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Procedure No. QA-AC-101-0201

Rev. 0 3-20-91

Oak Ridge National Laboratory

Analytical Chemistry Division

Date of Issue 8/16/89

QUALITY ASSURANCE PROGRAM

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Supersedes Issue dated:

Title: LOW LEVEL RADIOCHEMICAL ANALYSIS GROUP (LLRAG) QA PROGRAM

Prepared By: J. W. Wade

Introduction

1.0 Purpose

The purpose of this Quality Assurance (QA) Program is to provide a disciplined and systematic plan for the control of the work activity within the Low Level Radiochemical Analysis Group.

2.0 Applicability

This program, when implemented, will become an integral part of the QA Program for the Radioactive Materials Analysis Section which in turn will become a part of the overall QA Program for the Analytical Chemistry Division (ACD). The program, as outlined in this document, is based on the basic requirements of ANSI/ASME quality assurance program requirements for nuclear facilities (NQA-1). When implemented, the program should provide for QA within the Laboratory that is in compliance with NQA-1.

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QA Concurrence: P. B. Hoke
ORNL QA Manager

Approved By: W. D. Sheets
Division Director

Oak Ridge National Laboratory
Operated by
Martin Marietta Energy Systems, Inc.

QA Concurrence: P. L. Howell
QA Specialist

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3.0 Group Activity and Responsibility

The Low Level Radiochemical Analysis Group (LLRAG) is a group within the Radioactive Materials Analysis Section (RMAS) in the Analytical Chemistry Division. It is normally staffed by 10 analytical chemistry personnel consisting of the group leader, chemists, and laboratory technicians. The group leader and chemists are exempt salary status personnel while the laboratory technicians are nonexempt. Key assignments within the group include the Group Leader's alternate, the sample custodian, and the counting room coordinator.

The group's primary function is to provide analytical support and services and research and development for various environmental monitoring programs at ORNL. Samples are analyzed for gamma, alpha, and beta emitting radionuclides by direct counting or by chemical isolation followed by counting. Radionuclides frequently measured by the group include but are not limited to Sr-90, isotopic plutonium, isotopic uranium, isotopic thorium, Am-241, Cm-244, Tc-99, C-14, tritium, and isotopic radium.

4.0 Other Applicable Documents

A list of all procedures used by LLRAG is included in Appendix 5.

Basic Requirements

1.0 ORGANIZATION

1.1. This section lists the functional responsibilities, authorities and qualifications of each member of the group.

1.1.1 The Group Leader has overall responsibility for all LLRAG operations and activities including the following:

1.1.1.1 Implementation of and training to analytical procedures used in laboratory.

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LOW LEVEL RADIOCHEMICAL ANALYSIS GROUP (LLRAG) QA PROGRAM

- 1.1.1.2 Determination of applicability of procedures and methods for particular sample type.
- 1.1.1.3 Review of data generated within the LLRAG.
- 1.1.1.4 Final approval of all analytical data before leaving the LLRAG.
- 1.1.1.5 Certification of LLRAG personnel who perform the work within the Group.
- 1.1.1.6 Investigation of any quality failures which occur during routine sample analysis.
- 1.1.1.7 Approves any procedural modifications that may be required. Makes sure these modifications are properly documented.
- 1.1.1.8 General supervision of the LLRAG.
- 1.1.2 The staff member who acts as the Group's Sample Custodian has the following responsibilities:
 - 1.1.2.1 Establishes a "chain-of-custody" on all samples that come into the Group as chain-of-custody, or that are transferred to other laboratories within the division.
 - 1.1.2.2 Coordinates with the Group Leader the distribution of routine samples into the appropriate laboratory.
 - 1.1.2.3 Interfaces with customers to ensure that pertinent information about their needs and samples is recorded on the Request for Analytical Services form.
 - 1.1.2.4 Alerts the Group Leader when emergency or other unusual samples are submitted.
- 1.1.3 Senior laboratory personnel in the group have the following responsibilities:
 - 1.1.3.1 Coordinate the method and instrumentation troubleshooting and the R&D for the lab.
 - 1.1.3.2 Develop new methods and revise and/or upgrade existing methods and instrumentation.
 - 1.1.3.3 Develop computer programs to enhance the labs data processing.

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1.1.3.4 Assumes group leader responsibilities in his absence if designated by the group leader or section head.

1.1.3.5 Perform routine laboratory procedures in support of ongoing ORNL environmental monitoring programs.

1.1.4 The counting room coordinator has the following responsibilities:

1.1.4.1 Verify the proper operation and calibration of counting equipment by processing NBS traceable standards. This activity will take place at the beginning of each working day.

1.1.4.2 Document any problems such as out of control conditions, instrument malfunctions, etc., in the counting room logbook.

1.1.4.3 Fill the appropriate liquid nitrogen dewars once each week.

1.1.4.4 Generate a listing of control charts for each counting system and allow the Group Leader to review and approve the data. This activity will be performed once each month.

1.1.4.5 Interface with members of the LLRAG to ensure that samples flow smoothly through the counting room.

1.1.4.6 Alerts the Group Leader or a designated chemist in the group when any unusual occurrence is noted.

1.1.5 Other laboratory support personnel within the group are responsible for the following:

1.1.5.1 Responsible for analysis of ORNL environmental monitoring samples and laboratory emergency samples, using correct and approved methods.

1.1.5.2 Record laboratory activities on the proper form when written procedures do not exist or when an unusual event occurs which affects the sample data.

1.1.5.3 Enters all pertinent data into the Division's data management system (AnaLIS). This can also include the automatic transfer of data into AnaLIS when applicable.

1.2. Required Qualifications

Each individual who works in the LLRAG must meet the minimum criteria for each job or task assigned to him/her.

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- 1.2.1 Group Leader - Must have a B.S. degree or equivalent in chemistry from an accredited college or university. Must possess a thorough knowledge of analytical chemistry and have demonstrated this knowledge and leadership capability through on the job experience. The group leader will have a working knowledge of radiochemistry, must understand the potential for environmental problems at ORNL and know the appropriate personnel to contact in the case of an emergency situation.
- 1.2.2 Chemists in the LLRAG - Qualifications same as group leader.
- 1.2.3 Nonexempt Staff - Must have a degree from an accredited technical school or college or equivalent experience. Must have demonstrated the ability to perform laboratory procedures and possess the ability to make rational decisions under stressful conditions.

2.0 QA PROGRAM

- 2.1 This LLRAG QA Program document will supplement the Analytical Chemistry Division QA Program for routine laboratory operations. Additional QA plans may be developed on a project-specific basis if required.
- 2.2 The quality of analytical data reported by the LLRAG will be monitored through the ACD Quality Control (QC) program and the LLRAG internal QC program. In addition, intracomparisons from EPA-Las Vegas and the DOE EML Laboratory will be analyzed as they are received.
- 2.3 This section describes the training system used by LLRAG to assure that all personnel are adequately trained and that they remain trained as operational and work requirements change.
- 2.3.1 Generic Training. All personnel will be trained and required to pass written examinations on basic safety related subjects such as the following:
- Basic radiation safety and control practices.
 - Emergency preparedness.
 - Industrial safety and industrial hygiene.
 - Environmental protection and health risk awareness.

These training courses are either in place or are being developed by Industrial Hygiene, Health and Environmental Safety or Analytical Chemistry personnel. Documentation of satisfactory training will be kept in the division office.

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2.3.2 Occupational on the Job Training. All personnel working in the LLRAG are required to receive initial and abnormal operation training.

2.3.3.1 Initial training will include the following:

- Demonstration of techniques used in the laboratory such as pipetting, basic use of laboratory equipment and safety practices.
- Discussion with the Group Leader or a senior laboratory technician of written procedures, standard operating procedures, and standard analytical methods.
- Performance by trainee using standard operating procedures and standard analytical methods.
- Documentation and qualification of the trainee proficiency, through the ACD QC Program, and the LLRAG internal QC program.

2.3.3.2 Abnormal operation training - Trainee is taught proper procedures and techniques to use when the written procedures need to be modified because of sample matrix, time constraints, or any other abnormality. Practices for procedural deviation is described in Section 5.0 and 6.3.1 of this plan.

2.3.3.3 Scheduled group meetings are held to discuss safety, operations, personnel, quality assurance/controls, and other problems or subjects. Content of discussions and attendance of these meetings are documented by the group leader.

2.3.3.4 Formal courses completed by laboratory personnel at a school or institution are documented by a reference to school records.

2.3.3.5 Retraining and Certification. All personnel in the LLRAG are required to be proficient in the analytical methodology used within the Group. Ongoing proficiency is monitored through the ACD Quality Control Program, by analyzing National Institute of Standards and Technology (NIST) traceable material, by analyzing intracomparison samples from the Environmental Protection Agency's Environmental Monitoring Services Laboratory in Las Vegas (EPA-EMSLV), and by analyzing intracomparison samples from the Department of Energy's Environmental Measurements Laboratory (DOE EML). The group leader reviews recertification information at least once each year. The documentation for certification is kept in the Group Leader's office.

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3.0 DESIGN CONTROL

3.1 New procedures, instrumentation and software programs developed by the LLRAG will be defined, controlled, and verified.

3.1.1 Method and instrumentation adequacy will be verified by cross-checking against an equivalent method or instrument when possible.

3.1.2 Software driven calculations will be manually checked and verified for accuracy.

3.2 The documentation confirming verification will be signed and filed by the Group Leader in his office.

4.0 PROCUREMENT DOCUMENT CONTROL Addressed in the ACD QA Program.

5.0 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

To provide direction for personnel doing the work in a systematic, safe, and controlled manner, the standard analytical methods and standard operating procedures to be used by the LLRAG are listed in Appendix I. A formal process was used in writing these procedures to assure they are correct and complete, including appropriate quantitative acceptance criteria. If deviations occur, they will be documented on the "Record of Sample Analysis" form, (Example in Appendix I), and placed in the sample folder. Modifications to these procedures are reviewed for adequacy when they occur by the group leader or his alternate.

6.0 DOCUMENT CONTROL

Practices to control the documents used in the LLRAG are in place to assure that the procedures are always adequate for their intended use. These practices meet requirements established and documented in the ACD QA Program.

6.1 Distribution. A complete list of updated procedures is kept in each laboratory where they are available to all personnel in the Group. SOP's that detail the specifics of chain-of-custody and sample login are kept in the sample receiving area and in the Group Leader's office.

6.2 Application. The Group Leader is assigned the responsibility to assure that each procedure is used as intended. It is also the Group Leader's responsibility to make sure the correct and updated procedure is available to the personnel as needed.

6.3 Change Control. Adjustments to procedures are occasionally made to assure adequacy for a given analysis. These changes must be made in such a manner so that they do not introduce errors in the analysis. Changes will be recorded on the "Record of Sample Analysis" form, and included in the folder with the appropriate sample analysis

information. These changes may or may not result in a permanent revision to the procedure. Permanent revisions must follow the procedure outlined in QA-AC-000-0500 for Request for Procedure Revision.

6.3.1 Minor Changes. Minor changes are those changes that can be made during the procedure that do not actually impact or affect the final outcome. An example of a minor change is the decision to centrifuge a precipitate instead of letting it settle overnight because of time constraints. These changes are made in the laboratory by personnel as needed. They are documented in a laboratory notebook and on the "Record of Sample Analysis" form if the samples being analyzed are non-routine. Minor changes can be made at the discretion of laboratory personnel and need not be discussed with the Group Leader beforehand.

6.3.2 Major Changes. Major changes could adversely affect the final analytical results. These changes are reviewed and approved by the Group Leader or his alternate. If these changes mandate a revision of the written procedure, the review and approval process will follow the same guidelines used in writing the original procedure to assure they are correct and complete. If the changes are made to accommodate a specific problem, then these changes are documented as described in section 6.3.1 of this document.

7.0 CONTROL OF PURCHASED ITEMS AND SERVICES Addressed in ACD QA program.

8.0 IDENTIFICATION AND CONTROL OF ITEMS

8.1 Samples. Sample integrity will be assured by the following practices:

8.1.1 Receipt and Inspection. All samples received will be inspected for physical damage, improper identification and unexpected conditions according to AC-OP-101-0802. The requestor will be notified immediately of these other than normal conditions before any work is done on the sample. Those other than normal conditions will be noted on the request for analysis. Requestor notification is documented on the request for analysis with date and time.

8.1.2 Handling. Samples will be handled and stored in the laboratory in a manner so as not to affect their composition. This involves preventing contamination and a change in composition. If a sample is damaged in any way it will be disposed of and the requestor notified. Any contact with the customer will be noted on the customers request for analytical services form.

8.1.3 Disposition. Samples will be retained for at least 30 days after all work has been completed and the report has been mailed to the customer unless special retention instructions are given. All special or emergency type samples are retained for 60 days after the emergency is over or until disposal instructions are given by the requestor.

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8.1.4 Chain-of-Custody Samples. Chain-of-Custody samples will be handled according to the following:

AC-OP-101-0802
AC-OP-101-1301
AC-OP-101-0805

9.0 CONTROL OF PROCESS No special processes have been identified in the LLRAG.

10.0 INSPECTION Addressed in the ACD QA Program.

11.0 TEST CONTROL

Measurements must be controlled so that reported results will be within accepted or required tolerances. This control is assured as follows:

11.1 Analytical Methods and Procedures

The methods and procedures used in the laboratory, listed in Appendix I of this document, will be written to contain a calibration procedure for each method or procedure. These procedures will specify the standards to be used, frequency of use, special instruction for obtaining reliable data, and correct treatment of the data obtained, acceptable deviation limits and corrective actions to be taken in the event of a deviation.

11.2 Instruction for the preparation of the standard will be included. When possible, standards will be traceable to NIST or other recognized standards, such as Amersham. When possible, quality controls, supplied by the ACD QC program, will be used.

11.3 Tolerances for all measurements made in the use of the methods will be stated along with limits of error.

12.0 CONTROL OF MEASURING AND TEST EQUIPMENT

No controlled environments have been identified in the LLRAG.

A list of controlled equipment can be found in appendix 2.

12.1 Equipment. The integrity of all equipment, or suitability for its intended use, will be guaranteed by the following practices:

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12.1.1 Analytical Balances. All balances used in the laboratory are calibrated on a six month programmed basis by personnel from the ORNL Plant and Equipment Division. At least once each day when used, they are checked, using Class S certified weights.

12.1.2 Pipets. The dispensing pipets used in the laboratory are calibrated on a six month programmed basis by lab personnel, using water as the calibration standard. This calibration is verified on a daily basis through the use of known counting standards and controls. The pipets are not used if their reproducibility is greater than within 1%. All pipets are repaired, if possible, to bring them within the 1% limit, otherwise they are discarded. All pipet calibrations are documented in a pipet calibration notebook, listing date, weights of aliquots, deviation, temperature, the person doing the calibration, and actions taken to repair or replace the pipette.

12.1.3 Counting Equipment. The calibration for each instrument used to count radioactive samples will be checked each morning before any samples are counted. The calibration checks are recorded in either individual logbooks or in QA files on the ND-9900 counting system by the counting room coordinator.

Each instrument will have a written procedure that describes calibration checks, limits of deviation from known standards, and what steps to take if an instrument is found to be out of calibration.

Calibration standards will be NIST traceable when available. A certificate of calibration of the radioactive source or solution, which includes its stated value and accuracy, that will be used to calibrate a particular instrument will be kept in the Group Leader's office. When an instrument is recalibrated, that information is kept in a file with that instrument.

12.2 Quality of Chemicals. Unless otherwise stated in the method, all chemicals will be ACS reagent grade.

12.3 Labeling of Reagents and Standards. All reagents and standards will be labeled to include: name, concentration, solvent, if other than distilled water, date prepared or received. Improperly labeled materials will be discarded or properly labeled. The preparation of all standards is described in the appropriate Master Manual method to which they apply.

13.0 HANDLING, STORAGE, AND SHIPPING

In most cases the proper handling, storage and shipping of samples should be addressed by the requestor of analysis. Raw milk should be kept refrigerated to prevent spoilage until sample analysis is complete. Other aqueous samples need not be refrigerated. Samples processed by the LLRAG may contain environmental levels of radioactivity, routine laboratory safety should be practiced when handling these samples.

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14.0 INSPECTION, TEST, AND OPERATING STATUS Addressed by ACD QA program and in Section 12.0.

15.0 CONTROL OF NONCONFORMING ITEMS

One of the primary functions of this QA program is to assure timely identification of and to outline the corrective action for any failure, defect, error, deviations, and other conditions which would adversely affect the quality of results. Deficiency identification and correction is an integral part of all methods, procedures and equipment calibration used in the laboratory. Any deficiency or failed calibration will be reviewed by the Group Leader or his alternate and will be corrected before any sample analysis is made which might be impacted by the failure.

16.0 CORRECTIVE ACTION - Addressed in 15.0 and other sections as applicable. Corrective actions relating to daily work activities will be addressed and tracked by the group leader or his alternate. Corrective actions resulting from audits and surveillances will be tracked by the ACD QA Specialist. Corrective actions and appropriate responses will be documented and maintained as LLRAG records.

17.0 QA AND LABORATORY RECORDS

17.1 Records are used in the laboratory to provide traceability of results, control of samples, and data, and to indicate how the work was done, when and by whom. These records consist of the following:

17.1.1 Analysis Request. Samples coming into the laboratory will be accompanied by a request for analytical services form. The requestor will initiate the request containing at least the following information:

- Requestor's name and address
- Analysis required and estimate of concentration
- Date submitted/received
- Requestor's sample identification
- Sample matrix
- A valid charge number

For more information see the SOP AC-OP-101-0802.

17.1.3 Analysis Results. Sample analyses are assigned to personnel in the LLRAG by the Group Leader or his alternate. Information about the samples is discussed along with aliquot amounts and counting times that should be used in order to meet specific detection limits. The chemist or technician who performs the work will record the results of analysis on the analysis results form.

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17.1.4 Analytical Report. When all work has been completed on a group of samples, the chemist or technician will enter the results into the Division's data management system (AnaLIS). The folder containing all sample analysis information is given to the Group Leader or his alternate for final approval. A preliminary report will be generated by AnaLIS and the information on the report is checked against the information recorded on the results form by the Group Leader. The group leader then approves the report and deletes a "HOLD" analysis that will cause AnaLIS to generate two copies of the final report. Both copies of the report are signed and dated by the Group Leader or his alternate. One copy is retained in the folder and the other is mailed to the customer whose name appears on the request for analytical services form.

17.2 Control of Records. Since records provide the evidence needed for any review of the data generated, record control is an integral part of the activities of the laboratory. This control is accomplished through the ACD data management system and record storage within the laboratory as outlined in QA-AC-100-1201. All computer programs used in record control are verified and validated. The data that is computer generated is stored on tapes within the laboratory.

17.3 Retention Time and Storage of Records. The LLRAG's sample and QA records are stored in Room F-18 Building 4500S for one year, then transferred to ORNL Lab Records Department storage area. At Lab Records, the information is stored indefinitely. A complete listing of LLRAG QA records is included in Appendix 4.

18.0 AUDITS - Addressed in ACD QA Program

19.0 SOFTWARE

19.1 Computer Programming. All computer codes used to generate analytical data in the laboratory will be verified using hand calculations. The codes along with the verification are signed by the Group Leader and stored in his office. One person has been designated to do all computer programming, including verification, new programming and modification of old programs as needed. If changes need to be made by other personnel in the group, they may only do so after discussion with and approval of the Group Leader. The original program is retained for archival purposes in the file with subsequent revisions.

19.2 Change Control. Any changes in original design of instrumentation procedures or software will be documented and the changes approved by the group leader.

20.0 OTHER OPERATIONS

20.1 Housekeeping. An important part of the operation of the LLRAG is routine housekeeping. A clean safe work place is essential to the production of quality work. Once each week, the laboratories will be given a routine cleaning. Waste and glassware cans will be emptied when they are full. Hood floors and walls will be wiped and cleaned. The floors will be scrubbed and waxed by the janitorial service when they become soiled.

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Housekeeping is also monitored by the division Safety Officer through quarterly safety and housekeeping inspections.

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Title: APPENDIX 1. RECORD OF SAMPLE ANALYSIS

Rev. 0

RECORD OF SAMPLE ANALYSIS
LOW LEVEL RADIOCHEMICAL ANALYSIS
OAK RIDGE NATIONAL LABORATORY

Request number:

Sample numbers (first-last)

LLL _____

Comments:

1. Instrument calibration data and daily checks stored in G49 45005.

2. Analysis EPA Procedure no.

_____	_____
_____	_____
_____	_____
_____	_____

3. Analysis Benchmanual Procedure no.

_____	_____
_____	_____
_____	_____
_____	_____

4. Analysis Master Manual Procedure no.

_____	_____
_____	_____
_____	_____
_____	_____

5. Deviations:

Prepared by:	Date:
Approved by:	Date:

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QUALITY ASSURANCE PROGRAM

Title: APPENDIX 2. CONTROLLED EQUIPMENT LIST

SEE ATTACHMENT

91123640028

Controlled Equipment List

Low Level Radiochemical Analyses
 J. W. Wade, Supervisor
 August 16, 1989

<u>Item</u>	<u>Description</u>	<u>Location</u>	<u>Calibration Required*</u>	<u>Frequency</u>	<u>Calibration/Check Procedure</u>	<u>Calibration/Check Records</u>
1	Analytical Balance Mettler PE3600 X s/n 40151	4500S,F-47	B	6 mos.	AC-OP-101-1201	Computer record, back up record
2	pH Meter Fisher Model 810	4500S,F-47	C	When used	Fisher Model 810 Instruction Manual	--
3	Analytical Balance Mettler AE163 FAB 38500	4500S,F-47	B	6 mos	AC-OP-101-1201 (TBW)	--
4	Large Refrigerator Fisher Glass Door	4500S,F-48	A	--	--	--
5	Small Refrigerator-Whirlpool	4500S,F-48	A	--	--	--
6	Oven-Blue M (large)	4500S,F-54	A	--	--	--
7	Oven-Blue M Transite Oven	4500S,F-54	A	--	--	--
8	Furnace-X128312	4500S,F-54	A	--	--	--
9	Furnace-X128313	4500S,F-54	A	--	--	--
10	Analytical Balance Mettler AE163 s/n F53182	4500S,F-59	B	6 mos.	AC-OP-101-1201 (TBW)	Computer record back-up record
11	Microwave Oven CEM MDS 81D	4500S,F-59	A	--	--	--
12	Analytical Balance Mettler PE3600 s/nG 38396	4500S,F-59	B	6 mos.	AC-OP-101-1201 (TBW)	Computer record back-up record
13	Analytical Balance Mettler AE163 X-160854	4500S,F-63	B	6 mos. 6 mos.	AC-OP-101-1201 (TBW) AC-OP-101-1201 (TBW)	--
14	pH Meter - Fisher Model 910	4500S,F-59	C	When used	Fisher Model 910 Instruction Manual	--
15	Gamma Counter R&D Instrument IC22285	4500S,F-64	A	--	--	--

<u>Item</u>	<u>Description</u>	<u>Location</u>	<u>Calibration Required*</u>	<u>Frequency</u>	<u>Calibration/Check Procedure</u>	<u>Calibration/Check Records</u>
16	Gas Flow Proportional Counter R&D Instrument X160851	4500S,F-64	A	--	--	--
17	Radium Counter - Ludlum Model 2000 Scales R&D Instrument	4500S,F-64	A	--	--	--
18	G-M Tube Counter R&D Instrument I&C M109549	4500S,F-64	A	--	--	--
19	Alpha, beta counter Tennelec LB5100 X-154263	4500S,G-48	C	6 mos.	AC-MM-2 (0038)	Counting log, maintenance log
20	Alpha, beta counter Tennelec LB4000 X-182267	4500S,G-48	C	6 mos.	AC-MM-2 (00377)	" " " "
21	Gamma Spect. Nuclear Data 9900 X-182043	4500S,G-48	C	6 mos.	AC-MM-2 (00379) (TBW)	" " " "
22	Liquid Scintillation Counter Packard X-160846	4500S,G-48	C	6 mos.	AC-MM-2 (00378)	" " " "
23	Analytical Balance Mettler PE3600 s/n E55493	4500S,F-63	B	6 mos.	AC-OP 101 1201 (TBW)	Computer records back-up record

*Calibration: A = Not required
B = Recall Program (I&C or P&E)
C = Calibration by user

TBW = To be written

QUALITY ASSURANCE PROGRAM

Title: APPENDIX 3. LLRAG ORGANIZATION CHART

Low Level Radiochemical Analysis Group

Group Leader
J.W. Wade

M.T. Davis
N.A. Teasley
L.D. Bible
C.R. Cooper
P.S. Gouge
C.C. Granger
R.D. Johnson
S.H. Prestwood

Group Leader Alternate
N.A. Teasley

Sample Custodian
C.C. Granger
R.D. Johnson (Alt.)

Counting Room Coordinator
S.H. Prestwood
C.C. Granger (Alt.)
R.D. Johnson (Alt.)

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QUALITY ASSURANCE PROGRAM

Title: APPENDIX 4. QA RECORDS LIST

See Attachment

91127640032

APPENDIX 4

Records List

Requirements: Specific records to be controlled and retained and the length of retention. Include documents that would be required to allow this project to be repeated with the same results.

<u>Name of Record</u>	<u>Retention Period</u>	<u>Master File Point</u>	<u>Duplicate File Point</u>
QA Plan	Lifetime	ACD QA Specialist	Group Leader
Internal QC Raw Data	5 yr	LLRAG QC files/logs	Electronic files
Instrument Calibrations	5 yr	QC Files/logs	Electronic files
<hr/>			
EPA Intracomparison (EMSL- Las Vegas)			
Raw data	5 yr	Notebooks/Logs	EPA Report
Forms		Project File	EPA Report
Final reports		Group Leader	EPA-Las Vegas
<hr/>			
ACD QC Program Data			
Raw Data	6 mo	Group Leader	Electronic files
Results	10 yr		QC Officer/Electronic files
<hr/>			
Statistical Evaluation of Methods Data	10 yr	Chemist	Group Leader/QC Officer
Customer Requests/Reports	Indefinitely	Sample receiving	Customer/ ORNL Lab Records
Technical notebooks	25 yr	Principal investigator	Stored in Lab Records after completion
<hr/>			
Technician Training Records	TO BE DECIDED AT A LATER DATE		
Qualification Data			
Certification Files			
<hr/>			
Audit reports	10 yr	QA Specialist	Group Leader
Quality Investigations and Reports	10 yr	QA Specialist *	Group Leader
Surveillance Reports	5 yr	QA Specialist *	Group Leader
Corrective Action Reports	5 yr	QA Specialist *	Group Leader
Action Plans (general use)	2 yr	QA Specialist *	Group Leader

Retention Times are assumed to begin after completion of an activity.

* Group Leader may be master file point and QA Specialist or QC Officer the duplicate file point in some instances.

August 16, 1989

91123640033

STANDARD ANALYTICAL METHOD

Title: APPENDIX 5. LIST OF PROCEDURES

SEE ATTACHMENT

91127640034

APPENDIX 5

LIST OF PROCEDURES

ACD MASTER MANUAL PROCEDURES

<u>Method</u>	<u>Number</u>	<u>Tab</u>
<u>Americium</u> in Large Volumes of Water	2 31032	Am-1
Radiochemical Method for <u>Americium</u> and Curium in Soil and Sediments	2 31034	Am-2
Measurement of <u>Beta</u> Radioactivity by Cerenkov Counting	2 0964	B-1
<u>Lead-210</u> in Environmental Samples	2 31441	Pb-1
Radiochemical Method for <u>Neptunium-237</u> in Water	2 31533	Np-1
Radiochemical Method for <u>Plutonium</u> in Water	2 31624	Pu-1
Radiochemical Method for <u>Plutonium</u> in Soil and Sediments	2 31625	Pu-2
Radiochemical Method for <u>Plutonium</u> Isotopes in Fish	2 31626	Pu-3
Radiochemical Method for <u>Plutonium</u> in Air Filters	2 31627	Pu-4
<u>Plutonium</u> Isotopes in Vegetation. Radiochemical Method	2 31628	Pu-5
Radiochemical Determination of <u>Radium-226</u>	2 31681	Ra-1
Radiochemical Method for <u>Strontium</u> in Water	2 21802	Sr-1
Radiochemical Method for <u>Strontium-90</u> in Fish	2 21803	Sr-2
Radiochemical Method for <u>Strontium</u> in Soil and Sediments	2 21804	Sr-3
Radiochemical Method for <u>Strontium</u> in Air Filters	2 21805	Sr-4
<u>Strontium-90</u> in Vegetation. Radiochemical Method	2 21806	Sr-5
Radiochemical Method for <u>Thorium</u> Isotopes in Water	2 31871	Th-1
<u>Thorium</u> Isotopes in Soils and Sediments. Radiochemical Method	2 31873	Th-2
<u>Thorium</u> Isotopes in Vegetation. Radiochemical Method	2 31874	Th-3
<u>Thorium</u> Isotopes in Air Filters. Radiochemical Method	2 31875	Th-4
Radiochemical Method for <u>Uranium</u> in Water	2 31921	U-1

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Method	Number	Tab
Radiochemical Method for <u>Uranium</u> Isotopes in Soil and Sediments	2 31923	U-2
Radiochemical Method for <u>Uranium</u> in Air Filters	2 31924	U-3
<u>Uranium</u> Isotopes in Vegetation. Radiochemical Method	2 31925	U-4
Gross Alpha and Beta Radioactivity in Environmental Samples	2 2199	
Measurement of Y-90 in Isotope Product Solutions	9 0733963	
Sequential Analysis of Sr-90, Uranium and Plutonium Isotopes in Ashed Fish	2 22001	
Radiochemical Method for Alpha-Emitting Radium Isotopes in Water	2 21997	

EPA PROCEDURES

Gamma Emitting Radionuclides	901.1
Alpha Emitting Radium Isotopes	903.0
Radium-228	904.0
Radioactive Strontium	905.0
Tritium	906.0

STANDARD OPERATING PROCEDURES

AC-OP-101-1301	Sample Security and Storage
AC-OP-101-0802	Sample Receiving and Chain-of-Custody

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