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DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENT, SAFETY AND HEALTH DIVISION
ENVIRONMENTAL PROGRAMS BRANCH

COMPREHENSIVE ENVIRONMENTAL ASSESSMENT AND RESPONSE PROGRAM

PHASE 2:
ROCKY FLATS PLANT
INSTALLATION GENERIC MONITORING PLAN
SAMPLING PLAN

July 1986

WORKING DRAFT

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ROCKY FLATS PLANT
INSTALLATION GENERIC MONITORING PLAN

SAMPLING PLAN

1. INTRODUCTION

The Comprehensive Environmental Assessment and Response Program (CEARP) Generic Monitoring Plan (CGMP) provides generic guidance and establishes procedures for conducting site characterization activities under CEARP Phase 2. The CGMP Sampling Plan outlines how the Department of Energy (DOE) Albuquerque Operations Office (AL) will implement sampling program requirements under CEARP and provides guidance to Rocky Flats Plant and Los Alamos National Laboratory (LANL) to ensure the reliability of sample/measurement collection and analysis. Thus, the CGMP becomes the foundation for the Rocky Flats Plant Installation Generic Monitoring Plan (IGMP) and for each Site-Specific Monitoring Plan (SSMP) and is incorporated, as appropriate, by reference.

The Rocky Flats Plant IGMP Sampling Plan provides guidance for the sampling program based upon knowledge of the sites currently identified for CEARP Phase 2 site characterizations based on the CEARP Phase 1 report for Rocky Flats Plant.

2. IMPLEMENTATION

The Rocky Flats Plant IGMP Sampling Plan provides guidance to develop and execute each SSMP Sampling Plan necessary for CEARP Phase 2 Confirmation, which includes RCRA continuing release and CERCLA site characterizations at Rocky Flats Plant. The intent of the Rocky Flats Plant IGMP Sampling Plan is to identify those methods and materials discussed in the CGMP Sampling Plan sufficient to address most sampling situations that could occur while conducting CEARP Phase 2 site characterization studies at Rocky Flats Plant. The CGMP Sampling Plan includes generic guidelines for sample/measurement collection and analysis and is extensively referenced within the Rocky Flats Plant IGMP Sampling Plan.

3. BACKGROUND CONDITIONS

3.1. HAZARDOUS SUBSTANCES THAT MAY BE ENCOUNTERED

Since Rocky Flats Plant started operations in 1952, its primary mission has remained unchanged -- making metal components for nuclear weapons and recovering these metals from returned components. Therefore, the types of raw materials used and wastes generated at Rocky Flats Plant have also remained essentially unchanged throughout the plant's history. The major changes are in the ways the wastes are processed and disposed of. This consistency of materials used and of waste generation is helpful in planning RCRA continuing release or CERCLA site characterization activities because it targets the types of hazardous substances expected to be encountered during the sampling program. These substances are

1,1,1-Trichloroethane
Acetone
Americium
Barium Chloride
Bromine Trifluoride
Carbon Tetrachloride
Chlorine Trifluoride
Dioctyl Phthalate
ECM Sludge
Etchant Solution (Acid)
Ethanol
Freon 113
Hydrochloric Acid
Hydrochloric Acid
Hydrogen Sulfide
Iodine Pentafluoride
Magnesium
Mercury
Methanol
Methylene Chloride (Dichloromethane)
Nitric Acid
Phosphoric Acid
Plutonium
Potassium Nitrate
Silver
Sodium Cyanide
Sodium Nitrate
Sulfuric Acid
Tetrachloroethylene (Perchloroethylene)
Toluene
Tungsten Hexafluoride
Uranium
Used Oil
Used Paint Solvents/Sludge
Waste/Surplus Paint
Xylene

3.2. TYPES OF SITES

The CEARP Phase I report for Rocky Flats Plant places identified CEARP sites into three categories, based upon the type of waste at the site: (1) areas that might have received radioactive waste or contamination, (2) areas that might have received both radioactive and hazardous chemical wastes or contamination, and (3) areas that might have received nonradioactive hazardous chemical wastes or contamination. Each of these types of sites has distinct characteristics that will

determine the samples needed to be taken, the containers to be used for the samples, how the samples need to be preserved, analytical procedures to be performed, and the special precautions to be followed while handling these samples.

3.2.1. Sites with Radioactive Waste or Contamination

One site of this type currently requires a CEARP Phase 2 site characterization and is typical for this category. It contains approximately 320 tons of plutonium-contaminated soil with activity levels of about 7 dmp/g alpha and 60 yards of plutonium- contaminated soil with activity levels of about 250 dmp/g alpha. The site was identified in the CEARP Phase 1 report.

3.2.2. Sites with Radioactive/Hazardous Chemical Waste or Contamination

Nine sites of this type currently require CEARP Phase 2 site characterizations. They are identified in the CEARP Phase 1 report and include large surface impoundments, burial trenches, and landfills. Materials to be encountered are site-specific; however, the hazards are fairly well identified in the CEARP Phase 1 report. The surface impoundments are known to contain radionuclides, plus caustics and acids. Oils and solvents have been kept out of the ponds to prevent surface scum that would hamper evaporation. The trenches are known to contain uranium and plutonium, flattened drums, sewage sludge, and minute quantities of solvents. The landfills are known to contain small quantities of various radionuclides plus a variety of the hazardous substances that have been used at the plant.

3.2.3. Sites with Nonradioactive Hazardous Chemical Waste or Contamination

Four sites of this type currently require CEARP Phase 2 site characterizations and are identified in the CEARP Phase 1 report. These sites include reactive metal destruction sites, volatile organic compounds (VOCs) in groundwater, and an oil sludge pit. Again the types of materials expected to be encountered are well defined.

3.3. ENVIRONMENTAL PATHWAYS OF CONCERN

The CEARP Phase 1 report identifies two pathways--surface water and groundwater--that require attention during the CEARP Phase 2 site characterizations

at Rocky Flats Plant. The groundwater pathway is known to contain VOCs from past and/or present operations, and Rocky Flats Plant is currently conducting a hydrogeological investigation of it.

4. SAMPLING LOGISTICS

4.1. SCHEDULING

The CGMP Sampling Plan requires that before beginning a a CEARP Phase 2 site characterization, the probable duration (including contingency) and sequence of activities be forecast so that the critical path of these activities may be scheduled. Final schedules will be negotiated between DOE-AL, the LANL CEARP Project Office, Rocky Flats Plant, and the subcontractors. Approved schedules will be incorporated into each SSMP Sampling Plan, as appropriate.

4.2. SITE ACCESS

Site access arrangements for all CEARP site characterization personnel (LANL and LANL subcontractors) will be made with the Rocky Flats Plant security office in conjunction with the Rockwell International CEARP Program Manager (currently Mr. Tom Greengard). Field activities will be scheduled through the program manager with as much lead time as possible. Schedules will be confirmed by telephone 24-48 hours before the LANL CEARP staff and/or LANL subcontractors are expected to arrive.

Clearances for Q-cleared personnel must be transferred to the Rocky Flats Plant security office on the required DOE Form several days prior to site visits. Full names, social security numbers, and country of citizenship must also be provided in a timely fashion for uncleared personnel needing access to the site.

4.2.1. Badging and Wearing Badges

The badge office will issue uncleared personnel a red visitor's badge from the badge office upon reporting for work at Rocky Flats Plant. Q-cleared personnel will receive a blue visitor's badge designating the areas and information to which they will have access. All badges shall be worn above the waist and be plainly visible at all times.

4.2.2. Lost Badges

If a badge is lost, the person losing the badge shall immediately notify his or her supervisor or the nearest Rockwell International Plant Protection guard. A temporary badge will be issued for use until a check can be made and the lost badge found.

4.2.3. Escorted Uncleared Personnel

Uncleared personnel requiring access to a security area for CEARP Phase 2 site characterizations will be escorted by a Rockwell International Plant Protection guard. At no time shall uncleared personnel leave the custody of their escort while inside a security area.

4.2.4. After-Hours Access to Security Areas

No personnel will be permitted to enter security areas after normal working hours without approval of the shift superintendent. Approval from the shift superintendent shall be obtained through the Rockwell International CEARP Program Manager.

In case of an operational emergency requiring outside personnel, escort service will be supplied by Rockwell International Plant Protection.

4.2.5. Completion of Assignment

Upon completion of the assignment at Rocky Flats Plant, the visitor's badge must be turned in at the main gate when leaving for the last time.

5. SITE SURVEY AND MAPPING

Site survey and mapping are required for all sites identified for CEARP Phase 2 site characterization to delineate the boundaries of all sites and to illustrate the extent of contamination. At Rocky Flats Plant, site survey and mapping for CEARP Phase 2 site characterization will follow the guidance provided in the CGMP Sampling Plan.

6. FIELD SAMPLING AND MEASUREMENTS

As indicated in the CGMP Sampling Plan, sampling methodologies used at Rocky Flats Plant for CEARP Phase 2 site characterization studies will be determined based upon site-specific conditions. Site-specific variables include the type and size of the site, the topography, the type and environmental mobility of waste constituents, and the media (e.g., soil, water) affected. This information will determine the types of protective sampling equipment to be used, sampling precautions to be observed, as well as the types of samplers, sample containers and closures, and the preservatives required. These conditions will be evaluated and included in each SSMP Sampling Plan, as appropriate. The specific items to be included in each SSMP Sampling Plan are

- Sampling Plan Design
- Sample Types
  - * individual grab samples
  - * simple composite samples
  - * sequential composite samples
  - * hand-proportioned composite samples
  - * automatically proportioned composite samples
  - * continuous samples
- Sampling Strategies
  - * simple random sampling
  - * stratified random sampling
  - * systematic sampling
  - * stratified systematic sampling
  - * judgment sampling
- Sampling Equipment and Procedures
- Preparation of Sampling Equipment

6.1. SAMPLING

6.1.1. Sampling Sources

Known sources to be sampled at Rocky Flats Plant include liquid effluent streams, waste containers for liquids (e.g., drums, tanks, surface impoundments), and solid wastes (e.g., containers, piles, trenches, pits). Source sampling may be conducted using grab samples, composite samples, proportional samples, or continuous samples. The types of source samples to be taken and precautions to protect personnel will be described in each SSMP Sampling Plan, following the guidance provided in the CGMP Sampling Plan.

6.1.2. Sampling Air Pathways

Though not an anticipated problem at Rocky Flats Plant, contaminants may be released from hazardous waste sites through vapor release or resuspension of particulates and can be transported to other areas through the air pathway. If potential sources such as open containers, heavily contaminated soils, or gas vents are identified during the initial site inspection, air monitoring programs may be included in each SSMP Sampling Plan following the guidelines established in the CGMP Sampling Plan.

6.1.3. Sampling Surface Water Pathways

Surface water sampling will be conducted at Rocky Flats Plant as part of the CEARP Phase 2 site characterization to determine the potential of migration through the surface water pathway. The surface water sampling program will include both the collection of water samples and sediment samples following the guidance provided in the CGMP Sampling Plan. Specific equipment/methods will be identified in each appropriate SSMP Sampling Plan.

6.1.4. Sampling Groundwater Pathways

Groundwater monitoring will be conducted as part of the CEARP Phase 2 site characterization effort at Rocky Flats Plant to identify subsurface pathways of contaminant migration and to define the areal and vertical extent of the

contamination. The groundwater monitoring program will include sampling both the saturated and unsaturated zones, following the guidance provided in the CGMP Sampling Plan. Specific equipment/methods will be identified in each appropriate SSMP Sampling Plan.

6.1.5. Sampling Land Migration Pathways

The CEARP Phase 2 site characterization at Rocky Flats Plant will include sampling of land migration pathways on a site-by-site basis. As indicated in the CGMP Sampling Plan, the land pathways sampling program will include collecting soil and biota samples and conducting surface radiological surveys, as appropriate. The type, location, and frequency of samples collected will depend on the site-specific conditions. Specific equipment/methods will be identified in each SSMP Sampling Plan, and will be selected following the guidance provided in the CGMP Sampling Plan.

6.2. MEASUREMENTS

6.2.1. Geophysical Techniques

Surface geophysical techniques will be used in the CEARP Phase 2 site characterization efforts at Rocky Flats Plant to locate and provide additional information on hazardous waste sites and contamination plumes. Geophysics will be used primarily to collect reconnaissance data and to provide input to select sampling sites and groundwater monitoring locations. Specific equipment/methods will be identified in each SSMP Sampling Plan, and will be selected following the guidance provided in the CGMP Sampling Plan.

6.2.2. Direct Radiation Surveys

Direct radiation surveys may be used in the CEARP Phase 2 site characterizations efforts at Rocky Flats Plant to better define sites with radioactive contamination. Specific equipment/methods to be employed will be identified in each SSMP Sampling Plan, and will be selected following the guidance provided in the CGMP Sampling Plan.

7. SAMPLE MANAGEMENT

Sample management consists of all procedures from the time the sample is collected until it is archived or disposed of following specifications in the CGMP Sampling Plan.

7.1. SAMPLE CONTAINERS, PRESERVATION, AND HOLDING

Each SSMP Sampling Plan for CEARP Phase 2 site characterizations at Rocky Flats Plant will identify the proper containers and the procedures to preserve and ship samples to minimize chemical quality changes. In some cases, the samples may need to be split into several different portions, with different sample containers and preservation methods being used for each portion of the sample based on the analyses of interest. In selecting sample containers, preservation techniques, and holding times, the guidance presented in the CGMP Sampling Plan should be followed.

7.2. SAMPLE CONTROL AND DOCUMENTATION

All information pertinent to field sampling activities must be recorded as part of the CEARP documentation archive. Each document should bear a serial number and should be listed, with the number, in a project document inventory to be assembled at the completion of the project. Each SSMP Sampling Plan will identify a documentation coordinator whose responsibility will be to number all documents and records associated with the CEARP Phase 2 site characterization and maintain the project document inventory.

Accountable documents to be included are

- log books
- data records
- correspondence
- graphs
- chain-of-custody procedures and reports
- sample labels

- sample identification
- photographs
- analytical records.

7.3. HANDLING, TRANSPORT, AND STORAGE OF SAMPLES

Samples, both environmental and hazardous, collected during CEARP Phase 2 site characterization activities at Rocky Flats Plant will be transported from the field to the analytical laboratory. The handling, transportation, and storage of samples will be accomplished following the guidance provided in the CGMP Sampling Plan.

7.4. SAMPLE PREPARATION AND ANALYSES

The CGMP Sampling Plan provides recommended sample preparation and analytical procedures for selected parameters of interest in environmental matrices. This guidance should be followed in the preparation of each SSMP Sampling Plan.

7.5. SAMPLE ARCHIVING AND DISPOSAL

The need to archive samples will be determined on a site-specific basis. At Rocky Flats Plant, samples will be archived from those sites that have been identified by the state of Colorado as being subject to litigation.

Following analysis of CEARP samples, nonhazardous materials will be disposed of with regular laboratory waste. Hazardous and radioactive materials, as determined through analysis, will be appropriately contained or disposed of.

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ROCKY FLATS PLANT

INSTALLATION GENERIC MONITORING PLAN

TECHNICAL DATA MANAGEMENT PLAN

July 1986

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ROCKY FLATS PLANT
INSTALLATION GENERIC MONITORING PLAN

TECHNICAL DATA MANAGEMENT PLAN

1. INTRODUCTION

The Comprehensive Environmental Assessment and Response Program (CEARP) Generic Monitoring Plan (CGMP) provides generic guidance and establishes procedures for conducting site characterization activities under CEARP Phase 2. The CGMP Technical Data Management Plan outlines how the Department of Energy (DOE) Albuquerque Operations Office (AL) will implement data management requirements under CEARP and provides guidance to Rocky Flats Plant, and to Los Alamos National Laboratory (LANL) on data and documentation requirements under CEARP. In addition, it calls for LANL to establish a master data file to archive Rocky Flats Plant site- and installation-specific data and documentation required for AL to undertake subsequent phases of CEARP. Furthermore, it establishes reporting requirements under CEARP and DOE Order 5480.14 (CERCLA Implementation), with the provision that LANL will perform all final report preparation. (This is to provide uniformity across all AL installations.) Thus, the CGMP is the foundation for the Rocky Flats Plant Installation Generic Monitoring Plan (IGMP) and each Rocky Flats Plant Site-Specific Monitoring Plan (SSMP) and is incorporated, as appropriate, by reference.

The Rocky Flats Plant IGMP Technical Data Management Plan provides guidance on technical data/information requirements to be included in the SSMPs and to be prepared/archived during CEARP Phase 2 site characterization activities.

2. IMPLEMENTATION

As indicated in the CGMP, two major types of information will be collected, evaluated, and archived during each CEARP site characterization at Rocky Flats Plant: documentation (such as reports, maps, drawings, and aerial photographs) and data (e.g., sample analyses). The Rocky Flats IGMP Technical Data Management Plan presents guidance to Rocky Flats Plant, LANL, and their subcontractors on how data will be managed and what documentation will be prepared while performing the CEARP Phase 2 site characterization at Rocky Flats Plant.

Before beginning a CEARP Phase 2 site characterization study, a SSMP will be prepared to ensure that the required information is collected to support evaluation of both alternative response and remedial action activities and subsequent reporting requirements of CEARP. The CGMP and Rocky Flats Plant IGMP will be incorporated into each SSMP by reference, as appropriate.

As stated in the CGMP Technical Data Management Plan, the SSMP will be based on an evaluation of existing information to determine whether additional data collection and documentation are needed, and it will be implemented in stages, so that knowledge gained during the course of a site characterization can be used to guide the site characterization process. Because a CEARP site characterization at Rocky Flats Plant may be performed by Rockwell International, LANL, or their subcontractors, the SSMP and site characterization documentation associated with the study could be prepared by several different groups. To maintain uniformity in the site characterization process, LANL will review all CEARP-related documentation for AL. If modification is required, it may be done by LANL, Rocky Flats Plant, or the subcontractor, depending upon the nature of the required action. In addition, at the conclusion of the site characterization, LANL will prepare a CEARP Phase 2b report for AL. All CEARP reports will be forwarded to AL for review and concurrence, and all CEARP-related information will then be placed into the data archive at LANL.

Much of the information collected and managed under CEARP will not require computerized data basing. However, if Rocky Flats Plant or one of its subcontractors chooses to implement a computerized data base management system, general guidance

for this type of system is presented in Appendix A of the CGMP Technical Data Management Plan. There are two major requirements for such a system. First, it must be capable of producing data output files in American Standard Code for Information Interchange (ASCII) format for transfer between systems. Second, it must protect encoded data from improper use, alteration, manipulation, or unauthorized disclosure resulting from criminal, fraudulent, or other improper actions. Therefore, the computerized data management system must have system access security that meets the requirements of DOE Order 1360.2 (computer security program for unclassified computer systems) and AL Order 1360.2A, which sets forth AL implementing procedures to be followed in establishing a computer security program for unclassified computer systems. Once a system has been chosen, a computer security plan must be submitted to AL for review and approval as per AL Order 1360.2A.

3. DATA AND DOCUMENTATION REQUIREMENTS

Criteria for the acceptance of both data and documentation are presented in the CGMP Technical Data Management Plan. These criteria will apply to data and documentation collected or utilized under CEARP at the Rocky Flats Plant. Specifically, the criteria establish guidelines for acceptable, marginally acceptable, and unacceptable information. The basic premise of these guidelines is that data or documentation collected or prepared for one purpose may or may not satisfy the requirements of another purpose. (For example, data may be acceptable for reconnaissance characterization but unacceptable for extensive Phase 2a site characterization or confirmation of remedial action mitigation.)

The specific data and documentation required by CEARP include both descriptive information on potential hazardous waste sites at Rocky Flats Plant and information on the local environs at the Plant (geology, hydrology, meteorology, ecology). Care must be taken to ensure that data and documentation exist to prepare a CEARP Phase 2b Site Characterization Report and CEARP Phase 3 Engineering Assessment Report and that this information meets approved standards of good practice as outlined in the CGMP Technical Data Management Plan.

3.1. COMPILATION AND REVIEW OF EXISTING INFORMATION

As indicated in the CEARP Phase 1 report, several activities at Rocky Flats Plant, both ongoing and completed, have generated information useful to CEARP. Some of this information will be compiled into reports to be used in conjunction with the CEARP Phase 2 site characterization.

As part of the supplemental activities under CEARP Phase 1, data collected and documented as monthly memos-to-file during the Rocky Flats Plant radiometric survey (conducted from 1975 to 1983) will be compiled into a summary report that lists all sites and identifies their remedial action status (i.e., CEARP Phase). This report will document removal or absence of surface radioactive contamination (except for isolated locations within the 900 Area) or will identify locations warranting further action under CEARP. It will be prepared following the criteria set forth in the CEARP program to allow its inclusion in the data archive. Incomplete

information in the monthly memos-to-file will be augmented by collecting additional data, as appropriate.

A hydrogeologic site characterization is currently being performed at Rocky Flats Plant. It should provide information to CEARP regarding the volatile organic compounds (VOCs) detected in groundwater and provide input on hydrogeologic parameters to the models used for pathway analysis. LANL will review all reports generated by the hydrogeologic site characterization studies and incorporate them in the data archive as appropriate, provided that the data meet CEARP requirements for acceptibility.

3.2. ANTICIPATED CEARP PHASE 2b REPORTS

There are currently 14 sites or groupings of sites identified at Rocky Flats Plant that require CEARP Phase 2 site characterization and associated documentation, including Phase 2b reports. These sites are identified in Table 1.4 of the Rocky Flats Plant IGMP Synopsis. In addition to these sites, there are more than 30 sites that are undergoing reconnaissance investigation as part of supplemental activities under CEARP Phase 1. These are sites with insufficient information for Hazard Ranking System (HRS) evaluation. When sufficient information is acquired to complete the HRS evaluation for a site, a determination relative to the need for CEARP Phase 2 Site Characterization will be made.

4. REPORTING REQUIREMENTS

Reporting under CEARP for Rocky Flats Plant will follow the guidance set forth in DOE Order 5480.14 (CERCLA Implementation). It will be responsive to EPA guidance as appropriate for reporting on remedial investigations and feasibility studies under CERCLA as well as remedial investigation and corrective measures under RCRA for continuing release sites. At a minimum, documentation for each site characterization activity performed under CEARP Phase 2 for Rocky Flats Plant will be included in a CEARP Phase 2b report, which LANL will prepare for AL. Details on CEARP Phase 2 reporting requirements are provided in the CGMP Technical Data Management Plan.

5. DATA ARCHIVE

As described in the CGMP Technical Data Management Plan, a CEARP master data archive for Rocky Flats Plant CEARP-related documentation will be maintained for AL at LANL. This data archive will contain only that information necessary to document the various phases of CEARP and to allow subcontractors to perform additional CEARP-related tasks at any given site without having to re-collect data. In addition, this archive will allow easy access to relevant information regarding any site at Rocky Flats Plant if the need ever arises to re-evaluate a site.

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PHASE 2:

ROCKY FLATS PLANT

INSTALLATION GENERIC MONITORING PLAN

HEALTH AND SAFETY PLAN

July 1986

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ROCKY FLATS PLANT
INSTALLATION GENERIC MONITORING PLAN

HEALTH AND SAFETY PLAN

1. INTRODUCTION

The Comprehensive Environmental Assessment and Response Program (CEARP) Generic Monitoring Plan (CGMP) provides generic guidance and establishes procedures for conducting site characterization activities under CEARP Phase 2. It outlines how the Department of Energy (DOE) Albuquerque Operations Office (AL) will implement health and safety requirements under CEARP. Specifically, it provides generic guidelines and procedures that will be employed by Rocky Flats Plant and Los Alamos National Laboratory (LANL) during CEARP Phase 2 site characterization activities to protect the health and safety of personnel involved in CEARP. Thus, the CGMP becomes the foundation for the Rocky Flats Installation Generic Monitoring Plan (IGMP) and each Site-Specific Monitoring Plan (SSMP) for the Rocky Flats Plant and is incorporated, as appropriate, by reference.

The Rocky Flats Plant IGMP Health and Safety Plan provides guidance on health and safety requirements to be included in each SSMP Health and Safety Plan and to be followed during CEARP Phase 2 site characterization. Specific safety practices and procedural review requirements specified by Rocky Flats Plant are in the *Health, Safety, and Environment (HSE) Manual* (RI 1986a) and in the draft *Rocky Flats Operations Pocket Handbook for Contractors* (RI 1986b). They are incorporated by reference into the Rocky Flats Plant IGMP Health and Safety Plan, as appropriate.

2. IMPLEMENTATION

The CEARP Phase 2 site characterization conducted at Rocky Flats Plant, including preparation of the SSMPs, will follow health and safety procedures as outlined in the the Rocky Flats IGMP Health and Safety Plan, which is tiered to the CGMP Health and Safety Plan.

2.1. POLICY AND STANDARDS

As outlined in the CGMP, DOE has the responsibility for health, safety, and environmental protection programs at DOE-owned, contractor-operated facilities. It is DOE's policy that operations be conducted in a manner that will (1) limit risks to the health and safety of the public and employees, and (2) adequately protect property and the environment (DOE 5481.1A).

The Rocky Flats Plant IGMP Health and Safety Plan includes the policy and standards implemented in the Rockwell International *Health Safety and Environment Manual* (RI 1986a). This includes the concept of as low as reasonably achievable (ALARA) for control of personnel and environmental exposure from both radioactive and nonradioactive hazardous materials (Sec 1.02, HS&E Manual, RI 1986a).

2.2. HEALTH AND SAFETY RESPONSIBILITIES

2.2.1. General Responsibilities

The line organizations conducting the CEARP Phase 2 site characterizations will be responsible for protecting the health and safety of employees and the public. Each SSMP Health and Safety Plan will include the organization and person responsible for implementing that Health and Safety Plan, as follows:

- CEARP Phase 2 site characterizations conducted at Rocky Flats Plant by LANL, including LANL subcontractors -- Person in Charge will be the Rocky Flats Plant LANL CEARP Team Leader (currently, Dr. Kenneth Rea);

- CEARP Phase 2 site characterizations conducted at Rocky Flats Plant by Rockwell International, including Rockwell International subcontractors -- Person in Charge will be the Rockwell International CEARP Project Manager (currently, Mr. Tom Greengard).

2.2.2. Installation Requirements

Health and safety requirements at Rocky Flats Plant are assigned to a HS&E Area Representative who assembles a HS&E Area Safety Team to ensure that health, safety, and environmental criteria and standards are effectively and consistently applied throughout Rocky Flats Plant. Specific responsibilities and functions of the representative and safety team are presented in Section 2.02 of the *HS&E Manual for Rocky Flats Plant* (RI 1986a). A CEARP HS&E Area Representative and HS&E Area Safety Team will be assembled at Rocky Flats Plant to review and concur with each SSMP Health and Safety Plan before beginning a site characterization.

2.2.3. Specific Responsibilities

Specific health and safety responsibilities of the Los Alamos CEARP Project Office or the installation project leader, in conjunction with AL as appropriate, are given in the CGMP Health and Safety Plan. In addition, the plan places specific health and safety requirements on the CEARP Phase 2 field investigation team (including subcontractors as appropriate). These responsibilities and requirements will be applied on a site-specific basis in each SSMP Health and Safety Plan.

2.2.4. Assignment of a Health and Safety Coordinator for the Site

The CGMP Health and Safety Plan requires that a health and safety coordinator be assigned for each CEARP site that will be characterized as part of the Phase 2 site characterization. The coordinator will be responsible for ensuring that a health and safety review is conducted prior to beginning operations and for implementing the SSMP Health and Safety Plan at the site. Specific responsibilities of the coordinator, as outlined in the CGMP Heath and Safety Plan, will be applied on a site-specific basis in each SSMP Health and Safety Plan.

2.3. RISK ASSESSMENT AND PERSONNEL PROTECTION REQUIREMENTS

2.3.1. Identification of Hazards and Evaluation of Risk

This section provides general guidance to (1) identify physical, chemical, radiological, and biological hazards, and (2) evaluate the health and safety risks at sites

requiring CEARP Phase 2 site characterization as identified in the CEARP Phase 1: Installation Assessment - Rocky Flats Plant (Table 2.4, IGMP Synopsis). A detailed assessment of these risks will be performed on a site-specific basus during the development of each SSMP Health and Safety Plan. Protection requirements for personnel and general policies/mitigation measures will be determined and implemented based on the site-specific risk assessment. Continual feedback on hazards and risks will be provided throughout the entire sithe characterization process and used to update the protection requirements as necessary.

2.3.1.1. Physical Hazards

Known physical hazards at sites requiring CEARP Phase 2 site characterizations include: heat; cold (frostbite/hypothermia); mechanical equipment; electrical lines; pits, trenches, or steep banks; fire; and/or surface impoundments. All physical hazards will be identified and controlled to the extent possible before beginning the site characterization. Each SSMP Health and Safety Plan will identify and provide a detailed evaluation of the physical hazards at the site and specify appropriate operating procedures.

2.3.1.2. Chemical Hazards

Known chemical hazards at sites requiring CEARP Phase 2 site characterizations primarily involve possible inhalation, ingestion, or skin absorption of solvents, volatile organic compounds, or petrolem-based materials. In addition, the trenches present a reactive hazard because of the pyrophoric nature of the uranium, and some sites may contain small quantities of beryllium (a toxic metal). The SSMP Health and Safety Plan will identify and provide an evaluation of the known chemical hazards at the site under investigation and will specify appropriate operating procedures. This plan will be modified to reflect additional chemical hazards uncovered by the ongoing characterization activities.

2.3.1.3. Radiological Hazards

Known radiological hazards at sites requiring CEARP Phase 2 site characterizations primarily involve exposure to small quantities of plutonium and/or uranium.

The SSMP Health and Safety Plan will identify and provide an evaluation of the radiological hazards at site under investigation and specify appropriate operating procedures.

2.3.1.4. Biological Hazards

Known biological hazards at sites requiring CEARP Phase 2 site characterizations include: (1) rattlesnakes; (2) rodents that may carry disease (e.g., rabies); (3) insects (e.g., ticks, spiders); and (5) worker exhaustion (e.g., fatigue, heat stress). No poisonous plants have been identified at the sites currently requiring characterization. The SSMP Health and Safety Plan will identify and provide a evaluation of the biological hazards at the site under investigation and specify appropriate operating procedures.

2.3.2. Personnel Protection Requirements

2.3.2.1. Protection Levels and Protective Clothing

The CGMP presents an overview of the four EPA protection levels and requirements for protective clothing that may be used in CEARP Phase 2 site characterizations. Each SSMP Health and Safety Plan will define zones of contamination and identify levels of protection required for each zone. Appropriate standard operating procedures will be specified in the SSMP Health and Safety Plan. All personnel entering a contamination zone will be required to wear the attire designated for that zone. In all places where a self-contained breathing apparatus is required, at least three persons will be suited out for entry (two entry and one back-up).

2.3.2.2. Protective Equipment

A variety of safety equipment will be used to protect personnel from safety hazards and minimize exposures to hazardous chemicals and radionuclides during CEARP site characterization activities. A generic listing of some of the safety equipment that might be used is presented in the CGMP Health and Safety Plan. Safety monitoring equipment needed for each site will be identified in the SSMP Health and Safety Plan and appropriate standard operating procedures will be specified.

2.3.2.3. General Safety Practices and Mitigation Measures

The following general requirements must be observed during CEARP Phase 2 site characterizations at Rocky Flats Plant and will be included in each SSMP Health and Safety Plan:

- Eating, drinking, smoking, and chewing gum or tobacco will be prohibited in any area designated as contaminated. The hands and face must be washed upon leaving a contaminated work area and before eating, drinking, smoking, or chewing gum or tobacco.

- Decontamination procedures will be planned before entering the site, practiced as close to the contaminated areas as possible, and will be followed by personnel taking showers as soon as possible after leaving the site.

- Personnel entering respiratory protection areas will not be allowed to have facial hair that interferes with the mask-to-face seal on respirators.

- Unnecessary personnel will not be allowed to enter contaminated areas, and personnel in contaminated areas will avoid unnecessary contact with contaminated surfaces.

2.3.2.4. Specialized Practices and Mitigation Measures

The following special requirements must be observed during CEARP Phase 2 site characterizations at Rocky Flats Plant and will be included in each SSMP Health and Safety Plan:

- Flammable Materials and Fire--A fire and explosion prevention and control program will be established at sites with flammable and reactive materials. In the event of a fire, personnel shall evacuate the area and contact the fire department immediately. Fire extinguishers will be available for control of small fires by personnel with fire safety training.

- Explosivity--Continuous readings for combustible gas (explosivity) shall be obtained at ground, waist, and head levels in confined areas, or where explosive gases are suspected. If readings approach or exceed 10 percent of the lower explosive limit (LEL), extreme caution will be exercised in continuing the investigation. If readings approach or exceed 25 percent of the LEL, all personnel will be withdrawn from the site immediately. Before resuming any onsite activities, project personnel will consult with fire protection experts and/or the local fire department and then develop explosion prevention procedures for safely conducting work at the site.

- Chemical Hazards--When working in an environment with the potential for organic chemical vapors, vapor concentrations shall be monitored using a photoionization or flame ionization detection instrument. No respiratory protection equipment is necessary if the chemical constituents are known and the concentrations do not exceed the threshold limit values (TLVs). Air-purifying respirators may be worn when vapor concentrations do not exceed 5 parts per million (ppm) for a 5 minute time weighted average (TWA) period. If vapors exceed 5 ppm, a self-contained breathing apparatus must be worn. If atmospheric concentrations exceed 500 ppm, the site will be evacuated and appropriate health and safety personnel contacted to determine additional protective equipment (Level A) or safety precautions required for continued work at the site. Areas in which high levels of vapors are encountered should be avoided if possible.

- Radiation--Radioactive monitoring will be conducted as appropriate. If radiation levels approach 10.0 mR/hr, a detailed radiological site survey will be conducted. If radiation levels are greater than 10.0 mR/hr, the assistance of a radiation health physicist will be obtained prior to entering the site. Radioactivity levels up to 10.0 mR/hr (normal background radioactivity is usually less than 0.02 mR/hr) are acceptable for investigations of short duration.

  Because resuspension of radioactively contaminated soil can also result in radiation exposures and inhalation of radioactive particles, air monitoring will be conducted during activities involving the disturbance of contaminated soil, and respiratory protection will be used as appropriate.

  Radiation exposures will be monitored by thermoluminescent dosimeters (TLDs), other personal radiation dosimeters, radiation survey meters, and air monitoring as required by DOE Order 5480.1 Ch. XI. Radiation exposures will always be kept as low as reasonably achievable.

  Administrative limits will be used to ensure that employees do not receive occupational exposures that exceed the quarterly or annual limits specified in DOE Order 5480.1 Ch. XI (Appendix A). If administrative limits or standards are exceeded, employees exposed to the elevated levels of radiation shall be placed on work restrictions until the end of the period of concern. Employees under age 18 shall neither be employed in, or allowed to enter, controlled areas where they may receive radiation exposures above background levels.

- Noise--DOE Prescribed Standard AF 161-35 identifies the threshold limit value (TLV) for exposure of personnel to noise. Protective equipment for hearing and noise suppression devices will be mandatory for levels above the TLV and encouraged for levels below the TLV.

- Physical Hazards--Activities such as excavations, trenching, and shoring, and use of signs, signals, barricades, motor vehicles, and mechanized equipment will be conducted in accordance with OSHA requirements.

2.3.3. Site Access Control

2.3.3.1. Restricted Access Zones

The CGMP requires the establishment of restricted access zones at contaminated sites to protect employees and the general public from unnecessary exposure to toxic materials and/or radiation, and to prevent the spread of contamination. The restricted access (exclusion) zones will be designated based on the nature, magnitude, and extent of contamination, and the potential for contaminant migration, and will be included in each SSMP Health and Safety Plan for Rocky Flats Plant. The guidance for the establishment of these restricted access zones is presented in the CGMP.

Restricted access zones will be posted with the exclusion criteria, protection requirements, contact person, and other relevant information in accordance with the DOE Orders and guidance provided in each SSMP Health and Safety Plan.

2.3.3.2. Decontamination

The CGMP requires that decontamination procedures be developed as part of each Rocky Flats Plant SSMP Health and Safety Plan, implemented before entering the site for the first time, and used throughout the CEARP Phase 2 site characterization. Guidance for establishing decontamination procedures is presented in the CGMP.

2.3.4. Worker Training

As indicated in the CGMP, a health and safety training program will be established to provide training for all personnel involved in the CEARP Phase 2 site characterizations at Rocky Flats Plant. Guidance for establishing the worker training program is presented in the CGMP.

2.3.5. Medical Program for Employees

The CGMP Health and Safety Plan requires that all personnel involved in field activities participate in a medical program for employees. Such a program has been established for Rocky Flats Plant and LANL in accordance with the requirements of

DOE Order 5480.1A Ch. VIII (Appendix A). Subcontractors will operate their medical programs to ensure a level of employee protection equivalent to the DOE system and/or in compliance with any other regulations applicable to their operations.

2.3.6. Records and Reporting Requirements

2.3.6.1. Exposure and Medical Records

As stated in the CGMP, exposure and medical records of employes will be maintained in accordance with the requirements of DOE Order 5480.1A Ch. VIII and DOE Order 5484.1. Subcontractors will be responsible for maintaining exposure and medical records for their own employees.

2.3.6.2. Reports of Unusual Occurrences

The CGMP Health and Safety Plan requires that all unusual occurrences be reported, as appropriate, to the LANLCEARP Project Office, the Rocky Flats Plant DOE Area Office, and DOE-AL in accordance with the requirements of DOE and AL Orders 5484.1 and 5484.2 (Appendix A).

In addition, each SSMP Health and Safety Plan will require subcontractors involved in unusual occurrences to be responsible for any reporting requirements to OSHA under the Occupational Safety and Health Act or any other reporting requirements directly applicable to them.

2.3.7. Information for Employees

The CGMP requires each SSMP to specify that DOE Form F-5480.2--Occupational Safety and Health Protection (a poster outlining the contractor's responsibilities to provide safety and health protection) and DOE Form F-5480.4--Occupational Safety and Health Complaint Form (a form to be used in reporting violations) will be posted in prominent locations at the workplace, as appropriate (but not necessarily at the field site).

2.3.7.1. Right-to-Know

The CGMP Health and Safety Plan requires that all persons who may possibly be exposed to hazardous materials in the work environment be fully informed of potential health hazards and safety precautions. In addition, it stipulates that warning notices be posted as appropriate.

2.3.7.2. Health and Safety Complaints

As stated in the CGMP, employees are encouraged to report any conditions or practices that may be detrimental to their health/safety or that they believe are in violation of applicable health and safety standards. Each SSMP Health and Safety Plan will require that any imminent danger threatening life or having the potential to cause serious physical harm be brought to the immediate attention of the appropriate supervisor and/or the SHSC and that the employees evacuate the area until corrective action is taken. In addition, in the event of inadequate corrective action, as appropriate, the Rocky Flats Plant Safety Office, LANL CEARP Project Office, and/or DOE-AL will be immediately notified by telephone and an immediate inspection requested.

2.4. EMERGENCY RESPONSE PROCEDURES

Generic guidance is provided in this section for preparing SSMP emergency response plans for CEARP Phase 2 site characterization studies performed at Rocky Flats Plant. The general requirement of all emergency response plans will be that all personnel entering a restricted access zone will be required to read and be familiar with the emergency response procedures.

2.4.1. Emergency Contacts

This section in the SSMP Health and Safety Plan will provide emergency contact information as specified in the CGMP. The emergency contact information will be placed on a separate page that can be copied and posted in prominent locations at the work site.

EMERGENCY CONTACTS

** Site Health and Safety Coordinator--

Name: _____ Call: _____

** Installation Health and Safety Officer--

Name: George Campbell Call: 966-2206 Onsite: 2206

** 24-Hour Installation Health/Safety Coordinator--

Shift Superintendent Call: 966-2914 Onsite: 2914

** FIRE-- Call: 966-2911 Onsite: 911

** AMBULANCE-- Call: 966-2911 Onsite: 911

** POISON CENTER-- Call: 1-800-432-6866 Onsite: 911

** SECURITY-- Call: 966-7664 Onsite: 911

** POLICE-- Call: 966-2911 Onsite: 911

** YOU ARE LOCATED AT: _____

_____

** THE NEAREST TELEPHONE IS LOCATED AT:

_____

** THE NEAREST EMERGENCY MEDICAL SERVICES ARE LOCATED AT:

The medical building - building 122 (Next to Security)

(attach map)

2.4.2. Emergency Contingency Plans

The CGMP Health and Safety Plan requires that emergency contingency plans be included in each SSMP Health and Safety Plan for Rocky Flats Plant. The plans will include specific procedures to be followed in the event of specific types of emergencies. Guidance is provided in the CGMP on preparing these plans for the following:

- Fire/Explosion
- Injury to Personnel
- Contamination of Personnel
- Accidental Release to the Environment

2.5. ENVIRONMENTAL MONITORING

As stated in the CGMP Health and Safety Plan, provisions will be made in each SSMP Health and Safety Plan for Rocky Flats Plant to establish an ambient environmental monitoring program to be used during CEARP site characterization studies, as appropriate. Each SSMP Health and Safety Plan will designate sampling requirements, types and locations of samples required, and types of analyses required. Additional guidance on environmental monitoring requirements to be implemented in each SSMP Health and Safety Plan is presented in the CGMP Health and Safety Plan.

DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENT, SAFETY AND HEALTH DIVISION
ENVIRONMENTAL PROGRAMS BRANCH

COMPREHENSIVE ENVIRONMENTAL ASSESSMENT AND RESPONSE PROGRAM

PHASE 2:
ROCKY FLATS PLANT
INSTALLATION GENERIC MONITORING PLAN
QUALITY ASSURANCE/QUALITY CONTROL PLAN

July 1986

WORKING DRAFT

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ROCKY FLATS PLANT
INSTALLATION GENERIC MONITORING PLAN

QUALITY ASSURANCE/QUALITY CONTROL PLAN

1. INTRODUCTION

The Comprehensive Environmental Assessment and Response Program (CEARP) Generic Monitoring Plan (CGMP) provides generic guidance and establishes procedures for conducting site characterization activities under CEARP Phase 2. It outlines how the Department of Energy (DOE) Albuquerque Operations Office (AL) will implement quality assurance/quality control (QA/QC) requirements under CEARP and provides guidance to Rocky Flats Plant and Los Alamos National Laboratory (LANL) on QA/QC requirements under CEARP. Specifically, it provides generic guidelines and procedures that will be employed during CEARP Phase 2 site characterization activities to ensure the reliability of all data collected. Thus, the CGMP is the foundation for the Rocky Flats Plant Installation Generic Monitoring Plan (IGMP) and each Site-Specific Monitoring Plan (SSMP) for the Rocky Flats Plant and is incorporated, as appropriate, by reference.

The Rocky Flats Plant IGMP QA/QC Plan provides guidance on QA/QC requirements to be included in the SSMPs and to be followed during CEARP Phase 2 site characterization studies. For the purposes of CEARP, the following definitions of QA/QC will apply.

Quality assurance consists of those actions taken to provide adequate confidence that collected data reflect reality and to ensure repeatability of results. This is an external check of accuracy and generally consists of the methods used for measurement, sampling, analysis, management, and validation of data.

Quality control consists of those actions taken to ensure that precisely defined procedures for collecting and analyzing samples and data are followed in order to obtain correct results. This is an internal check of precision and generally consists of procedures used to implement methods selected for measurement, sampling, analysis, management, and validation of data.

2. IMPLEMENTATION

The CEARP Phase 2 activities conducted at Rocky Flats Plant, including preparing the SSMPs, will follow QA/QC procedures as outlined in the the CGMP QA/QC Plan and Rocky Flats Plant IGMP QA/QC Plan. LANL will provide external audits (QA) for CEARP Phase 2 site characterizations being conducted by Rocky Flats Plant, including its subcontractor, or by a LANL subcontractor. At a minimum, the following QA/QC procedures will apply.

2.1. CONTENTS OF SSMP QA/QC PLANS

Each SSMP QA/QC Plan will include QA/QC requirements for field measurement, sample collection, and sample analysis. QA/QC for data management is provided in the CGMP and in the Rocky Flats Plant IGMP Data Management Plan. Guidelines to be followed in preparing each SSMP QA/QC Plan are presented below.

2.1.1. QA/QC for Sampling Plan

QA/QC for each Rocky Flats Plant SSMP Sampling Plan requires that sufficient samples be collected at each site to develop a statistically valid data set.

General quality assurance requirements for sampling activities to be included in each SSMP and implemented during CEARP Phase 2 site characterization follow:

- The levels of confidence to be allowed for data collection;
- The statistical methods to be used in determining the number of samples required to obtain the specified levels of confidence;
- Appropriate pathway analysis techniques to be used to determine sampling locations.

General quality control requirements for sampling activities to be included in each SSMP and implemented during CEARP Phase 2 site characterization follow:

- The checkpoints where preliminary evaluations will be made to determine whether modifications of the SSMP are necessary;
- The environmental pathways data to be used to determine whether deviations from the environmental pathway analysis are occurring.

In addition, a QA/QC check list that contains QA/QC requirements for both sample collection/field measurement and sample analysis will be included in each SSMP Sampling Plan. The purpose of this check list is to ensure that QA/QC objectives are not overlooked during sampling.

2.1.2. QA/QC for Sample Collection/Field Measurement

As indicated in the CGMP QA/QC Plan, the QA/QC requirements for sample collection/field measurement at Rocky Flats Plant will be satisfied by using standard methods, procedural cross-checks, and audits. If there is an indication that problems with either collection or measurement procedures are adversely affecting data, the procedures will be re-evaluated and the SSMP revised accordingly. The collection or measurement will then be repeated.

Quality assurance requirements to be included in each SSMP and implemented in sample collection/field measurement activities follow:

- The use of approved standard methods or techniques for all measurements (e.g., geophysical or radiation measurements) or sample collections;

- The collection of duplicate samples or measurements by a second individual using the same procedures on a small subset of the samples or measurements taken to statistically verify accuracy (required number of duplicates to be specified in the SSMPs);

- The use of log books to record sample collection and field measurement activities;

- The use of approved standard procedures to ensure that field instruments are calibrated/standardized as appropriate;

- The use of approved standard protocols to treat samples during and after sample collection to ensure that analytical measurements reflect the original sample parameters; the following items will be addressed in the protocols:

  (1) The type of sample containers to be used to ensure noninterference with the type of sample collected,

  (2) The cleaning procedures to be used for sample containers to ensure that samples are not contaminated,

  (3) The decontamination procedures to be used for sampling equipment and instruments between each collection of a sample,

(4) The holding time, preservatives, and storage conditions to be used to prevent deterioration and/or interaction of samples during the time between collection and analysis;

- The use of chain-of-custody to document the entire history of a sample.

Quality control requirements to be included in each SSMP and implemented in sample collection/field measurement activities follow:

- The periodic collection of multiple samples or taking of multiple measurements to provide a cross-check of procedures;

- The use of multiple samples or subsamples whenever field analysis of any parameter occurs to prevent one analytical procedure from biasing the results of subsequent analyses;

- The use of field blanks or trip blanks to determine whether sample contamination is occurring in the sample collection/handling process;

- The provisions to be taken to maintain a sample library for use in the event that additional data and/or data verification are required;

- The procedures to be used to determine levels of confidence associated with field measurements or field analyses;

- The auditing procedures for log books and other documentation to ensure that measurement techniques, sample collection techniques, instrument calibration/standardization procedures, sample treatment requirements, and chain-of-custody procedures are being followed.

2.1.3. QA/QC for Sample Analysis

The QA/QC control of the analytical process for Rocky Flats Plant will be accomplished by using procedural cross-checks, audits, personnel training, instrument standardization/calibration, standard reference materials, split samples, blanks, and spikes. The SSMP will define the number and types of QA/QC samples required to ensure the desired quality of sample analysis.

Quality assurance requirements to be included in each SSMP and implemented in sample analysis follow:

- The use of officially approved Environmental Protection Agency (EPA) or demonstrated equivalent procedures as accepted by EPA for analyses;

- The use of standard reference materials to check the accuracy of analytical procedures [National Bureau of Standards (NBS) and EPA standard reference materials will be the primary standards used, although U.S. Geological Survey, Canadian, or other reference materials may be used if no NBS or EPA standards are available.];

- The use of instruments calibrated/standardized on a daily basis;

- The use of multiple samples (samples collected at the same time from the same location) to check the reproducibility of analytical data;

- The use of split samples and laboratory blanks to check for bias and/or contamination introduced by a particular analytical laboratory or analytical procedure;

- The use of spike samples to check the ability of an analytical procedure to recover known quantities of material added to a matrix;

- The use of procedures, including log books, to ensure that all analytical data are clearly traceable to the standard reference materials and calibration/standardization procedures employed to calibrate/standardize the analytical instrument or procedure.

Quality control requirements to be included in each SSMP and implemented in sample analysis follow

- The use of written procedures and trained personnel to perform analyses;

- The use of replicate analyses on each sample to quantify analytical precision (level of confidence), the number of replicates to be specified in the SSMP;

- The procedures for checking analytical errors (levels of confidence) against the desired levels of confidence;

- The use of audits or log books and other documentation to ensure that analytical methods and calibration/standardization procedures are being followed and that results from QA samples are being evaluated appropriately.