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## Quality Assurance Program Plan for the Radiological Survey Activities Program — Uranium Mill Tailings Remedial Action Project

QAP-X-91-HSRD-001

R. R. Knott  
C. A. Little

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**HEALTH AND SAFETY RESEARCH DIVISION**

Waste Research and Development Programs  
(Activity No. EX 20 40 01 0; 3180000)

**QUALITY ASSURANCE PROGRAM PLAN FOR THE RADIOLOGICAL SURVEY  
ACTIVITIES PROGRAM — URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT**

R. R. Knott — Quality Assurance Coordinator  
B. A. Berven — Associate Division Director  
P. S. Rohwer — Section Head  
C. A. Little — Group Leader

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OAK RIDGE NATIONAL LABORATORY  
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APPROVAL SIGNATURES

R. R. Knott  
R. R. Knott, PAG QA Coordinator

12-7-90  
Date

Craig A. Little  
C. A. Little, PAG Group Leader

12/19/90  
Date

B. A. Berven  
B. A. Berven, EMAS Section Head

1/8/91  
Date

S. V. Kaye  
S. V. Kaye, HASRD Division Director

1/10/91  
Date

P. B. Hoke  
P. B. Hoke, ORNL QA Manager

1/14/91  
Date

Tom L. Metchie  
DOE UMTRA Project Manager

1/31/91  
Date



## ABSTRACT

The Pollutant Assessments Group (PAG) at the Grand Junction Office (GJO), Colorado, of Oak Ridge National Laboratory (ORNL) is responsible for surveying designated sites in the vicinity of 24 inactive mill sites involved in the Department of Energy's (DOE) Uranium Mill Tailings Remedial Action Project (UMTRAP). The purpose of these surveys is to provide a recommendation to DOE whether to include or exclude these sites from UMTRAP based on whether the on-site residual radioactive material (if any) originated from the former mill sites, and radiation levels on-site are in excess of appropriate Environmental Protection Agency (EPA) criteria.

This report describes the Quality Assurance Plan (QAP) for the PAG in conducting all activities related to UMTRAP. All quality assurance provisions given by the DOE, DOE/UMTRA and ORNL organizations are integrated into this plan. Specifically, this report identifies the policies and procedures followed in accomplishing the PAG/UMTRA QA program, identifies those organizational units involved in the implementation of these procedures, and outlines the respective responsibilities of those groups.



## 1. INTRODUCTION

The Pollutant Assessments Group (PAG), Grand Junction Office (GJO), of the Health and Safety Research Division (HASRD) at Oak Ridge National Laboratory (ORNL) currently participates in the Department of Energy's (DOE) Uranium Mill Tailings Remedial Action Project (UMTRAP) as the Inclusion Survey Contractor (ISC) and the Independent Verification Contractor (IVC). The purpose of ISC is to survey designated sites potentially contaminated with radioactive material originating from 24 inactive uranium mill sites in UMTRAP and make recommendations as to whether the site should be included for or excluded from further consideration by UMTRAP. These recommendations are based on radiological surveys conducted at these sites to ascertain if sufficient radioactive material is present to exceed the Environmental Protection Agency (EPA) criteria established for UMTRAP (40 CFR 192)<sup>1</sup> as applied in the *Summary Protocol — UMTRAP Vicinity Properties* and the *Vicinity Properties Management and Implementation Manual (VPMIM)*.<sup>2</sup> The purpose of the IVC is to verify that remedial action projects have been cleaned up and are within acceptable EPA guidelines. Detailed field survey procedures, sampling procedures, and methodology employed by PAG for all such activities are described in various documents.<sup>3-6</sup>

### 1.1 PURPOSE

The purpose of this document is to provide general information as to the organization, conduct, and documentation of PAG's Quality Assurance Plan (QAP) for all UMTRAP activities and to integrate quality assurance (QA) provisions given by DOE.<sup>5,7,8</sup>

### 1.2 SCOPE

The PAG/UMTRAP QAP applies to all activities performed by PAG and ORNL for UMTRAP or its subcontractors in support of PAG. Specifically, the PAG/UMTRAP QAP will (1) identify the organizational units involved in the implementation of the QAP and outline their responsibilities and (2) identify the policies and procedures for accomplishing the PAG/UMTRAP QA program.

### 1.3 PROGRAM

The QA program for the PAG/UMTRAP is coordinated by the PAG QA coordinator (QAC) under the direction of the ORNL QA manager (Table 1).

The elements contained in this QAP are implemented through written procedures by the ORNL line organization. These written procedures describe all activities of the ISC and IVC (PAG/UMTRAP). The generic procedures for the ISC in the DOE/UMTRAP project are provided in the *Summary Protocol — UMTRAP Vicinity Properties: Identification — Characterization — Inclusion*.<sup>9</sup> The ISC responsibilities are defined and described in the *Vicinity Properties Management and Implementation Manual*.<sup>2</sup> Specific methods and procedures employed by PAG for personnel training and subsequent daily operations are given in the *Pollutant Assessments*

*Group Procedures Manual.*<sup>3</sup>

All activities conducted within PAG UMTRAP will follow procedures specified in the above-referenced documents. Revisions to these documents will be enacted by the PAG project manager or the UMTRAP project manager. QA activities to monitor the use of these procedures shall also be documented with appropriate forms and a monthly report to the PAG project manager.

<b>Table 1. Modular profile of the Quality Assurance Program Plan for the Radiological Survey Activities Program – Uranium Mill Tailings Remedial Action Project</b>				
<b>NQA-1 basic element</b>	<b>To be applied (Y/N)</b>	<b>Implementing ORNL QA procedure(s)</b>	<b>Project-specific procedures</b>	<b>See indicated QA plan section</b>
1. <i>Organization</i>	Y	QA-L-1-100	6	2.1
2. <i>Quality Assurance Program</i>	Y	QA-L-2-100 QA-L-2-101 QA-L-2-103 QA-L-2-105 QA-L-2-106	1,2,3,5,6,9	2.2
3. <i>Design Control</i>	Y	QA-L-3-100 QA-L-3-101 QA-L-3-102	2,6	2.3
4. <i>Procurement Document Control</i>	Y	QA-L-4-100 QA-L-4-101	6	2.4
5. <i>Instructions, Procedures, and Drawings</i>	Y	QA-L-5-100	2,6	2.5
6. <i>Document Control</i>	Y	QA-L-6-100	2,6	2.6
7. <i>Control of Purchased Items and Services</i>	Y	QA-L-7-100 QA-L-7-101 QA-L-7-102	6	2.7
8. <i>Identification and Control of Items</i>	Y	QA-L-8-100	6	2.8
9. <i>Control of Processes</i>	Y	QA-L-9-100	6	2.9
10. <i>Inspection</i>	Y	QA-L-10-100	2,6	2.10
11. <i>Test Control</i>	Y	QA-L-11-100	6	2.11
12. <i>Control of Measuring and Test Equipment</i>	Y	QA-L-12-100	6	2.12
13. <i>Handling, Storage, and Shipping</i>	Y	QA-L-13-100	6	2.13
14. <i>Inspection, Test, and Operating Status</i>	Y	QA-L-14-100 QA-L-14-101	6	2.14

Table 1 (continued)				
NQA-1 basic element	To be applied (Y/N)	Implementing ORNL QA procedure(s)	Project- specific procedures	See indicated QA plan section
15. <i>Control of Nonconforming Items</i>	Y	QA-L-15-100	6	2.15
16. <i>Corrective Action</i>	Y	QA-L-16-100 QA-L-16-101 QA-L-16-102 QA-L-16-103	6	2.16
17. <i>Quality Assurance Records</i>	Y	QA-L-17-100	2,6	2.17
18. <i>Audits and Surveillances</i>	Y	QA-L-18-100 QA-L-18-101 QA-L-18-102	2,6	2.18
19. <i>Software</i>	Y	QA-L-19-100		2.19

## 2. QUALITY ASSURANCE PLAN DESCRIPTION

### 2.1 ORGANIZATION

This section describes the administrative, financial, and QA organization for ORNL.

- The general administrative organization for ORNL is shown in Fig. 1. Seven associate directors are managed by the ORNL director. The HASRD director is managed by the Associate Director for Biomedical and Environmental Sciences.
- The administrative organization detailed in Fig. 2 shows PAG in the Assessment Technology section of HASRD.
- Financial organization illustrated in Fig. 3 shows UMTRAP under the Waste R&D programs managed by the Associate Director for Advanced Energy Systems.
- Component activities of PAG are presented in Fig. 4.
- A summary organizational structure for PAG, Grand Junction Office, Colorado, is shown in Fig. 5.
- The QA organization for HASRD is shown in Fig. 6.

#### 2.1.1 Requirements

Document and control the organization, functional responsibilities (Table 2), levels of authority, and lines of communication for activities affecting quality.<sup>7</sup>

#### 2.1.2 Responsible Party

- (1) The QA programs of ORNL and this PAG/UMTRAP QAP interface directly with the DOE/UMTRAP QAP<sup>6</sup> and DOE Order 5700.6A—Quality Assurance.<sup>5</sup> For each of these organizations, conduct of the QA program follows the appropriate responsible individual.
- (2) Responsibility for QA in any PAG/UMTRA project shall be delegated to the project manager.
- (3) Activities affecting QA within the PAG/UMTRA projects are reported directly to the PAG QAC.

## 2.2 QUALITY ASSURANCE PROGRAM

### 2.2.1 Requirements

- (1) All personnel entering PAG/UMTRA projects shall receive training to acquire the necessary skills to perform their responsible tasks.
- (2) Training shall consist of all appropriate procedural documents and on-the-job training by experienced PAG/UMTRAP personnel.
- (3) Successful completion of training shall be documented by a detailed training record in the individual's personnel file.
- (4) All subcontract personnel shall be trained in a similar fashion by the appropriate subcontract personnel, with acknowledgement in established personnel files.

### 2.2.2 Responsible Party

ORNL management shall implement those QA requirements that are applicable to all projects given by DOE in DOE Order OR 5700.6A , Quality Assurance,<sup>5</sup> and by Martin Marietta Energy Systems, Inc. (Energy Systems), in Quality Procedures<sup>7</sup> and GP-5, Quality Assurance Program.<sup>10</sup>

## 2.3 DESIGN CONTROL

(Based on ANSI/ASME NQA-1, Sect. II-3<sup>11</sup>).

### 2.3.1 Requirements

The design must be defined, controlled, and verified.<sup>7</sup>

### 2.3.2 Responsible Party

PAG is responsible for the following:

- (1) Authorize conceptual design, provide technical criteria, and then review and approve design for PAG/UMTRA projects.
- (2) Perform design activities in accordance with authorization and technical criteria.
- (3) Determine if completed design is satisfactory for use.



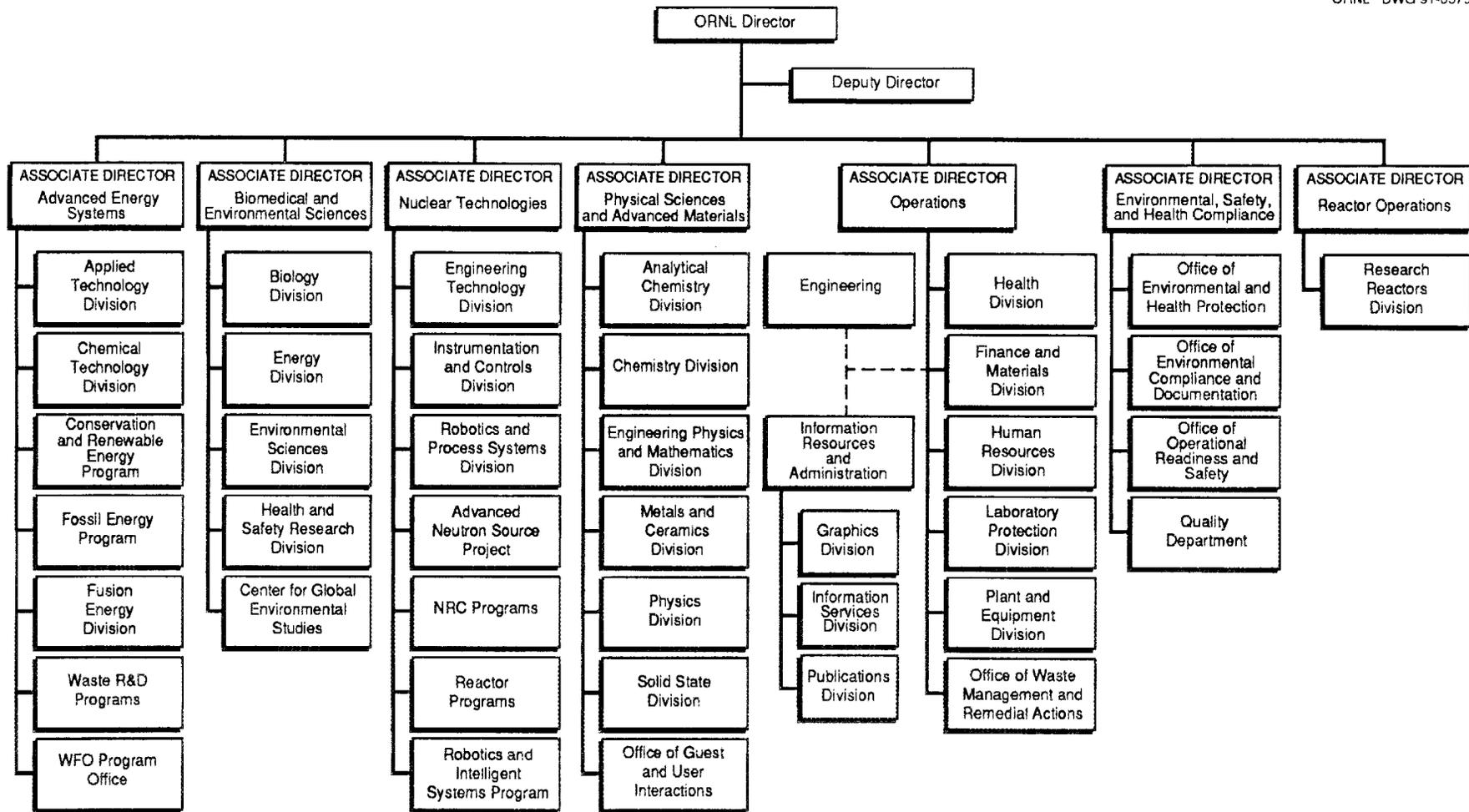


Fig. 1. General administrative organization for ORNL.

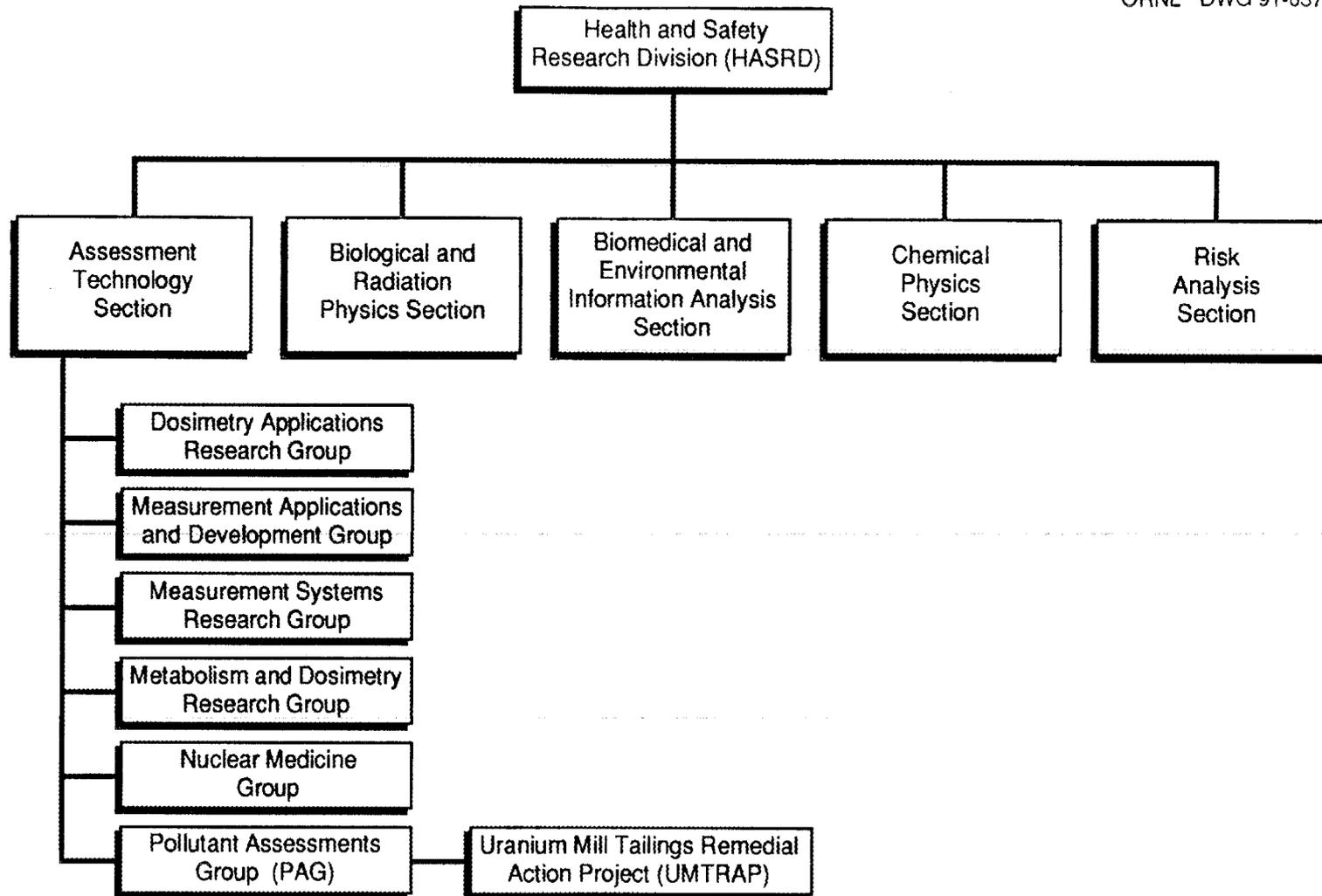
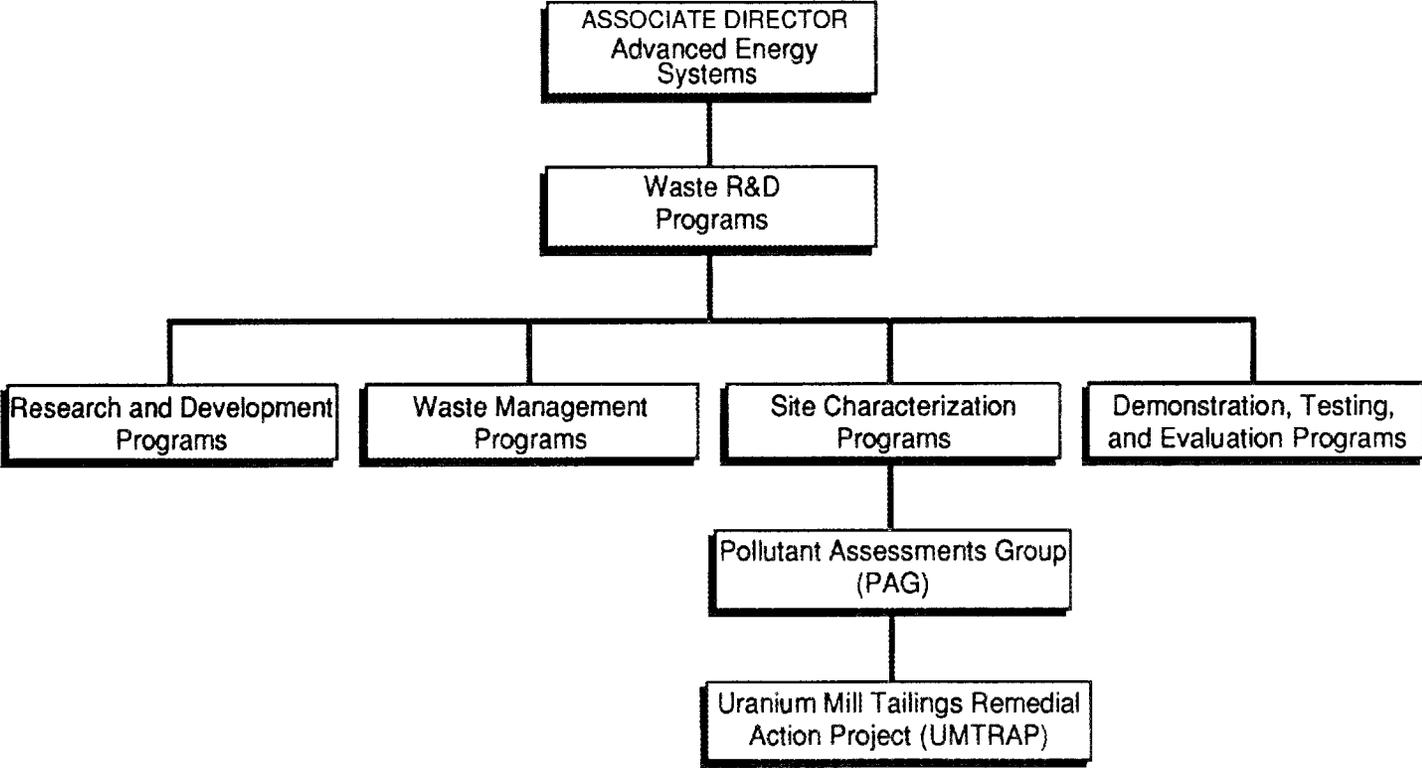
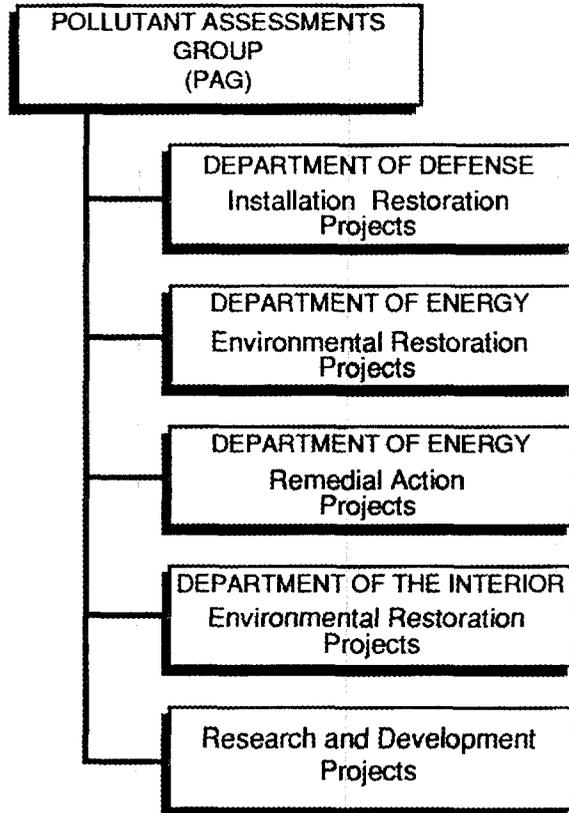


Fig. 2. Administrative organization for the Health and Safety Research Division (HASRD).



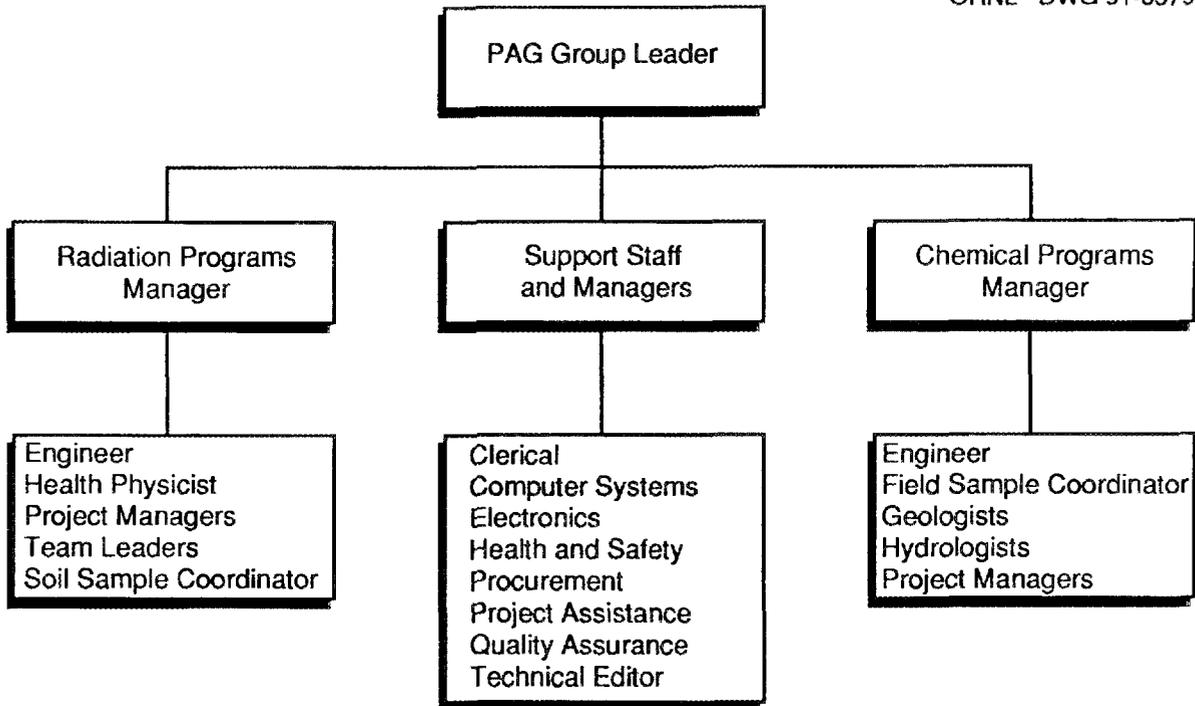
**Fig. 3. Financial organization of the Pollutant Assessments Group (PAG).**

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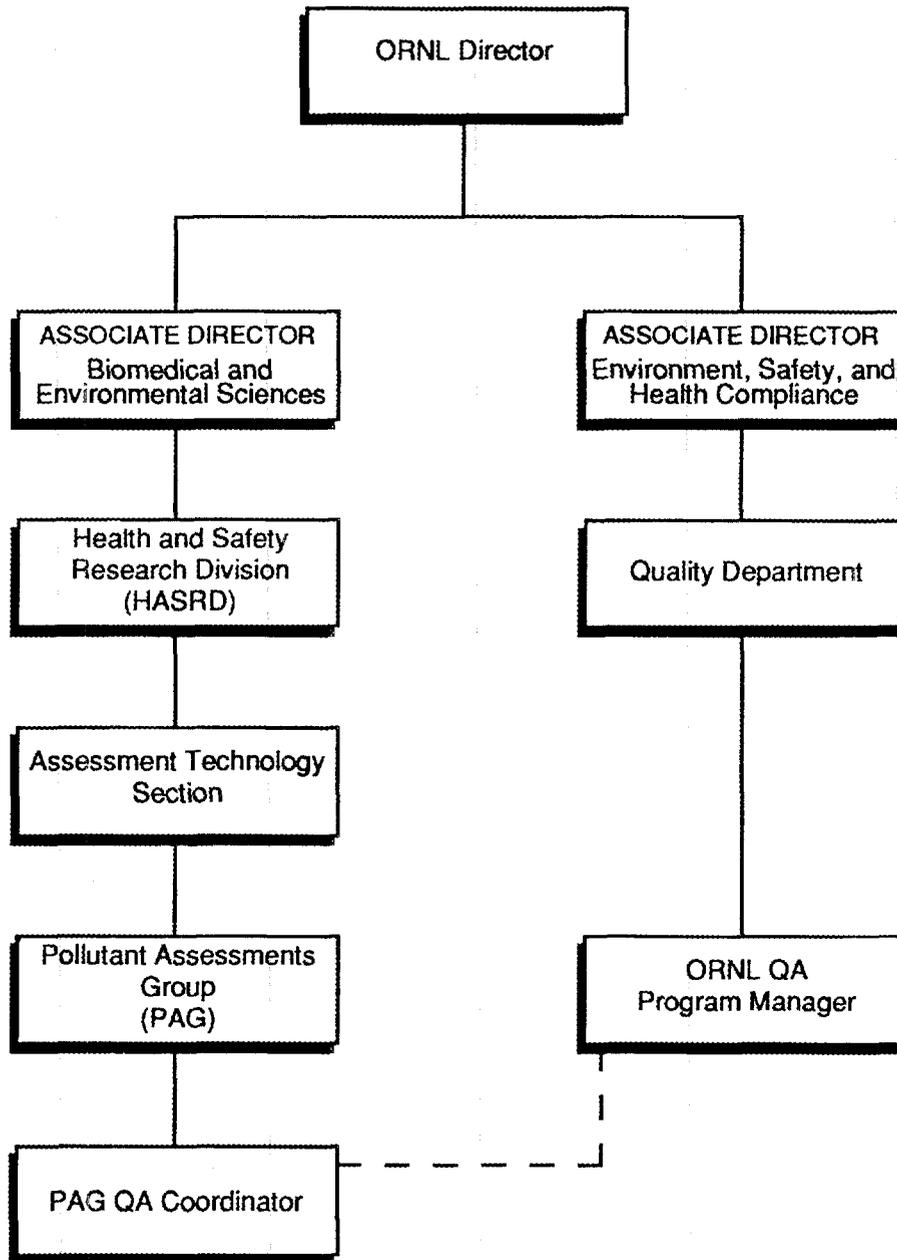


**Fig. 4. Pollutant Assessments Group (PAG) component activities.**

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**Fig. 5. Pollutant Assessments Group (PAG) summary organization, Grand Junction Office, Colorado (GJO).**



**Fig. 6. ORNL quality assurance (QA) organizational plan.**

## 2.4 PROCUREMENT DOCUMENT CONTROL

### 2.4.1 Requirements

- (1) Ensure adequate quality is included or invoked on documents (e.g., purchase requisitions, purchase orders, and specifications) for procurement of items.
- (2) Establish measures ensuring purchased items conform to procurement documents.<sup>7</sup>
- (3) Require the supplier to meet applicable specifications of UMTRAP for all items and services procured by contract.
- (4) Ensure specifications are written in the ORNL Purchase Order Agreement, and if needed, discuss with the supplier at the time of the contract award by representatives of UMTRAP ensuring the specifications are clearly understood by all parties concerned.

### 2.4.2 Responsibility Party

Inclusion of appropriate specifications in the contracts shall be the shared responsibilities of the PAG project manager, UMTRAP project manager, and the purchasing agent in Energy Systems' purchasing department.

## 2.5 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

(Based on ANSI/ASME NQA-1, Sect. II-5,<sup>11</sup> and DOE Order OR 5700.6A<sup>5</sup>).

### 2.5.1 Requirements

- (1) All activities affecting quality will be prescribed by and performed in accordance with documented instructions, procedures, or drawings of a type appropriate to circumstances.
- (2) These documents shall include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished.<sup>7</sup>
- (3) All aspects of UMTRAP activities, from the generic to the specific, are described in UMTRAP documentation (refs. 10, 9, and 2 respectively). These aspects encompass all instructions, procedures, and requirements for drawings as follows:
  - procedures to identify properties that are potentially contaminated with material originating from former uranium mill sites,
  - procedures to acquire consent forms from property owners;
  - preparation of property site drawings and maps;

- procedures to ensure dependability of detector equipment;
- procedures used to conduct inclusion radiological surveys;
- procedures used in analysis of samples collected in the field;
- procedures to inspect and decontaminate personnel and equipment;
- preparation of radiological survey reports;
- procedures to ensure document control; and
- procedures to submit survey reports, inclusion recommendations, and necessary data to DOE and appropriate DOE contractors.

### **2.5.2 Responsible Party**

All documents and letters shall be reviewed by the PAG project manager or authorized proxy to ensure compliance with accepted procedures, and approval shall be acknowledged by signature on the transmittal letter.

## **2.6 DOCUMENT CONTROL**

### **2.6.1 Requirements**

- (1) The preparation, issuance, and change of documents that specify quality requirements for items or prescribe activities affecting quality (fitness for intended use) shall be controlled to ensure that correct documents are being employed and are available at the location where they are to be used.
- (2) Such documents, including changes thereto, shall be reviewed for adequacy and approved for release by authorized personnel.<sup>7</sup>

### **2.6.2 Responsible Party**

- (1) All PAG documents and correspondence will be reviewed for adequacy, conformance, and completeness and issued either by the PAG or UMTRAP project manager.
- (2) All reports shall be reviewed by at least two PAG staff members including the team leader who conducted the investigation.
- (3) Inclusion/exclusion letters of recommendation and issuance of radiological survey reports will be acknowledged by signature of the PAG or UMTRAP project manager or his designee.

## **2.7 CONTROL OF PURCHASED ITEMS AND SERVICES**

### **2.7.1 Requirements**

- (1) Requirements necessary to control procuring items or services shall be invoked to ensure conformance with specified requirements.
- (2) As a minimum, procuring special items and services for all ORNL projects and programs shall be controlled.
- (3) Such control shall provide for source evaluation and selection, evaluation of objective evidence of quality furnished by the supplier, and examination of items or services upon delivery or completion.<sup>7</sup>
- (4) All items, with the exception of routine office supplies, shall be visually inspected by the individual using the item, with any nonconformances reported, verified, and documented in accordance with written procedures.

### **2.7.2 Responsible Party**

- (1) To ensure specification compliance, the procurement of items and services is controlled by PAG and is based on criteria specified in the contract purchase order prepared by PAG.
- (2) The purchasing department of Energy Systems reviews the purchase order agreement for completeness and then bids the contract to qualified bidders according to procedures approved by DOE and ORNL.
- (3) Supplier bids are reviewed by the purchasing agent, and the lowest qualified bid is recommended to PAG personnel.
- (4) The qualifications and bids are reviewed by either the PAG or UMTRAP project manager for acceptance.

## **2.8 IDENTIFICATION AND CONTROL OF ITEMS**

### **2.8.1 Requirements**

- (1) Establish controls to ensure only correct and accepted items are used or installed.<sup>7</sup>
- (2) Control all equipment, spare parts, and high-quality items such as computer, survey, laboratory, and sampling equipment.
- (3) Any items improperly identified or defective in workmanship shall be identified with "hold" tags and handled in accordance with written procedures.

## 2.8.2 Responsible Party

- (1) Electronic spare parts and items received in Oak Ridge, Tennessee, shall be identified and documented by the Instrumentation and Controls Division (I&C) in a manner that provides direct traceability to the documentation that verifies the acceptability of the items.
- (2) High-quality items received at the PAG project office shall be identified, documented, and inspected by the user of the item.

## 2.9 CONTROL OF PROCESSES

### 2.9.1 Requirements

- (1) In accordance with specified requirements,<sup>7</sup> qualified personnel shall perform special processes that control or verify quality.
- (2) Control processes affecting the quality of items.
- (3) Personnel and equipment shall be protected from the risk of contamination, and all health and safety concerns shall be addressed.
- (4) Equipment decontamination will be conducted as provided in Sect. TE-073 of the *Pollutant Assessments Group Procedures Manual*.<sup>3</sup>

### 2.9.2 Responsible Party

Processes that control or verify the quality of an item or process are documented on the key personnel list (see Appendix), which is maintained in the PAG QAC office in Grand Junction, Colorado. This list also documents the designated backups for all key personnel of the PAG, Grand Junction Office. The key personnel backup list will be updated by the PAG QAC on an as-needed basis.

## 2.10 INSPECTION

### 2.10.1 Requirements

Plan and execute inspection activities to verify conformance of an item or activity to specified requirements.<sup>7</sup>

### 2.10.2 Responsible Party

- (1) Specific inspection responsibilities are addressed in the *Pollutant Assessments Group Procedures Manual*.<sup>3</sup>
- (2) Overall inspection responsibilities are given to the PAG/UMTRAP project manager but may be delegated to an appropriate individual.

- (3) Purchased equipment delivered to Oak Ridge, Tennessee, is inspected by I&C according to specific procedures as documented in the *ORNL Quality Assurance Manual*.<sup>7</sup>

## 2.11 TEST CONTROL

### 2.11.1 Requirements

- (1) Plan and execute required tests to verify conformance of an item to specifications and to demonstrate satisfactory reliability.
- (2) Specify characteristics to be tested and test methods to be employed.
- (3) Document test results and evaluate their conformance with acceptance criteria.<sup>7</sup>

### 2.11.2 Responsible Party

Test Control requirements are to be maintained by the PAG group leader.

## 2.12 CONTROL OF MEASURING AND TEST EQUIPMENT

(Based on ANSI/ASME NQA-1, Sect. II-12<sup>11</sup>).

### 2.12.1 Requirements

- (1) QA plans shall list all special calibration requirements.<sup>7</sup>
- (2) According to documented procedures, record all quality assurance documentation related to instrument calibration. Detailed calibration instructions for equipment and instruments used by PAG are found in the *Pollutant Assessments Group Procedures Manual*.<sup>3</sup>
- (3) Meet program objectives and ensure safe, reliable, cost-effective, and timely operation.
- (4) Control and calibrate as necessary, all measuring and test equipment used during research, development, manufacturing, installation, construction, preoperational testing, operation, and maintenance activities.
- (5) As a minimum, calibrate before initial use and in a timely manner during routine use, all measuring and test equipment relied upon for safe operation, acquisition of reportable experimental data, and inspection activities.
- (6) To ensure correct response, prior to daily use, check portable instrumentation.
- (7) Regularly conduct conformance testing on equipment.

- (8) Routinely calibrate instruments according to the operating instructions for that instrument, and where applicable and warranted, use standard solutions traceable to the National Institute of Standards and Technology (NIST).

#### **2.12.2 Responsible Party**

Control of measuring and test equipment shall be maintained by the GJO resident electronics technician.

### **2.13 HANDLING, STORAGE, AND SHIPPING**

#### **2.13.1 Requirements**

- (1) Conduct handling, storage, and shipping of items according to established work and inspection instructions, drawings, specifications, shipment instructions, or other pertinent documents or specified procedures used to conduct the activity.<sup>7</sup>
- (2) Control handling, storage, cleaning, packaging, shipping, and preservation of items to prevent damage or loss and to minimize deterioration or loss of integrity.

#### **2.13.2 Responsible Party**

The individual in the PAG/UMTRAP activities performing these tasks shall be responsible for ensuring proper coordination and conformance of this activity in accordance with written procedures.

### **2.14 INSPECTION, TEST, AND OPERATING STATUS**

#### **2.14.1 Requirements**

- (1) Identify the status of inspection and test activities, either on items or in documents traceable to the items, to ensure that required inspections and tests are performed.
- (2) Ensure that items which have not passed the necessary inspections or tests are not inadvertently installed, used, or operated.<sup>7</sup>
- (3) Ensure that equipment used in the PAG/UMTRAP activities has attached stickers indicating date of last inspection and date of next inspection according to PAG requirements and procedures.
- (4) Maintain nonconforming equipment reports in a separate file.
- (5) Relocate nonconforming equipment where it cannot be used.

### **2.14.2 Responsible Party**

The inspection, test, and operating status on all equipment is maintained by the electronics technician.

## **2.15 CONTROL OF NONCONFORMING ITEMS**

(Based on ANSI/ASME NQA-1, Sect. II-15<sup>11</sup>).

### **2.15.1 Requirements**

- (1) Control nonconforming items to prevent inadvertent installation or use.
- (2) Control and correct nonconforming items as described in the *ORNL Quality Assurance Manual*.<sup>7</sup>

### **2.15.2 Responsible Party**

Each division and program shall ensure prompt identification, control, and disposition of items that do not conform to drawings and specifications.<sup>7</sup>

## **2.16 CORRECTIVE ACTION**

(Based on ANSI/ASME NQA-1, Sect. II-16, ref. 4).

### **2.16.1 Requirements**

- (1) Investigate and document all significant quality problems for management review and, when appropriate, take corrective actions.<sup>7</sup>
- (2) Promptly and practically identify and correct conditions adverse to quality. In the case of a condition significantly adverse to quality, determine the cause of the condition, and take corrective action to prevent recurrence.
- (3) Document the identification, cause, and corrective action for significant conditions adverse to quality on the appropriate form, and report to responsible levels of management.

### **2.16.2 Responsible Party**

The QA coordinator (QAC) shall take follow-up action to verify implementation of corrective actions.

## 2.17 QUALITY ASSURANCE RECORDS

### 2.17.1 Requirements

- (1) Prepare, and maintain records that furnish documentary evidence of quality, such as inspections, audits, and corrective actions, in a file in the PAG project office in accordance with the provisions outlined in the *ORNL Quality Assurance Manual*<sup>7</sup> and the Quality Assurance Documents List (Table 3).
- (2) Protect records against damage, deterioration, or loss.
- (3) Establish and document requirements and responsibilities for record transmittal, distribution, retention, maintenance, and disposition.<sup>7</sup>
- (4) Maintain these records until appropriate representatives approve ultimate disposition.

### 2.17.2 Responsible Party

The PAG QA coordinator (QAC) shall meet the requirements of maintaining the QA records.

## 2.18 AUDITS

### 2.18.1 Requirements

- (1) Perform planned and scheduled audits to verify compliance with all aspects of the QA program and to determine its effectiveness.
- (2) Perform audits in accordance with written procedures and checklists by personnel who do not have direct responsibility for performing audited activities.
- (3) Document audit results, and report to responsible management for review.
- (4) Conduct audits and surveillances of subcontract performance.
- (5) All audits and surveillances conducted by the PAG QAC or qualified designee shall be performed in accordance with written procedures as outlined in QA-L-18-100, 101, and 102 of the *ORNL Quality Assurance Manual*.<sup>7</sup>
- (6) Follow-up action for discrepancies noted during the audit or surveillance shall be taken and implemented as needed.
- (7) All follow-up actions shall be documented and properly filed in the PAG QA file.

### **2.18.2 Responsible Party**

- (1) To verify compliance with all aspects of the QA program and to determine its effectiveness, planned and scheduled audits shall be performed internally by the ORNL QAC for HASRD and externally by the DOE/UMTRA Project Office.
- (2) Follow-up action shall be taken by the responsible line organization when necessary, and the corrective actions will be monitored by the ORNL Manager of Quality Audits.<sup>7</sup>
- (3) Audit and surveillance results shall be documented and reported to and reviewed by responsible management.

## **2.19 SOFTWARE**

### **2.19.1 Requirements**

Verify all computer codes acquired, modified, or developed during or in support of a PAG/UMTRA project. Validation is required at the responsible manager's option.

### **2.19.2 Responsible Party**

The procedure is to be applied in a graded manner according to agreements reached between the responsible manager and the Quality Assurance Specialist (QAS).<sup>7</sup>





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## ACRONYMS AND INITIALISMS

DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
GJO	Grand Junction Office, Colorado
HASRD	Health and Safety Research Division
I&C	Instrumentation and Controls Division
ISC	Inclusion Survey Contractor
IVC	Independent Verification Contractor
NIST	National Institute of Standards and Technology
ORNL	Oak Ridge National Laboratory
PAG	Pollutant Assessments Group
QA	Quality Assurance
QAC	Quality Assurance Coordinator
QAP	Quality Assurance Plan
R&D	Research and Development
UMTRAP	Uranium Mill Tailings Remedial Action Project
VPMIM	Vicinity Properties Management and Implementation Manual



## GLOSSARY OF SELECTED TERMS

### **Accept**

To certify that items(s), or specific characteristics of the items(s), conform to the criteria, requirements, standards, or limits established by the specified QA documents.

### **Acceptance criteria**

Specified limits placed on characteristics of an item, process, or service defined in codes, standards, or other requirement documents.

### **Audit**

A planned and documented activity performed to determine by investigation, examination, or evaluation of objective evidence the adequacy of, and compliance with, established procedures, instructions, drawings, and other applicable documents, and effectiveness of implementation. An audit should not be confused with surveillance or inspection activities performed for the sole purpose of process control or product acceptance. *See also* **Quality assurance audit**.

### **Calibration**

The comparison of a measurement system or device of unverified accuracy to a measurement system or device of known and greater accuracy to detect or correct any variation from required performance specifications of the unverified measurement system or device.

### **Calibration standard**

- *National reference standard* – A standard maintained at the National Institute of Standards and Technology (NIST) or other institutions as designated by congressional statute.
- *Reference standard* – A standard of the highest accuracy order in a calibration system which establishes the basic accuracy values for that system.
- *Transfer standard* – A standard which has been calibrated against a standard of higher order of accuracy.
- *Working standard* – A standard maintained at other standards laboratories calibrated against a Primary Standard.

### **Contractor**

The individual or organization entering into a contract, subcontract, or purchase order issued by purchaser. *See also* **Supplier**.

### **Controlled documents**

Any document for which distribution and status are to be kept current by the issuer in order to ensure that authorized holders or users of the document have available the most up-to-date version for their actions.

**Corrective action**

Measures taken to rectify and/or to prevent recurrence of a quality failure. *See also Quality failure.*

**Deviation**

A departure from specified requirements.

**Document**

Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results.

**Facility**

A generic term used to describe buildings and land where equipment is located, installed, and operated.

**Failure**

The inability of an item or activity to perform within specified limits.

**Guideline**

A suggested practice that is not mandatory in programs intended to comply with a standard. The word "should" denotes a guideline; the word "shall" denotes a requirement.

**Inspection**

Examination or measurement to verify whether an item or activity conforms to specified requirements.

**Item**

An all-inclusive term used as a substitute for any of the following: appurtenance, assembly, component, equipment, material, module, part, structure, subassembly, subsystem, unit, or facility.

**Measuring and test equipment**

Devices or systems used to calibrate, measure, gage, test, inspect, or control in order to acquire research, development, test, or operational data; for process control; for safety, and to determine compliance with design specifications, or other technical requirements. Systems used for measurement or testing include components from the sensing element through the data output and/or control element.

**Nonconformance**

A deficiency in characteristics, documentation, or procedures that renders the quality of an item or activity unacceptable or indeterminate.

**Objective evidence**

Any documented statement of fact, other information, or record, either quantitative or qualitative, pertaining to the quality of an item or activity based on observations, measurements, or tests which can be verified.

**Occurrence**

In general terms, an occurrence is anything other than a routine maintenance item, personnel concern, or something covered by most administrative programs. Summarizing Energy Systems'

GP-13 (General Policy), an occurrence is defined as (1) reportable problems, concerns, and adverse conditions or events that have, or could have, adverse or negative impact on safety, environment, health, quality, security, or operations; (2) failure, malfunction, deficiency, deviation, defective item or nonconformance in material, equipment, process, procedure, or program within Energy Systems; or (3) deviations from standard requirements, procedures, or operations, including all safety, quality, environmental, and operational activities. Note: DOE Order 5000.3A categorizes occurrences as emergencies, unusual occurrences, or off-normal occurrences. For detailed and important information regarding the categorization and reporting of occurrences, refer to Energy Systems' GP-13, "Occurrences, Notification, Investigation, and Reporting" (July 1987) and DOE Order 5000.3A, "Occurrence Reporting and Processing Operations Information" (May 1990).

**Procedure**

A document that specifies or describes how an activity is to be conducted.

**Program**

Activities, items, and functional actions of those engaged in the establishment of providing controls over such aspects as training, planning, quality assurance, and accomplishments, with consideration of the technical aspects affecting such activities. A plan, procedure, or system under which action may be taken toward a specific goal.

**Project**

A planned undertaking such as a formulated piece of research or a large government-supported undertaking. Note: A generic term for experiments, tasks, tests, jobs, programs, etc.

**Purchaser**

The organization responsible for establishment of procurement requirements and for issuance, administration, or both, of procurement documents.

**QA coordinator**

*See* Quality assurance specialist

**Qualification**

Certification that a person, item, or procedure is qualified.

**Qualified**

Possessed or previously determined qualities or capacities that indicate the capability of rendering an expected service or performance.

**Quality**

The totality of features and characteristics of an item or service that bear on its ability to satisfy given needs; fitness for intended use.

**Quality assurance (QA)**

All those planned and systematic actions necessary to provide adequate confidence that a structure, system, component, or facility will perform satisfactorily in service.

**Quality assurance audit**

An independent survey performed to verify that applicable elements of the QA program have been developed, documented, and effectively implemented in accordance with specified requirements. *See also* audit.

**Quality assurance plan**

A document which describes potential significant quality failures, defines, the QA actions required to provide confidence that these failures are unlikely to occur, and specifies the responsibility and schedule for carrying out the QA actions.

**Quality assurance program**

The functional actions of those engaged in establishing quality requirements, attaining quality, and providing quality assurance.

**Quality assurance specialist**

An individual trained in the quality sciences and whose duty is to provide guidance to the line organization in quality matters. Note: A generic term used in QA procedures to denote responsibilities of QA coordinators, QA specialists, or quality engineers.

**Quality control**

The regulatory process through which we measure actual quality performance, compare it with standards, and act on the difference.

**Quality failure**

An item or a service for which the quality is inadequate or is indeterminate. *See also* Corrective action.

**Quality investigation**

The actions taken as the result of a quality problem to (1) determine the cause of the problem, (2) evaluate the QA measures which were taken, and (3) define appropriate corrective or preventive action and follow-up.

**Quality problem**

An existing or potential difficulty which has resulted in, or is judged to be likely to lead to, a significant quality failure, or which would have a prolonged detrimental effect on the quality of a product or major item.

**Quality records**

Documented information that indicates the extent of conformance of articles or quality characteristics to contractual requirements, applicable specifications, or drawing requirements.

**Quality verification**

Those actions required to confirm, substantiate, and ensure that items or services (including subcontracted items), submitted to the purchaser for acceptance, conform to the specified quality requirements.

**Remedial action**

Those immediate actions taken following a quality failure, nonconformance, or unusual occurrence which will permit the activity, facility, item, program, or system to continue.

**Reliability**

The probability that an item will perform its intended function for a specified period of time under stated conditions.

**Risk**

The combined effect of the probability and consequences of a failure of an item expressed in qualitative or quantitative terms.

**Service**

The performance of activities such as design, fabrication, inspection, nondestructive examination, repair, or installation.

**Standard**

A written method or procedure approved by a recognized organization, which has been achieved by general consent, or common use, and establishes a definite level of degree, material, quality, and the like, which is proper and adequate for a given purpose.

**Subsystem**

A group of assemblies or components or both, combined to perform a single function. *See also System.*

**Supplier**

Any individual or organization who furnishes items or services to a procurement document. An all-inclusive term used in place of any of the following: vendor, seller, contractor, subcontractor, fabricator, consultant, and other levels. *See also Contractor.*

**Surveillance**

The act of monitoring or observing to verify whether an item or activity conforms to specified requirements.

**System**

A group of subsystems united by some interaction or interdependence performing many duties but functioning as a single unit. *See also Subsystem.*

**Traceability**

The ability to trace the history, application, or location of an item and like items or activities by means of recorded identification.

**Verification**

The act of reviewing, inspecting, testing, checking, auditing, or otherwise determining and documenting whether items, processes, services, or documents conform to specified requirements.



## APPENDIX

### KEY PERSONNEL AND BACKUP LIST

Health and Safety Research Division  
 Pollutant Assessments Group  
 Grand Junction Office, Colorado

Revised June 14, 1991

KEY PERSON	TITLE	DESIGNATED BACKUP PERSON	TITLE
C. A. Little	PAG Group Leader	D. K. Halford	Radiation Program Manager
D. K. Halford	Radiation Program Manager	M. L. Espergrem	UMTRA Project Manager
N. E. Korte	Chemical Program Manager	P. M. Kearl	Senior Hydrologist
M. J. Wilson	SFMP Project Manager	D. K. Halford	Radiation Program Manager
G. H. Stevens	GJPORAP Project Manager	D. K. Halford	Radiation Program Manager
R. R. Knott	Quality Assurance Coordinator	R. A. Mathis	QA Coordinator <sup>d</sup>
J. E. Thate	Health and Safety Coordinator	N. E. Korte	Chemical Program Manager
K. M. Woynowski	Computer Services Manager	R. P. Lenc	Computer Network Manager
D. E. Chavarria	Procurement Coordinator	L. H. White	(temporary assignment) <sup>d</sup>
C. D. Retolaza	Public Relations Coordinator	E. P. Schlauger	Public Relations Assistant
S. A. Tighe	Document Control Coordinator	E. P. Schlauger	Public Relations Assistant
D. K. Barslund	Accounts Secretary	T. J. Graves	Accounting Support Specialist <sup>d</sup>
R. F. Hughes	ORAU Administrator	L. L. Friese	ORAU Office Manager
<b>ORNL petty cash disbursal</b>			
R. R. Knott	QA Coordinator	C. D. Retolaza	Public Relations Coordinator

<sup>d</sup>Oak Ridge, Tenn.



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