA (See Item 9)

9. VERIFICATION OF ARRIVAL IN AREA TO BE SAMPLED

Rationale: The transporation of material, vehicles, and personnel should be coordinated to minimize the amount of "dead time".

Recommendation: To ensure that materials arrive in the sampling area, the materials should be carried by the personnel whenever practicable. If verification of materials and/or personnel is not received by the URE Project office within a reasonable time, the procedures stated in the Field Procedures Manual (K/UR-25) and/or established UCC-ND procedures should be followed.

Responsibility: Director of Field Operations.

10. PRESS RELEASE TO NEWS MEDIA

Rationale: Before initiating sampling in an area, it is beneficial to inform the public of the NURE Program through the news media in that region. This information acquaints the landowners with the HSSR Program and the possibility that they might be contacted. Then, when the contact occurs, the landowners are generally less surprised, more cooperative, and less suspicious of the authenticity of the program.

Recommendation: Established URE Project procedures should be adhered to.

Responsibility: Director of Field Operations.

11. GEOLOGIC FIELD ORIENTATION

Rationale: The purpose of the geologic field orientation is to better acquaint the field personnel with the geology of the area.

Recommendation: Prior to sampling an area, a geologic field orientation should be conducted whenever possible. The orientation should be led by someone knowledgeable in the geology of the area.

Responsibility: Director of Field Operations.

12. PUBLIC RELATIONS AND/OR REQUEST FOR ACCESS

Rationale: Prior to entering private property, it is important to contact the landowner to request permission to gain access to the land and to obtain information concerning the sampling site. If permission is not obtained, the landowner has the legal right to file charges against the offending individual and/or UCC-ND. If necessary information about the site is not obtained, the quality of the sample and the information needed to evaluate the sample is questionable.

Recommendation: The following steps are recommended:

1. All field personnel should be informed of the program objectives and activities so that they can discuss them in a knowledgeable manner with the news media and/or landowners.

2. The importance of distributing the brochures explaining the NURE Program should be stressed.

3. All field personnel should be instructed on how to properly conduct themselves when confronted with an angry and/or uncooperative landowner.

4. The procedures described in the Field Procedures Manual (K/UR-25) for contacting Law Enforcement, Federal, and State agencies should be strictly adhered to.

Responsibility:

1. Director of Field Operations - Recommendations 2 and 3.

2. Report Coordinator - Recommendation 1.

3. Supervising Field Geologist - Recommendation 4.

13. COLLECTION OF SAMPLES

Rationale: To fulfill the purpose of the URE Program, it is necessary to collect and analyze samples and interpret data from those samples. The samples must be collected in accordance with the designated field procedures to correctly analyze and evaluate these data.

Recommendation: The following steps should be followed:

1. All field personnel should be totally familiar with the Field Procedures Manual (K/UR-25).

2. All Supervising Field Geologists should be trained and periodically checked (both scheduled and unscheduled) by the Director of Field Operations.

3. All new field personnel should go through an introductory program with the Director of Field Operations.

4. Techniques of all field personnel should be regularly reviewed by the Supervising Field Geologist.

5. The Director of Field Operations should make periodic checks (scheduled and unscheduled) on the field teams to observe techniques and/or implement new ones.

6. Quality control resampling should be done periodically to check field sampling and laboratory analysis.

Responsibility: Director of Field Operations.

14. FIELD COMMUNICATION

Rationale: Communications are a vital part of a smooth-operating program. The Director of Field Operations must know where to locate each person in the field and must furnish other personnel with information necessary to perform their tasks efficiently.

Recommendation: The following steps are recommended:

1. The Supervising Field Geologist should contact the Director of Field Operations at least once a week.

2. The Supervising Field Geologist should notify the Director of Field Operations immediately of changes in location of field personnel.

3. In cases where the Director of Field Operations is not available, the field personnel should notify a previously designated representative.

4. The Supervising Field Geologist should inform the Director of Field Operations concerning field activities related to other areas of responsibility so the proper project personnel can be made aware of information significant to their responsibility.

Responsibility: Supervising Field Geologist.

15. SHIPMENT OF SAMPLES TO 9720-6

Rationale: Reasonable steps should be taken to prevent the loss of samples in shipment from the field to Oak Ridge. If samples should be lost in shipment, they would have to be retaken. This would result in a loss of time and additional cost to the Project.

Recommendation: Each field person should be instructed on how to securely pack and mail samples as described in the Field Procedures Manual (K/UR-25). A periodic check of sample packages should be made upon their arrival at the URE Project Laboratory.

Responsibility: Supervising Field Geologist and Director of Field Operations.

16. SHIPMENT OF MAPS, FIELD FORMS, AND OTHER MATERIALS TO K-1570A/C

Rationale: Field forms must be entered into the computer system before analysis can be initiated. Site locations and geologic codes must be verified prior to making the data tape.

Recommendation: Field forms for samples that are being shipped to 9720-6 should be shipped to the URE Project office at the same time. Digitizer maps should be shipped to the URE Project office as soon as possible after sampling is completed.

Responsibility: Supervising Field Geologist.

17. KEYPUNCH

Rationale: Keypunching field forms is the method used to transmit field data into the computer.

Recommendation: Keypunch personnel should be made aware of necessary completion dates at least one month in advance.

Responsibility: Data Management Coordinator.

18. DIGITIZER

Rationale: Digitization assigns a latitude and longitude to sample sites.

Recommendation: Digitizer personnel should be kept aware of necessary completion dates at least one month in advance.

Responsibility: Data Management Coordinator.

19. VERIFICATION

Rationale: The verification process ensures that the proper latitude/longitude, geologic code(s), and field form information are present for the samples and checks on the laboratory analysis.

Recommendation: Assurance should be made that the proper personnel are available for verification, trained in verification procedures, and made aware of necessary completion dates.

Responsibility: Report Coordinator.

20. DATA TAPE TO GRAND JUNCTION OFFICE INFORMATION SYSTEM

Rationale: The Grand Junction Office Information System (GJOIS) data tape is the medium used by GJO to obtain data for quadrangle evaluation. It is also used to create additional tapes requested by non-NURE groups.

Recommendation: The following steps are recommended:

1. All verification should be checked for completion.
2. It should be checked that all sample numbers are on the data tape printout.
3. It should be ensured that the data tape is at GJOIS on schedule.

Responsibility: Report Coordinator.

21. DRAFTING

Rationale: This function involves preparing all graphics for a report.

Recommendation: Necessary material and information should be provided to Graphic Arts with enough lead time to allow preparation of figures. Also, Graphic Arts Supervisor and personnel must be made aware of all report deadlines at least two weeks in advance.

Responsibility: Report Coordinator.

22. PHOTOGRAPHY

Rationale: This function includes preparing all FR-80 film for reports.

Recommendation: Necessary material and information should be provided to Photography with enough lead time to allow preparation of figures. Also, Photography Supervisor and personnel must be made aware of all report deadlines at least one month in advance.

Responsibility: Information Processing Coordinator.

23. OPTI-COPY

Rationale: This function includes preparing all mylar plates for reports.

Recommendation: Necessary material and information must be provided to Opti-Copy personnel with enough lead time to allow for preparation of plates. Also, Opti-Copy personnel must be made aware of all report deadlines at least one month in advance.

Responsibility: Information Processing Coordinator.

24. OS-6 SYSTEM TYPING

Rationale: The text of all reports is entered on the OS-6 either directly or through two magnetic-card typewriters. The critical components of the OS-6 system are as follows: (1) magnetic-card typewriters to enter text material, (2) typewriter on OS-6 system, and (3) OS-6 printer. The failure of any of the preceding components could cause moderate to significant delay in attaining program objectives.

Recommendation: IBM service contract must be maintained.

Responsibility: Information Processing Coordinator.

25. REPORT WRITING (See Section 26)

26. REVIEW PROCESS

Rationale: The report reflects the URE Project evaluation of uranium potential in an area and is available for public review.

Recommendation: The following is recommended:

1. Ensure that the proper personnel are available for writing.

2. Ensure that all personnel involved are aware of deadlines.

3. Maintain at least the present minimum review process as outlined as a procedure by J. W. Arendt in a memo dated November 12, 1980.

Responsibility:

1. Director of Field Operations - Recommendation 1.

2. Report Coordinator - Recommendation 2.

3. Information Processing Coordinator - Recommendation 3.

27. REPRODUCTION

Rationale: This process involves the printing and publication of all URE Project documents.

Recommendation: Reports must be completed according to established schedules. Also, the Reproduction Supervisor and his personnel must be made aware of report mailing deadline at least one month in advance.

Responsibility: Information Processing Coordinator.

28. OPEN-FILING PROCESS

Rationale: The open-filing process includes the distribution of report copies and owner notification letters.

Recommendation: The proper personnel should be informed of open-filing dates.

Responsibility: Information Processing Coordinator.

LABORATORY

The URE Project laboratories are managed by the Y-12 Plant, Product Certification Division, Plant Laboratory Department. The URE Project analytical facility located in Building 9720-6 at the Y-12 Plant is a 640-ft^2 environmentally controlled clean room equipped with hoods, benches, mass spectrometer, fluorescence analyzer, inductively coupled argon plasma-optical emission spectrometer (ICP-OES), two atomic absorption spectrophotometers, a chloride and sulfate analyzer, and an 11/34 computer system. In addition, the facility includes (1) a hooded area of 100 ft^2 where samples are sieved, ground, and crushed; and (2) several smaller areas slightly exceeding 1500 ft^2 where samples are received, staged, and stored and where supplies are stored. A second ICP-OES system to analyze sediment samples is located in Building 9995 at the Y-12 Plant. The 11/60 computer in Building 9995 is used to transmit data to ORGDP. The personnel associated with the analytical work currently include a department head who is responsible for three groups in addition to personnel at the URE Project laboratory, a supervisor, two shift task coordinators, and seven analysts. The number of analysts associated with the URE Project varies from 4 to 15, depending on work load. Additionally, technical support from the Y-12 Technical Services Group is provided as required.

QUALITY ASSURANCE ASSESSMENT: LABORATORY

JOB ELEMENT NO.	BRIEF DESCRIPTION	POTENTIAL FOR PROBLEM	
		YES	NO
1	Equipment	X	
2	Sample preparation	X	
3	Facilities	X	
4	Maintenance and spare parts inventory	X	
5	Availability and arrangement of samples before, during, and after analysis	X	
6	Entering analyses into 11/34 computer	X	
7	Transmission of data from 11/60 computer	X	
8	Scheduling	X	
9	Transportation	X	
10	Reliability of analyses	X	
11	Contamination	X	
12	Labeling of samples through various stages of analysis	X	
13	Quality Control Program	X	
14	New analyses requested	X	

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	R	YES	NO	
1. Equipment										
1.1 Mass Spectrometer	L	X				X		X		2, 4, 7, 10, 13, 17
1.2 ICP-OES (2)	L	X				X			X	2, 4, 7, 10, 13, 16
1.3 Fluorescence analyzer	L	X				X		X		2, 4, 7, 10, 13, 17
1.4 Chloride-sulfate analyzer	L	X				X		X		2, 4, 7, 10, 12, 13, 17
1.5 Atomic absorption analyzer (2)	L	X				X			X	2, 4, 7, 10, 13, 16
1.6 11/34 computer	L	X				X		X		2, 7, 11, 12, 17
1.7 11/60 computer	L	X				X		X		2, 7, 11, 12, 17
2. Sample preparation										
2.1 Water (filtered)	L	X				X			X	2, 7, 8, 10, 14
2.2 Sediment (dried, sieved, HNO_3/HF dissolution)	L	X				X			X	2, 7, 8, 10, 14

SECTIONS: P - PLANNING; S - SAMPLING; L - ANALYSIS; D - DATA MANAGEMENT; R - REPORTING; A - ARCHIVES; C - QA COORDINATOR

L - LOW; H - HIGH; U - UNKNOWN; I - INSIGNIFICANT; S - SIGNIFICANT

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
2.3 Rock (crushed, ground, HNO_3/HF dissolution)	L	X				X			X	2, 7, 8, 10, 14
3. Facilities										
3.1 Hoods	L	X				X		X		4, 7, 10, 11, 13, 18, 19
3.2 Benches, desks, and chairs	L	X			X				X	6, 10, 12
3.3 Heating-Air Conditioning	L			X		X		X		1, 3, 7, 11, 13, 17
3.4 Dollies for storage	L		X			X		X		4, 7, 10, 15, 17
3.5 Press, sieves, blender, grinder, crushers, oven, and balances	L	X					X		X	2, 4, 6, 10, 12, 16
4. Maintenance and spare parts inventory	L		X			X		X		5, 7, 10, 11
5. Availability and arrangement of samples before, during, and after analysis	L		X			X		X		5, 7, 15
6. Entering analyses into 11/34 computer	L	X				X		X		5, 7, 8, 11, 17
7. Transmission of data from 11/60 computer	L	X				X			X	1, 5, 7, 12, 16

SECTIONS: P - PLANNING; S - SAMPLING; L - ANALYSIS; D - DATA MANAGEMENT; R - REPORTING; A - ARCHIVES; C - QA COORDINATOR

L - LOW; H - HIGH; U - UNKNOWN; I - INSIGNIFICANT; S - SIGNIFICANT

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
8. Scheduling										
8.1 UREP	L		X			X		X		7, 15
8.2 Bendix	L		X			X		X		7, 15
8.3 SRL	L		X			X		X		1, 7, 15
9. Transportation	L	X				X			X	5, 7, 10, 15, 16
10.Reliability of analyses	L	X				X			X	2, 7, 8, 10, 14
11.Contamination	L	X				X			X	2, 7, 8, 10, 14
12.Labeling of samples through various stages of analysis	L	X				X			X	7, 17
13.Quality Control Program	L	X				X			X	2, 8, 10, 14
14.New analyses requested										
14.1 Special dissolution	L			X		X		X		1, 3, 7, 9, 21
14.2 Special equipment	L			X		X		X		1, 3, 5, 7

SECTIONS: P - PLANNING
S - SAMPLING
L - ANALYSIS
D - DATA MANAGEMENT
R - REPORTING
A - ARCHIVES
C - QA COORDINATOR

L - LOW
H - HIGH
U - UNKNOWN
I - INSIGNIFICANT
S - SIGNIFICANT

QUALITY ASSURANCE PLAN: LABORATORY

1. EQUIPMENT

1.1 MASS SPECTROMETER

Rationale: The 6-in. radius, 60° sector mass spectrometer is a thermal ionization instrument equipped for ion counting and rapid sample entry. Organically extracted and uranium-233 spiked water samples are back-extracted into ammonium carbonate and pipetted onto a rhenium filament. The filament is loaded into the mass spectrometer source, and the system is evacuated to less than 2 x 10^{-6} torr. Nanograms-per-liter (ppt) concentrations of uranium in natural surface and groundwater samples are analyzed at a rate of 75 per day on an 8-hour shift. The critical components of the mass spectrometer are as follows:

1. Magnet and source power supplies.
2. Vacuum system.
3. Rhenium filament.
4. Liquid nitrogen system.
5. Electronic components.

A failure of any of the preceding components could cause moderate to significant delay in attaining program objectives. However, projections for sample loads indicate the use of the mass spectrometer will be minimal.

Recommendation: The following recommendations are made:

1. Maintain inventory of spare parts, supplies, filaments, and pumps for adequate backup.
2. Prepare a procedure to ensure that liquid nitrogen will be available at all times.

Responsibility: Laboratory Supervisor.

1.3 FLUORESCENCE ANALYZER

Rationale: Uranium from water or leached sediment samples is extracted into trioctylphosphine oxide in Varsol, and an aliquot is

sintered on a sodium fluoride pellet. The yellow-green uranium fluorescence of the pellet is measured using a fluorometer and compared to pellets of known uranium content prepared in a similar manner. The lowest concentrations reported are 0.25 μg uranium/g for sediments and 0.2 μg uranium/l for waters. One hundred samples are analyzed daily per 8-hour shift. The critical components of the fluorescence analyzer are as follows:

1. Motor drive.

2. Ultraviolet source and photomultiplier.

3. Electronic components.

A failure of any of the preceding components could cause moderate to significant delay in attaining program objectives.

Recommendation: The following recommendations are made:

1. Perform monthly preventive maintenance on instrument during first week of each month.

2. Maintain inventory of spare parts for instrument.

Responsibility: Maintenance Electronics Technician and Laboratory Supervisor.

1.4 CHLORIDE-SULFATE ANALYZER

Rationale: Chloride and sulfate analyses of URE Project water samples are determined using a Technicon automated analyzer. Sulfate samples are passed through a cation exchange column to remove metallic interferences. Sulfate in the sample is reacted with barium chloride at a pH of 2.5 to 3.0 to form barium sulfate. Excess barium reacts with methyl thymol blue to form a blue-colored chelate at a pH of 12.5 to 13.0. The amount of uncomplexed methyl thymol blue, measured at 460 nm, is proportional to the sulfate present. Chloride ion concentration depends on the liberation of thiocyanate ion from mercuric thiocyanate by the formation of nonionized but soluble mercuric chloride. In the presence of ferric ions, the liberated thiocyanate forms a highly colored ferric thiocyanate proportional to the original chloride concentration measured at 480 nm. One hundred samples can be analyzed daily on an 8-hour shift. The critical components of the sulfate-chloride analyzer are as follows:

1. Proportional pump.

2. Dual colorimeters.

3. Sampler.

A failure of any of the preceding components could cause moderate to significant delay in attaining program objectives.

Recommendation: The following recommendations are made:

1. Maintain inventory of spare parts, including pumps.

2. Provide routine monthly preventive maintenance for the instrument.

Responsibility: Maintenance Electronics Technician and Laboratory Supervisor.

1.6 11/34 COMPUTER

Rationale: The PDP 11/34 minicomputer system has 128K words of memory and two RL-01 disk drives. The system is interfaced to the inductively coupled plasma spectrometer, the atomic absorption spectrophotometer(s) (two AA's with both programs operational), the Technicon chloride-sulfate analyzer, and the fluorescence analyzer. Real time data acquisition and calculation of data on each sample for all five instruments are stored on disks. Programs for data management allow supervisory personnel to monitor the progress of the sample in the laboratory and observe quality control data on a daily basis. The critical components of the system are as follows:

1. Infoton terminals.

2. Computer boards.

3. Temperature in the clean room.

4. RL-01 disk drives.

A failure of any of the preceding components could cause moderate to significant delay in attaining program objectives.

Recommendation: The following recommendations are made:

1. Purchase a new terminal as backup for the Infoton terminals.

2. Keep a supply of spare boards to be used in emergency.

3. Provide greater cooling capacity to the clean room.

4. Maintain the RL-01 drives on a monthly basis. Order spare drives which will not only serve as backup, but will also increase the capability and flexibility of the facility.

Responsibility:

1. Laboratory Computer Specialist - Recommendation 1.

2. Maintenance Electronics Technician - Recommendation 2.

3. Plant Laboratory Engineer - Recommendation 3.

4. Laboratory Computer Specialist - Recommendation 4.

1.7 11/60 COMPUTER

Rationale: The PDP 11/60 system includes 128K words of memory and three RL-01 disk drives. Disks containing URE Project analytical data are processed through the 11/60 Computer to the Y-12 Plant computer center and on to ORGDP. The 11/60 system is also used to report plant laboratory analytical data. The critical components of the system are as follows:

1. Communication line to Y-12 Plant computer center.

2. Boards.

3. Temperature control.

A failure of any of the preceding components could cause moderate delay in attaining program objectives.

Recommendation: The following recommendations are made:

1. Maintain DEC service contract with 4-hour response.

2. Use Dymcas or Y-12 Plant computer to transmit data or take disk to ORGDP.

3. Install climate control system in computer room.

Responsibility:

1. Laboratory Computer Specialist - Recommendation 1.

2. Laboratory Computer Specialist - Recommendation 2.

3. Records Department Head and Laboratory Computer Specialist - Recommendation 3.

3. FACILITIES

3.1 HOODS

Rationale: The URE Project laboratory clean room is equipped with two hoods in which sodium fluoride pellets are prepared, sediment samples are dissolved, mass spectrometry samples are prepared, and fluorescence samples are dried. Critical components are as follows:

1. Makeup air in room.
2. Hood fans.
3. Coordinating work to prevent overcrowding hoods.

A failure of any of the preceding components could cause moderate to significant delay in attaining program objectives.

Recommendation: The following recommendations are made:

1. Engineer will provide drawings to ensure adequate makeup air in room.
2. Coordinate analytical efforts in the laboratory in a cost-effective manner.

Responsibility:

1. Plant Laboratory Engineer - Recommendation 1.
2. Laboratory Supervisor - Recommendation 2.

3.3 HEATING-AIR CONDITIONING

Rationale: Heating and air conditioning of the 9720-6 clean room are provided to maintain temperature in the room constant to ±2°C over an 8-hour period and humidity less than 50% relative. Critical components of the system are as follows:

1. Refrigeration system.
2. Fan system.
3. Heaters.

Failure of any of the preceding components coupled with a 2°C temperature variation could cause instabilities in the plasma spectrometer and make its operation impracticable.

Recommendation: The following recommendations are made:

1. Have Utilities Division provide a stand-by motor.

2. Inform Maintenance Division of critical performance of components so that service will be provided if required.

Responsibility:

1. Y-12 Plant Utilities Division - Recommendation 1.

2. Laboratory Department Head - Recommendation 2.

3.4 DOLLIES FOR STORAGE

Rationale: Storage dollies are provided to accommodate 30,000 samples. Other dollies can be purchased at a cost of $250 each for future samples. Each dolly can store from 1,500 to 2,000 samples. Critical aspects of the dolly storage would involve the following:

1. Samples are easily retrievable when stored properly.

2. Ordering dollies would require a 90- to 120-day lead time to process, requisition, receive, and assemble.

Failure to purchase dollies could result in moderate delays in analyzing samples.

Recommendation: Sample storage requirements and funds to buy dollies will be made available.

Responsibility: Project Manager.

4. MAINTENANCE AND SPARE PARTS INVENTORY

Rationale: Maintenance and spare parts inventory will be provided. Critical items are as follows:

1. Maintenance is currently provided on a day-shift basis.

2. Some equipment requires special maintenance.

Failure of Maintenance Division to provide service or an inadequate inventory of spare parts could cause moderate to significant delays in meeting program objectives.

Recommendation: The following recommendations are made:

1. Inform Maintenance Division when coverage is required on a two-shift basis.

2. Maintain an adequate inventory of spare parts.

3. Have card punches maintained by Sorbus on a service contract basis.

Responsibility:

1. Laboratory Department Head - Recommendation 1.

2. Maintenance Electronics Technician - Recommendation 2.

3. Laboratory Supervisor - Recommendation 3.

5. AVAILABILITY AND ARRANGEMENT OF SAMPLES BEFORE, DURING, AND AFTER ANALYSIS

Rationale: Samples are arranged on dollies in the staging area of 9720-6 prior to analysis and stored on dollies after analysis for easy retrieval. Cards on each sample are filed in the sample receiving area and are cross-referenced to the dollies on which the samples are stored. Critical components in the arrangement of samples are as follows:

1. Lack of adequate dollies and shelves.

2. No cards submitted with samples.

3. Packing lists not included when non-ORGDP samples are received.

Failure of any of the preceding components could cause moderate to significant delays in meeting program objectives.

Recommendation: The following recommendations are made:

1. Provide dollies and/or shelves when sample requirements are defined and money is available.

2. Have control supervisor ensure that packing lists are included in each box for non-ORGDP samples.

3. Provide IBM cards as required.

Responsibility:

1. Project Manager - Recommendation 1.

2. Laboratory Department Head - Recommendation 2.

3. Computer Programmer for Laboratory - Recommendation 3.

6. ENTERING ANALYSIS INTO 11/34 COMPUTER

Rationale: A separate terminal is required for all systems. Infoton terminals are currently used. The terminal is used for operation interaction so that the 11/34 computer can receive data. Critical components are as follows:

1. Infoton terminals.

2. Interface to 11/34 computer.

3. 11/34 computer.

4. Keypunch errors by Laboratory when IBM cards not available from ORGDP.

Failure of any of the preceding components could cause moderate to significant delays in meeting program objectives.

Recommendation: The following recommendations are made:

1. Order spare terminal for backup to the Infoton terminal.

2. Maintain 11/34 computer spare parts inventory.

Responsibility:

1. Laboratory Computer Specialist - Recommendation 1.

2. Y-12 Plant Maintenance Division - Recommendation 2.

8. SCHEDULING

8.1 URE PROJECT (see Section 8.2)

8.2 BENDIX

Rationale: Sample schedules are submitted to the clean room by ORGDP URE Project personnel who receive priorities from Grand Junction. Critical components in scheduling would be as follows:

1. Adequate time allowed to develop procedures for elements that have not previously been analyzed.

2. Too many samples being scheduled at one particular time.

3. Communication between groups.

Failure of any of the preceding components could cause moderate to significant delays in meeting program objectives.

Recommendation: The following recommendations are made:

1. Ensure that URE Project office informs URE Project analytical personnel as soon as schedules are announced.

2. Keep URE Project office informed of procedure development and cost for analysis.

Responsibility:

1. Project Manager - Recommendation 1.

2. Laboratory Department Head - Recommendation 2.

8.3 SRL

Rationale: Scheduling of SRL samples with other NURE Program work will be coordinated with URE Project office. Critical conditions could exist if SRL requested their samples be given priority over other NURE samples. Failure to coordinate samples could lead to SRL and/or URE Project and Bendix samples not being analyzed on time.

Recommendation: The following recommendations are made:

1. Ensure that coordination efforts with SRL are made by Product Engineering.

2. Keep URE Project office informed of SRL program requirements.

Responsibility:

1. Project Engineer and Laboratory Department Head - Recommendation 1.

2. Laboratory Department Head - Recommendation 2.

14. NEW ANALYSIS REQUESTED

14.1 SPECIAL DISSOLUTION

Rationale: When elements not analyzed by current URE Project methodology are requested, special dissolution techniques must be considered. Critical components in this endeavor are as follows:

1. Availability of personnel to perform experiments.
2. Availability of laboratory space.
3. Sufficient time for procedure development.

Failure of any of the preceding components could cause a delay in meeting program objectives.

Recommendation: As soon as URE Project office is informed of special requests, URE Project analytical personnel will be notified.

Responsibility: Project Manager.

14.2 SPECIAL EQUIPMENT

Rationale: New analyses sometimes require special equipment not readily available that must be scheduled for URE Project use or must be procured from outside vendors. Critical components are as follows:

1. Availability of special equipment from other Oak Ridge laboratories.
2. Availability of vendor equipment within the time frame of analysis request.
3. Availability of money for equipment.

Failure of any of the preceding components could result in delays in meeting program objectives.

Recommendation: The following recommendations are made:

1. As soon as URE Project office is informed of special requests, notify URE Project analytical personnel.
2. Notify URE Project office personnel when new equipment is required.

Responsibility:

1. Project Manager - Recommendation 1.

2. Laboratory Department Head - Recommendation 2.

DATA MANAGEMENT

Data management is handled by the Computer Sciences Division (CSD) personnel who are responsible for the operation and maintenance of the URE Project Data Processing System. This system is described in the following reports:

1. *Data Display and Analysis Programs in the URE Computing System* (K/UR-45) and

2. *File Maintenance and Data Processing Procedures and Programs in the URE Data Processing System* (in preparation).

In addition, the following report lists procedures for requesting routine information from the computer: *Hydrogeochemical and Stream Sediment Reconnaissance Basic Data Reports Computer Program Request Manual* (K/UR-37).

QUALITY ASSURANCE ASSESSMENT: DATA MANAGEMENT

JOB ELEMENT NO.	BRIEF DESCRIPTION	POTENTIAL FOR PROBLEM	
		YES	NO
1	Programming	X	
2	Equipment	X	
3	Loss of Information	X	

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
1. Programming										
1.1 Present programs	C	X				X			X	4
1.2 New programs	C	X				X		X		31
2. Equipment										
2.1 Keypunch	C	X					X	X		12
2.2 Terminals	C	X					X	X		12
2.3 IBM 3211 and 1403 printers	C	X					X	X		12
2.4 Quantor 105 microfiche unit	C	X					X	X		12
2.5 3M 571 duplifiche unit	C	X					X	X		12
2.6 Calcomp 1036 plotter	C	X					X	X		12
2.7 Information International Inc. FR-80 Graphics Recorder	C	X					X	X		12
2.8 Textronix digitizing system and MODCOMP2 minicomputer	C	X					X	X		12
3. Loss of Information	C	X				X		X		16

SECTIONS: P - PLANNING
S - SAMPLING
L - ANALYSIS
D - DATA MANAGEMENT
R - REPORTING
A - ARCHIVES
C - QA COORDINATOR

L - LOW
H - HIGH
U - UNKNOWN
I - INSIGNIFICANT
S - SIGNIFICANT

QUALITY ASSURANCE PLAN: DATA MANAGEMENT

1. PROGRAMMING

1.2 NEW PROGRAMS

Rationale: The addition of new statistical techniques requires that new programs or packages be interfaced with the system. The interfacing and testing of new programs or packages could take from a month to a year, depending on the complexity of the program or package.

Recommendation: CSD should be informed of the need for new programs as soon as possible.

Responsibility: CSD Liaison.

2. EQUIPMENT

Rationale: Because of the importance of the computer system to other groups within the three plants, the probability that equipment will become unavailable for an extended period of time is extremely low.

Recommendation: It is recommended that at least one week lead time for programs using the IBM 3211 and 1403 printers and at least one month lead time for keypunching and digitizing and for programs using the Quantor 105 microfiche and 3M 571 duplifiche units, the Calcomp 1036 plotter, and the FR-80 graphics recorder be kept in case of temporary equipment unavailability or heavy computer usage. If necessary, keypunching can be contracted to outside groups. Programs that use the Calcomp 1036 plotter can be run on the FR-80 graphics recorder (and the reverse) with photography transferring the results to the desired medium.

Responsibility: Report Coordinator.

3. LOSS OF INFORMATION

Rationale: Placing the master file on magnetic tape enables an easy system of rotating tapes to provide a backup of the master file in the event of computer system anomalies.

Recommendation: Continue present procedure.

Responsibility: CSD Coordinator.

ARCHIVES

The URE Project Archives consist of the following:

1. Field data (maps and field forms).

2. Samples (waters and solids).

3. Materials generated in the report preparation process (maps and film).

The purpose of the archives is to retain items which may be needed for further study or reexamination in a retrievable manner. Currently, archives for samples are coincident with storage of in-progress samples and are maintained by Y-12 Plant personnel. Field data and report materials are currently archived by URE Project personnel.

QUALITY ASSURANCE ASSESSMENT: ARCHIVES

JOB ELEMENT NO.	BRIEF DESCRIPTION	POTENTIAL FOR PROBLEM	
		YES	NO
1.	Storage Space	X	
2.	Arrangement and availability of samples, material, and data after open filing	X	
3.	Materials to be archived after open-filing	X	
4.	Materials to be salvaged after open-filing	X	
5.	Storage containers		
6.	Request to archive a large number of samples	X	

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
1. Storage space	A		X			X		X		3, 5, 7, 15, 17
2. Arrangement and availability of samples, materials, and data after open filing	A			X		X		X		5, 7, 15
3. Materials to be archived after open filing	A	X				X		X		8, 15
4. Materials to be salvaged after open filing	A	X				X		X		8, 15
5. Storage containers	A	X				X			X	2, 4, 12, 15
6. Request to archive a large number of samples	A			X		X		X		1, 5, 7, 9, 15, 21

SECTIONS: P - PLANNING
S - SAMPLING
L - ANALYSIS
D - DATA MANAGEMENT
R - REPORTING
A - ARCHIVES
C - QA COORDINATOR

L - LOW
H - HIGH
U - UNKNOWN
I - INSIGNIFICANT
S - SIGNIFICANT

QUALITY ASSURANCE PLAN: ARCHIVES

1. STORAGE SPACE

Rationale: The size of the area will depend on the projected number of samples. Critical considerations for the storage space are as follows:

1. Availability of space.

2. Availability of funds to equip the facility.

Failure to provide a storage area could cause delays in meeting program objectives.

Recommendation: The following recommendations are made:

1. Consider possible sites for a storage facility.

2. Provide money to upgrade storage area utilities.

Responsibility:

1. Archives Coordinator and Project Manager - Recommendation 1.

2. Project Manager - Recommendation 2.

2. ARRANGEMENT AND AVAILABILITY OF SAMPLES, MATERIALS, AND DATA AFTER OPEN FILING

Rationale: Sediment and rock samples are arranged on dollies in the staging area of 9720-6 after analysis. They remain there after open filing as archival samples.

Recommendation: The following recommendations are made:

1. Provide adequate dollies and/or shelves when sample requirements are defined.

2. Ensure proper sample identification.

Responsibility:

1. Project Manager - Recommendation 1.

2. Archives Coordinator - Recommendation 2.

6. REQUEST TO ARCHIVE A LARGE NUMBER OF SAMPLES

Rationale: Archiving samples required identifying samples, filing samples, and developing a system which allows for the retrieval of samples. Critical components are as follows:

1. Sufficient suitable storage space.

2. Sufficient computer hardware, software, and programming time.

3. Sufficient time to set up system.

Recommendation: The following recommendations are made:

1. Locate possible storage space.

2. Prepare possible plans for a system.

Responsibility: Project Manager.

PERSONNEL

This division evaluates the personnel needs of the various sections of the URE Project.

QUALITY ASSURANCE ASSESSMENT: PERSONNEL

JOB ELEMENT NO.	BRIEF DESCRIPTION	POTENTIAL FOR PROBLEM	
		YES	NO
1.	Planning	X	
2.	Sampling	X	
3.	Laboratory	X	
4.	Report Preparation	X	
5.	Archives	X	
6.	Data Management	X	

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
1. Planning										
1.1 Procuring necessary materials	C	X				X		X		7, 31
1.2 Site planning	C	X				X		X		7, 31
2. Sampling										
2.1 Hiring	C			X		X		X		7, 31
2.2 Training	C	X				X		X		7, 21
3. Laboratory										
3.1 Hiring	L		X			X		X		7, 21
3.2 Training	L		X			X		X		7, 21
4. Report preparation										
4.1 Data verification	C	X				X		X		7, 31
4.2 Writing	C			X		X		X		7, 31

SECTIONS: P - PLANNING
S - SAMPLING
L - ANALYSIS
D - DATA MANAGEMENT
R - REPORTING
A - ARCHIVES
C - QA COORDINATOR

L - LOW
H - HIGH
U - UNKNOWN
I - INSIGNIFICANT
S - SIGNIFICANT

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
4.3 Clerical	R	X				X			X	7, 20
4.4 Drafting	C			X		X		X		7, 20
5. Archives	C			X			X		X	31
6. Data management	C	X				X		X		7, 20

SECTIONS: P - PLANNING, S - SAMPLING, L - ANALYSIS, D - DATA MANAGEMENT, R - REPORTING, A - ARCHIVES, C - QA COORDINATOR

L - LOW, H - HIGH, U - UNKNOWN, I - INSIGNIFICANT, S - SIGNIFICANT

QUALITY ASSURANCE PLAN: PERSONNEL

1. PLANNING

1.1 PROCURING NECESSARY MATERIALS

Rationale: Personnel should be available to procure material using established procedures whenever possible.

Recommendation: The following recommendations are made:

1. Ensure that personnel are aware of standard URE Project and/or UCC-ND procedures.

2. Assign responsibility to a person(s) who is familiar with standard procedures and ways to expedite necessary procedures.

Responsibility: Director of Field Operations.

1.2 SITE PLANNING

Rationale: Personnel must be available for planning before sampling can begin.

Recommendation: The following recommendations are made:

1. Ensure that at least two people are available for planning.

2. Ensure that planning personnel are informed of the sampling strategy for the area.

Responsibility: Director of Field Operations.

2. SAMPLING

2.1 HIRING

Rationale: An adequate number of personnel must be available to complete an area within a given time period. The availability of additional personnel will depend on time of year and job market.

Recommendation: The following recommendations are made:

1. Plan personnel requirements as far ahead of schedule as possible.

2. Budget personnel requirements around academic calendar.

Responsibility: Project Manager.

2.2 TRAINING

Rationale: Personnel must be familiar with URE Project procedures for collecting samples.

Recommendation: The following recommendations are made:

1. Allow one week for individual in-field training. Team sampling total should be anticipated at about one-half normal total.

2. Anticipate one-half to three-fourths normal sample total for beginning samplers for next two weeks.

Responsibility: Director of Field Operations.

3. LABORATORY

3.1 HIRING

Rationale: Depending upon the sample load projection, more non-exempt roll personnel might need to be hired. Normally, applicants are screened by the Laboratory Department Head and suitable prospects are interviewed and, if acceptable, are placed in clearance. Critical components of hiring are as follows:

1. Availability of suitable candidates.

2. Time to hire after program goals are set.

Recommendation: The following recommendations are made:

1. Screen applicants for interview from computer printouts provided by Central Employment of all available personnel.

2. Ensure the URE Project office communicates sample load projections as early as possible.

Responsibility:

1. Employee Relations Representative and Laboratory Department Head - Recommendation 1.

2. Project Manager - Recommendation 2.

3.2 TRAINING

Rationale: New personnel are trained to work according to existing procedures for a period of three to six months after hiring. For any large increase in the rate of samples to be analyzed, analysts need to be trained for a minimum of three months. All analytical methods used in the clean room laboratory have written procedures readily available for analysts to follow (*Plant Laboratory Analytical Procedures*, Volumes 1 and 2). Critical components in the program are as follows:

1. Analysts hired adapt well to laboratory methods and goals.

2. Adequate training time is available for analysts.

Recommendation: The following recommendations are made:

1. Hire analysts with a minimum of two years of college chemistry and laboratory experience if possible.

2. Set up an adequate training program for analysts to include methodology, computer inputting of data, and safety procedures.

Responsibility:

1. Laboratory Department Head - Recommendation 1.

2. Laboratory Supervisor - Recommendation 2.

4. REPORT PREPARATION

4.1 DATA VERIFICATION

Rationale: Personnel must be available for verification.

Recommendation: It is necessary to ensure that personnel familiar with the area are available for verification.

Responsibility: Director of Field Operations.

4.2 WRITING

Rationale: Personnel must be available for data interpretation and report writing.

Recommendation: It is necessary to ensure that personnel are available.

Responsibility: Director of Field Operations.

4.3 CLERICAL

Rationale: Personnel must be available to prepare material for publication.

Recommendation: It is necessary to ensure that personnel are available.

Responsibility: Information Processing Coordinator.

4.4 DRAFTING

Rationale: Personnel must be available for drafting of report material.

Recommendation: It is necessary to keep Graphic Arts Supervisor aware of all report deadlines at least two weeks in advance.

Responsibility: Report Coordinator.

6. DATA MANAGEMENT

Rationale: Additional personnel can usually be acquired from other parts of CSD if needed.

Recommendation: One month should be allowed for additional personnel to become available for and/or acquainted with the URE Project data processing system.

Responsibility: CSD Coordinator.

PROTECTION OF SENSITIVE INFORMATION

The URE data become sensitive when chemical determinations are associated with the location of the sample site. Disclosure of this information could give an individual or company an unfair advantage in the exploration for uranium or other resources. Thus, the data are released in a controlled manner by DOE. Until this release, it is imperative that the security of the data be maintained.

QUALITY ASSURANCE ASSESSMENT: SENSITIVE INFORMATION

JOB ELEMENT NO.	BRIEF DESCRIPTION	POTENTIAL FOR PROBLEM	
		YES	NO
1.	Planning		X
2.	Sampling	X	
3.	Laboratory	X	
4.	Reporting	X	
5.	Archives		X
6.	Data Management	X	

POTENTIAL PROBLEM AREA	SECTION	PROBABILITY OF PROBLEM			CONSEQUENCE OF PROBLEM			CRITICAL		RATIONALE FOR CLASSIFICATION
		L	H	U	I	S	U	YES	NO	
1. Planning	C	X			X				X	31
2. Sampling	S		X			X		X		1, 22, 30
3. Laboratory	L	X				X			X	2, 6, 8, 10, 14
4. Reporting	C	X				X		X		14, 28, 30
5. Archives	A	X			X				X	29
6. Data Management	C	X				X		X		8,22

SECTIONS: P - PLANNING; S - SAMPLING; L - ANALYSIS; D - DATA MANAGEMENT; R - REPORTING; A - ARCHIVES; C - QA COORDINATOR

L - LOW; H - HIGH; U - UNKNOWN; I - INSIGNIFICANT; S - SIGNIFICANT

QUALITY ASSURANCE PLAN: SENSITIVE INFORMATION

1.0 PLANNING

Rationale: To date, no sensitive information has been used in planning a sampling area.

Recommendation: Appropriate precautions must be taken to protect sensitive information when applicable.

Responsibility: Director of Field Operations.

2.0 SAMPLING

Rationale: The proper security of sensitive data and materials is necessary to protect the interests of the public and the company, and to prevent a "conflict of interest" situation from arising. It is intended to prevent any one person from obtaining information preferentially.

Recommendation: The following recommendations are made:

1. Brief all personnel on what type of information is considered sensitive and why.

2. Give instructions on how to best protect this information.

Responsibility: Director of Field Operations.

3.0 LABORATORY

Rationale: Information is not in a form that is easily available. In addition, information is missing latitude/longitude.

Recommendation: It is necessary to secure information at the end of each workday.

Responsibility: Laboratory Department Head and Laboratory Supervisor.

4.0 REPORTING

Rationale: Information is in a form that is easily used (i.e., paper plots, FR-80 film, and line printer copy).

Recommendation: The following recommendations are made:

1. Secure information at the end of each workday.

2. Store information securely between publication and open filing.

Responsibility: Report, Data Management, and Information Processing Coordinators.

5. ARCHIVES

Rationale: Information in archives has been open filed.

Recommendation: None.

Responsibility: None.

6. DATA MANAGEMENT

Rationale: The data became potentially sensitive after being placed on the URE Project master file by the file maintenance program because of the separation of the data sources. The URE Project master file is password-protected through the security system at ORGDP, which is a DOE classified area. The passwords are maintained in a classified environment, where only authorized personnel have access to the password. The URE Project master file is not treated as "classified" by security procedures, but rather as proprietory data. A protection code is assigned to the DEC-10 URE Project region, along with use of individual program protection codes.

Recommendation: Present procedures should be continued.

Responsibility: CSD Coordinator.

DISTRIBUTION

INTERNAL

1- 4. Computer Sciences Division
Carter, H. P.
Green, R. O.
Hammerling, F. D.
Westley, G. W.

5. Ecological Sciences Information Center
Daniel, E. W.

6. Enrichment Technology Div.
Merriman, J. R.

7. K-25 Quality Assurance
Melroy, P. E.

8- 9. K-25 Technical Services Div.
Levin, R. W.
Napolitan, D. S.

10. Library

11. Operations Analysis and Planning Division
Bradbury, J. T.

12. Technical Director
Wilcox, W. J., Jr.

13. Uranium Resource Evaluation Project
Arendt, J. W.

14. ORGDP Records Department (RC)

15-16. Oak Ridge National Laboratory
Row, T. H.
Shults, W. D.

17-21. Y-12 Plant
Bernander, N. K.
Hibbs, R. F.
Mundt, F. D.
Vanstrum, P. R.
White, J. C.

EXTERNAL

22. M. A. Boyd
Development Division
Oak Ridge Operations Office
Department of Energy
P.O. Box E
Oak Ridge, Tennessee 37830

23. D. E. Broxton
Los Alamos Scientific Laboratory
P.O. Box 1663, Mail Stop 586
Los Alamos, New Mexico 87545

24. Al Clebsch, Jr.
Water Resources Division
U. S. Geological Survey
Denver Federal Center
Mail Stop 406
Denver, Colorado 80225

25. David H. Dahlem, Project Officer
NURE Project Office - Geochemistry
Grand Junction Office
Department of Energy
P.O. Box 2567
Grand Junction, Colorado 81502

26. M. L. Hyder
NURE Program
Savannah River Laboratory
Aiken, South Carolina 29801

27. Victor J. Janzer
Water Resources Division
U. S. Geological Survey
Federal Center
Box 25046, Mail Stop 407
Lakewood, Colorado 80225

28. E. B. Kiser, Assistant Manager
for Development and Planning
Oak Ridge Operations Office
Department of Energy
P.O. Box E
Oak Ridge, Tennessee 37830

29-30. Donald E. Livingston
Bendix Field Engineering Corporation
P.O. Box 1569
Grand Junction, Colorado 81502

31-33. T. W. Offield, Chief
Branch of Uranium-Thorium Resources
U. S. Geological Survey
Box 25046, Mail Stop 916
Denver Federal Center
Denver, Colorado 80225

34. C. H. Roach, Assistant Manager
Resource Assessment
Grand Junction Office
Department of Energy
P. O. Box 2567
Grand Junction, Colorado 81502

35. Arthur W. Rose
Pennsylvania State University
119 Mineral Sciences Building
University Park, Pennsylvania 16802

36. Nathaniel Stetson, Manager
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29801

37-38. Technical Information Center
Department of Energy
P.O. Box 62
Oak Ridge, Tennessee 37830

39-138. Technical Library
Bendix Field Engineering Corporation
P.O. Box 1569
Grand Junction, Colorado 81502