Energy Technology Engineering Center

Contractor to the U.S. Department of Energy
Rocketdyne Division, Rockwell International

No. A4CM-SP-0003 Rev. NC
Page 1 of 22
Orig. Date 03/10/95
Rev. Date

TITLE: AREA IV CHARACTERIZATION PROJECT - WATER SAMPLING PROCEDURE

APPROVALS

Originator	L. A. Martinez	Engineering	J. R. Cleveland
Assoc. Program Mgr.	Bijan Ha.	QA	Sam Leeder
Gen Operations Mgr.		RP&HPS	Chris Richardson
		Health & Safety	Jack Emmerson

DRR 25671

REV. LTR.	REVISION	APPROVAL/DATE

OFFICIAL COPY
APR 19 1995
NOTICE: THIS COPY SUPERSEDES ALL PRIOR COPIES ISSUED.

1. PURPOSE

This procedure defines the methods to be used when collecting and storing water samples for the Area IV Radiological Characterization Program (Reference 2.1). Water sampling is performed to characterize the radioactive properties of standing water in Area IV so that the results may be used as evidence of freedom from contamination or as a basis for follow-up actions such as additional characterization or remediation (Reference 2.1).

This procedure addresses sampling of water for radiological evaluation. It also covers administrative control of water samples and water sample analysis documentation. The procedure starts with the Sampling Crew receiving directions from the Sampling Manager on where to sample. Sample handling ends with the shipment of the samples from the Sample Collection Center to the analytical laboratory or to a disposal site (if surplus sample material is returned by the laboratory after analysis). The procedure also includes receipt and distribution of analysis reports received from the laboratory.

Portions of Area IV are known to be radiologically contaminated. These are addressed by other programs. The Area IV Radiological Characterization Program focuses on areas that are thought to be free from contaminants; however, health and safety precautions are defined in this procedure to alert operators to potential hazards associated with contamination migration.

2. REFERENCES

2.1 A4CM-ZN-0004, "SSFL Area IV Radiological Characterization Field Sampling, Analysis, and Data Management Plan"

2.2 A4CM-AN-0002, "Area IV Characterization, Health and Safety Plan"

2.3 A4CM-ZR-0007, "Area IV Characterization and Monitoring Safety Assessment"

2.4 A4CM-SP-0002, "Area IV Characterization Project - Soil Sampling Procedure"

2.5 A4CM-SP-0001, "SSFL Area IV Gamma Survey Procedures in Support of the Site Radiological Characterization Study"

3. SPECIAL EQUIPMENT AND MATERIALS

3.1 Field Logbook

3.2 Field Datasheets (water sampling)

3.3 Rinseate Datasheets (equipment rinseate sampling)

3.4 Sample containers - glass, containing 12 ml of 8N HNO_3 acid as a sample preservative (provided by the analytical laboratory)

3.5 Sample containers - amber glass (provided by the analytical laboratory)

3.6 Sample container labels (provided by the analytical laboratory)

3.7 Custody seal labels (provided by the analytical laboratory)

3.8 Chain of Custody Forms (provided by the analytical laboratory)

3.9 Funnel (for transfer of a standing water sample from the collection container or field blank sample from a deionized water container to the sample container)

3.10 Filter paper to place in the funnel for transfer of water collected for other than tritium analyses.

3.11 Sample transfer container (for collection of water and transport to the sample container)

3.12 Field transport container for sample containers

3.13 Sample shipping container (provided by the analytical laboratory)

3.14 Buckets for tool cleaning

3.15 Scrub brush for tool cleaning

3.16 Water, drinking quality and deionized, for tool cleaning and field blank samples

3.17 Detergent - Alconox, Sparkleen, or equivalent

3.18 5-gallon containers to store potentially contaminated water from tool cleaning

3.19 HNU Model 101 photoionization detector & calibration gases

3.20 Ludlum 12 counter with GM beta/gamma detector or equivalent

3.21 Ludlum 2221 scaler and gamma detector probe or equivalent

3.22 Personal protective equipment

4. GENERAL REQUIREMENTS

4.1 Safety Precautions/Special Instructions

4.1.1 Safety Precautions

All personnel performing this procedure shall be trained on the information contained in the Health and Safety Plan (Reference 2.2), the Safety Assessment (Reference 2.3), and this procedure.

Level D personnel protection equipment (PPE) will be utilized for this project unless the Health and Safety representative determines that the working conditions require additional protection (Reference 2.2). Additional PPE requirements will be provided by written recommendations from the Health and Safety representative to the Sampling Manager. The health physics technician shall ensure that the identified PPE is worn by Sampling Crew personnel.

Health and safety information shall be entered in the Area IV Radiological Characterization Field Logbook. This shall include, as a minimum, PPE specifications from the Health and Safety representative and safety instructions or special precautions. Written instructions from the Health and Safety representative shall be attached in the Field Logbook. Entries during sampling operations shall include unexpected conditions or substances relative to potential safety concerns. In the event of such findings notifications to the appropriate authorities shall be made and noted in the Field Logbook (e.g., notices of chemical substances to the Health and Safety representative and notices of radioactivity to Radiation Protection and Health Physics Services management). Calibration data for the HNU photoionization detector shall be entered on a datasheet for this calibration.

No smoking shall be permitted except in designated areas.

The health physics technician shall be responsible for monitoring the Sampling Crew for heat stress-related symptoms; however, each crew member shall be trained in the symptoms and shall provide appropriate notification if such symptoms are observed.

4.1.2 Special Instructions

4.1.2.1 Procedure Control

A single designated working copy of this procedure shall be used by the Sampling Crew. It shall be designated on the cover page as "Working Copy." The working copy shall be taken to sampling locations by the Sampling Crew to permit convenient reference to it.

The procedure working copy may be redlined to indicate changes which become necessary. The changes must be approved by at least the Sampling Manager and ETEC Quality Assurance representative. Radiation Protection and Health Physics Services (RP&HPS) must approve and sign any changes affecting radiation safety. The program manager must approve and sign any changes affecting cost or schedule.

When an approved change to the procedure is made, work affected by the change will not begin until the change has been documented in the working copy and the Sampling Crew has had an opportunity to read the change.

4.1.2.2 Procedure Sign Offs

The steps outlined in this procedure must be adhered to. The health physics technician shall sign each datasheet in the space provided to verify that all procedure steps were followed and completed, and that all data entries are valid.

4.1.2.3 Sample Collection Center

The Sample Collection Center is the designated location for processing samples for shipment to the analytical laboratory and for control of samples pending shipment. It is located in Building 009 in the storage space between Rooms 123 and 125. Access to the lockable room is controlled by the Sample Collection Center Custodian. The Center provides a secure location for maintain custody integrity for stored samples. The procedure for operation of the Center is given in Section 5.5 of Reference 2.4.

4.1.2.4 Staff

The following paragraphs identify the personnel required to perform this procedure, along with their respective responsibilities.

Sampling Manager

The Sampling Manager is generally responsible for implementing the sampling portion of the Field Sampling, Analysis, and Data Management Plan (Reference 2.1) and is specifically responsible for providing water sampling specifications (location, type, etc) to the health physics technician, specifying the sampling sequence, providing general oversight of the Sampling Crew, and ensuring that all required equipment specified in Section 3 is available.

Sampling Crew

The Sampling Crew shall be comprised of at least three people, one of whom shall be a health physics technician. The health physics technician shall have overall responsibility for day-to-day activities of the Sampling Crew, and shall have the following specific responsibilities:

1. Make all required log entries in the Field Logbook and datasheets.
2. Ensure that data entered are correct and that all steps of this procedure are adhered to. The datasheets shall be signed in order to satisfy this requirement.
3. Calibrate and operate the Ludlum 12 and 2221 gamma detectors for all radioactivity measurements.

A Sampling Crew member who has been trained in the calibration and operation of the HNU instrument shall be responsible for the instrument, and shall conduct all HNU measurements. The Sampling Crew members shall collect all water samples using the appropriate collection equipment, and clean all sampling equipment after its use for sample collection.

Sample Collection Center Custodian

The Sample Collection Center Custodian shall be responsible for the operation of the Sample Collection Center. The Custodian shall coordinate with the health physics

technician for transfer of samples from the field to the Sample Collection Center, control samples and maintain their custody integrity while they are stored there, ship samples to the analytical laboratory, maintain a record of sample location and status, receive and distribute analysis reports received from the laboratory, and receive, store, and ship excess sample material which may be returned from the laboratory.

Health and Safety Representative

The Health and Safety representative shall serve as the safety advisor for the duration of the project, provide guidance on interpretation of data related to safety, and advise on appropriate levels of worker protection. Detailed responsibilities are presented in the Health and Safety Plan (Reference 2.2).

4.1.2.5 Training

All Sampling Crew personnel must be trained on the information in the Health and Safety Plan (Reference 2.2), the Safety Assessment (Reference 2.3), and this procedure. The training must provide a thorough understanding of the water sampling procedure. In addition, personnel must be trained in the following specific areas:

1. Proper use of the HNU photoionization detector
2. Finding grid locations of sampling locations specified by the Sampling Manager
3. Proper sealing and labeling of sample containers
4. Proper cleaning of contaminated sampling equipment
5. Proper use of Chain of Custody Forms.

The following training courses must be completed by all field personnel, as required by the Health and Safety Plan (Reference 2.2).

1. Course # 4013, "Radiation Safety"
2. Course # 4044, "Cardio Pulmonary Resuscitation"

4.1.2.6 Screening of Water Sample Locations for Radiation

As a precautionary measure the health physics technician shall examine all sampling locations for the presence of radioactivity using a Ludlum 2221 gamma detector or equivalent. The health physics technician shall record the findings of the radiation screening on the Field Datasheet for the location. This examination will be conducted before sampling, as detailed in Section 5.

If the detector reading exceeds 21,500 cpm (~100 μR/hr), the health physics technician shall direct the Sampling Crew to stop all sampling activities, and shall then notify RP&HPS management and the Sampling Manager, and request direction.

4.1.2.7 Screening of Water Sample Locations for Volatile Organic Chemicals

As a precautionary measure for personnel safety, all sampling locations shall be examined for the presence of volatile organic chemicals by the use of an HNU photoionization detector calibrated to isobutane. The examination shall be done by a crew member trained in the use of the HNU detector. The health physics technician shall record the findings of the chemical screening in the Field Datasheet for the sampling location. This examination will be conducted before sampling, as detailed in Section 5.

If an indication of isobutane greater than 2 ppm is detected, the health physics technician shall direct the Sampling Crew to leave the area immediately, and shall then notify the Health and Safety representative and the Sampling Manager, and request direction.

4.1.2.8 Screening of Water Samples for Radiation

The health physics technician shall examine all water samples after their collection for the presence of radioactivity, using a Ludlum 2221 gamma detector or equivalent. The health physics technician shall record the findings of the radiation screening on the Field Datasheet for the sample.

If the detector reading exceeds 21,500 cpm (~100 μR/hr), the health physics technician shall direct the Sampling Crew to stop all sampling activities, and shall then notify RP&HPS management and the Sampling Manager, and request direction. No sample showing a detector reading greater than 21,500 cpm shall be transferred to the Sample Collection Center unless approval has been granted by the Sampling Manager and RP&HPS management.

4.1.2.9 Documentation and Chain of Custody

Documentation of all water samples collected shall be maintained as outlined in the detailed procedure (Section 5). The documentation used is described in this section.

The Area IV Radiological Characterization Field Logbook shall be used to record the date and time of the start of water sampling activities, the names of team members present, the work plan for the day, reference to procedures in use, and notes on special instructions received (including instructions from the Health & Safety representative), occurrence of accidents or injuries, and instrument problems or breakage. The Field Logbook shall be maintained by the health physics technician.

Field Datasheets (Appendix A) shall be filled out as the sampling procedure is performed, to record pertinent data as described in Section 5. The health physics technician shall be responsible for data entry and shall sign the completed datasheet to document that the data entered are valid and that the procedure was followed and completed.

The Chain of Custody Form (Appendix B) will be initiated and maintained for all samples collected in order to maintain sample custody control and traceability. Responsibility for completing the entries is described in Appendix B.

A RP&HPS Instrument Qualification Report (Appendix C) shall be used to record data for the gamma detector functional performance checks performed daily (at the beginning, middle, and end of the shift) when a detector is in use to support sampling. The health physics technician is responsible for the performance checks and recording the data.

4.1.2.10 Sample Packaging

The glass sample containers shall be sealed, labeled, and placed in sealed plastic bags to contain the sample in the event of glass breakage. The plastic bag will be placed in a protective shipping container for handling to prevent container breakage during field handling and transport to the analytical laboratory.

4.1.2.11 Sample Volume

The sample volume will be that needed to fill the sample container.

4.1.2.12 Sampling Specifications

The following sampling information shall be provided by the Sampling Manager to the Sampling Crew for each sample to be obtained. This information shall be entered in the Field Logbook by the health physics technician.

1. Sampling location (survey block identifier and coordinates within the block).
2. Number of samples to be collected at each location
3. Sample identification numbers. The format is A4CM-YY-XXXX-a, where YY is the last two digits of the year, XXXX is a sequential number for the sample and -a is a subdivision if more than one sample is taken at a specific location.
4. Quality assurance sample requirements (field blank, equipment rinseate)

4.1.2.13 Sample Transfer and Control

Sample transfer and control involves documentation of the transfer of samples from the field to the Sample Collection Center; storage, handling, and shipment of samples; and final receipt of analysis documentation. The Chain of Custody Form (Appendix B) will be used to provide continuous documented responsibility for each sample from collection until completion of analysis. The responsibility at Area IV will be with one or more Sampling Crew members and the Sample Collection Center Custodian. After a sample has been collected the health physics technician will assume responsibility by signing the Chain of Custody Form in the "Samplers Signature" space. The health physics technician (or another Sampling Crew member to whom custody has been transferred) will transport the sealed and labeled sample to the Sample Collection Center when leaving the field. (Samples must be transferred to the Sample Collection Center whenever a Sampling Crew member cannot provide physical custody.) The Sample Collection Center Custodian will then take custody of the sample and initiate shipping activities or storage pending shipping.

4.1.2.14 Instrument Calibrations

The HNU Model 101 photoionization detector shall be inspected and calibrated to the manufacturer's instructions prior to work start-up of each sampling day. The Sampling Crew member to whom HNU photoionization detector responsibility has been assigned shall document the inspection and calibration in the HNU calibration datasheet. Recalibration is required after cleaning the lamp or when background levels drift. The instrument is sensitive to humidity and may require periodic lamp cleaning if it is humid.

The Ludlum 12 and 2221 gamma detectors shall be qualified at shift start, mid-shift, and at shift end when sampling will be conducted. The qualification checks shall be

documented in the Daily Instrument Qualification Report (Appendix C). If the instrument fails to qualify, a new instrument must be used or the failed instrument must be repaired and recalibrated. The health physics technician shall perform and document the qualification checks.

4.1.2.15 Quality Assurance Sampling

Water sampling shall be supported by collection of quality assurance samples for analysis (Reference 2.1). Quality assurance sample data will be compared to data from sampling of standing water as part of the data validation process. The following quality assurance samples will be collected. More details of these samples are provided in Reference 2.1.

1. Field blank sample. A field blank sample is a field-prepared sample of deionized water which has been carried to the sampling location. It provides a check for sample contamination during the sampling procedure.
2. Equipment rinseate sample. An equipment rinseate sample is a sample of the water that has been used to rinse the sampling equipment after decontamination following sampling.

4.2 Limits

4.2.1 Sampling Crew personnel and all other authorized personnel shall stop all sampling activities if the Ludlum 2221 gamma detector reading exceeds 21,500 cpm (~100 μR/hr).

4.2.2 Sampling Crew personnel and all other authorized personnel shall immediately leave an area if the HNU photoionization detector reading exceeds 2 ppm isobutane.

4.3 Prerequisites

4.3.1 Prior to initiating sampling tasks the Sampling Manager shall verify that all training requirements (Section 4.1.2.3) have been met by all members of the Sampling Crew. Evidence thereof shall be available in the personnel files maintained by the department manager.

4.3.2 Prior to initiating sampling tasks the Sampling Manager shall review this document with the Sampling Crew.

4.3.3 Prior to initiating sampling tasks, the Health and Safety representative shall determine the proper personnel protection equipment. A listing of this equipment shall be entered in the Field Logbook by the health physics technician.

4.3.4 A Field Logbook shall be available and maintained by the health physics technician, who shall record all pertinent information specified herein.

4.4 Sequence of Activities

4.4.1 Major segments of this procedure (Sections 5.1 through 5.5) must be done in the sequence shown. Furthermore, as equipment is used for sampling activities, and thus becomes potentially dirty or contaminated, Section 5.4 (Tool Cleaning/ Decontamination) must be implemented before sampling begins at another sampling location.

4.4.2 The procedure steps within the major segments must be done in sequence unless otherwise noted.

5. DETAILED PROCEDURE

This section provides the detailed procedure which must be followed for water sampling as part of the Area IV Radiological Characterization Program. A checklist based on this procedure is given in Appendix D.

5.1 Procedure Verification

Verification that this procedure is the latest revision and permission to proceed:

Sampling Manager: _____ _____ _____
Print Signature Date/Time

5.2 Mapping Extent of Water

5.2.1 Obtain from the Sampling Manager an Area IV topographic map for the area containing the body of water to be sampled.

5.2.2 Prepare an approximate map of the body of water by marking the Area IV topographic map section to show the extent of the water. Mark the map also to show access considerations (geographic features and vegetation). Include in the markup the location of at least one Area IV survey marker which can be used as the reference for determining the coordinates of the sampling locations.

5.2.3 Give the map to the Sampling Manager to serve as the basis for selection of sampling locations.

5.3 Preparation for Water Sampling

5.3.1 Verify that the Field Logbook, blank Chain of Custody Forms, and blank Field Datasheets are in the possession of the health physics technician.

5.3.2 Obtain and record in the Field Logbook the water sampling directions from the Sampling Manager. Verify that this includes the sampling location, types of samples to be collected (including quality assurance samples), number of samples to be collected, and sample identification numbers.

5.3.3 Enter the date and time, names of the members of the Sampling Crew, sampling location, and sample type(s) on the Field Datasheet.

5.3.4 Notify the Sample Collection Center Custodian that sampling is beginning and establish a preliminary schedule for transferring samples to the Center.

5.3.5 Obtain all required water sampling equipment according to the equipment check list.

5.3.6 Verify that all sampling equipment is clean in accordance with Section 5.5 of this procedure. If the equipment is not clean, proceed to Section 5.5 for cleaning and decontamination. Otherwise, proceed to Section 5.3.7.

5.3.7 Obtain the sample containers required per the Sampling Manager instructions (Section 5.3.2).

5.3.8 Verify that all PPE is available and Sampling Crew members are properly suited up as required by the sampling conditions.

5.3.9 Proceed to the sampling location. Identify the location as described in Section 5.2.4 of Reference 2.5. If specified locations are approximate and final locations are identified in the field, identify the coordinates of the location selected. Record on the Field Datasheet the survey block identification and grid coordinates within the block or the data necessary to allow calculation of the grid coordinate by an alternate method.

5.3.10 Remove all surface vegetation and non-aqueous materials as necessary to gain access to the sampling location. The area to be cleared shall be determined by the health physics technician.

5.3.11 Scan the area to be sampled, using a Ludlum 2221 gamma detector or equivalent. Record the maximum reading on the Field Datasheet.

5.3.12 Examine the area for the presence of volatile organic chemicals using the HNU photoionization detector. Record the readings on the Field Datasheet.

5.4 Water Sampling

5.4.1 Collection of Water Samples

5.4.1.1 Make sure all the preparation steps in Section 5.3 have been completed.

5.4.1.2 Collect a water sample for tritium analysis, using a clean amber glass sample container having no preservative. Obtain the sample either by submerging the sample container in the water to fill it or (if the water is too shallow for direct collection of the necessary volume) by transferring water to the sample container using a sample collection container and funnel. Sample in a manner to avoid inclusion of surface debris, surface film, or bottom solids (avoid stirring up bottom solids). Record the time, type of sample ("tritium"), and sample identification number on the Field Datasheet.

5.4.1.3 Scan the sample container with the Ludlum 2221 gamma detector or equivalent. Record the maximum reading on the Field Datasheet.

5.4.1.4 Close and seal the sample container:

1. Place a clean lid on the container.
2. Seal the seam of the lid and container with plastic electrical tape.
3. Sign and date a custody seal (performed by the health physics technician).
4. Affix the custody seal across the seam of the lid so that the lid cannot be removed without tearing the seal.

5.4.1.5 Fill out the sample container label (done by the health physics technician). The label is affixed to the container as received from the analytical laboratory. Enter the following information in the spaces provided:

1. Sample Enter the identification number specified by the Sampling Manager in the format defined in Section 4.1.2.12.
2. Location Enter "SSFL Area IV".

3. Analysis Enter an "X" in the appropriate analysis columns for each sample to identify the analyses to be performed, or leave blank for entry later by the Sample Collection Center Custodian.
4. Date and Time Enter date and time.
5. Preservative Enter "None".
6. Client Enter "Rocketdyne".

5.4.1.6 Place the container in a new clear plastic bag and seal the bag with tape. Take care that the tape does not obscure the information on the sample container label.

5.4.1.7 Enter information in the Chain of Custody Form for the sample collected. A new form shall be used for each trip to the field since at the end of each trip the Chain of Custody Form will be placed with the samples in the Sample Collection Center. The health physics technician shall record the following information, then sign in the space provided for samplers signature:

1. Sample No Enter the sample ID number from the sample container label.
2. Date and Time Enter date and time.
3. Location "SSFL Area IV"

5.4.1.8 Place the sample container in the field transport container.

5.4.1.9 Collect a water sample for the analyses other than tritium. Use a clean plastic sample container prepared with 8N HNO_3 preservative. (CAUTION: The sample container has 12 ml of 8N HNO_3 acid. Be careful not to spill the acid when handling the sample container.) Obtain the sample by transferring water to the sample container using a sample collection container and a funnel with filter paper. Sample in a manner to avoid inclusion of surface debris, surface film, or bottom solids (avoid stirring up bottom solids). Record the time, type of sample ("other"), and sample identification number on the Field Datasheet.

5.4.1.10 Scan the sample container with the Ludlum 2221 gamma detector or equivalent. Record the maximum reading on the Field Datasheet.

5.4.1.11 Close and seal the sample container:

1. Place a clean lid on the container.
2. Seal the seam of the lid and container with plastic electrical tape.
3. Sign and date a custody seal (performed by the health physics technician).
4. Affix the custody seal across the seam of the lid so that the lid cannot be removed without tearing the seal.

5.4.1.12 Shake the sample container to mix the pre-added 8N HNO_3 with the sample.

5.4.1.13 Fill out the sample container label (done by the health physics technician). The label is affixed to the container as received from the analytical laboratory. Enter the following information in the spaces provided:

1. Sample Enter the identification number specified by the Sampling Manager in the format defined in Section 4.1.2.12.
2. Location Enter "SSFL Area IV".

3. Analysis Enter an "X" in the appropriate analysis columns for each sample to identify the analyses to be performed, or leave blank for entry later by the Sample Collection Center Custodian.
4. Date and Time Enter date and time.
5. Preservative Enter "8N HNO_3".
6. Client Enter "Rocketdyne".

5.4.1.14 Place the container in a new clear plastic bag and seal the bag with tape. Take care that the tape does not obscure the information on the sample container label.

5.4.1.15 Enter information in the Chain of Custody Form for the sample collected. A new form shall be used for each trip to the field because at the end of each trip the Chain of Custody Form will be placed with the samples in the Sample Collection Center. The health physics technician shall record the following information, then sign in the space provided for samplers signature:

1. Sample No Enter the sample ID number from the sample container label.
2. Date and Time Enter date and time.
3. Location "SSFL Area IV"

5.4.1.16 Place the sample container in the field transport container.

5.4.1.17 If field blank samples are to be collected at this location proceed to Section 5.4.1.18. If not, proceed to Section 5.4.1.22.

5.4.1.18 Prepare a field blank sample for tritium analysis by pouring deionized water through a clean funnel into a clean amber glass sample container with no preservative. Record the time, type of sample ("blank - tritium"), and sample identification number on the Field Datasheet.

5.4.1.19 Repeat Sections 5.4.1.3 through 5.4.1.8 to scan the sample for radioactivity; close, seal, label, and package it; prepare the Change of Custody Form; and place the sample in the field transport container.

5.4.1.20 Prepare a field blank sample for other analyses by pouring deionized water through a clean funnel into a clean glass sample container prepared with 8N HNO_3 preservative. (CAUTION: The sample container has 12 ml of 8N HNO_3 acid. Be careful not to spill the acid when handling the sample container.) Record the time, type of sample ("blank - other"), and sample identification number on the Field Datasheet.

5.4.1.21 Repeat Sections 5.4.1.10 through 5.4.1.15 to scan the sample for radioactivity; close, seal, label, and package it; mix the sample and preservative; prepare the Change of Custody Form; and place the sample in the field transport container.

5.4.1.22 Record on the Field Datasheet any comments concerning the sampling activities which might aid evaluation of the data (e.g., water coloration, presence of foreign objects nearby, proximity to geological features, etc.), and health physics technician sign the datasheet.

5.4.1.23 Notify the Sample Collection Center Custodian that samples are ready to be transferred to the Sample Collection Center.

5.4.1.24 Transport the field transport container containing the sample(s), Chain of Custody Form(s), and datasheets (field and rinseate, if applicable) to the Sample Collection Center.

5.4.1.25 Transfer custody of each sample by signing its associated Chain of Custody Form. The Sampling Crew member having custody will sign in the next available "Relinquished By / Date" space. The Sample Collection Center Custodian will sign in the next "Received By / Date" space. If the Sample Center Custodian is not available at the time of sample delivery, the health physics technician will act as the Custodian and follow the Sample Collection Center sample receiving procedures of Sections 5.5.1.4 through 5.5.1.6 of Reference 2.4. Custody transfer will be accomplished when the Custodian is available.

5.4.1.26 In accordance with the procedures for Sample Collection Center operation (Section 5.5 of Reference 2.4), maintain control of the samples pending shipment, ship to the laboratory for analysis, receive and distribute analysis results, and receive samples if returned from the laboratory.

5.5 Tool Cleaning/Decontamination

Since contamination of equipment is not always easily discernable, it is necessary to assume that all sampling equipment is contaminated until shown otherwise. The following steps shall be taken to clean/decontaminate sampling tools prior to collecting water samples. Cleaning/decontamination may take place at any time prior to sampling. Sampling tools and sampling equipment include everything which could transfer contamination between samples (i.e., sample collection container and funnel for water transfer to the sample container).

5.5.1 Set up cleaning buckets in the equipment cleaning area.

5.5.2 Add detergent and cleaning water to the wash bucket and scrub the equipment with a scrub brush. The cleaning solution may be reused for cleaning other equipment unless it has become too dirty.

5.5.3 Using as little water as possible, rinse the equipment with clean water into the rinse bucket, making sure all rinse water drains into the bucket.

5.5.4 Air dry the equipment and seal it in clean plastic bags.

5.5.5 Check the dried equipment for contamination using the Ludlum 12 counter with a GM beta/gamma detector. If the scan indicates that equipment is still radioactively contaminated, repeat Steps 5.5.1 through 5.5.17 until it is clean. Record the readings on the radiation survey sheet, Form 732A, and place it in the logbook.

5.5.6 Transfer to and retain the soak solutions and rinse solutions in a suitable container specified by Environmental Protection. The container shall be properly labeled and stored per Environmental Protection instructions. The soak solutions and rinse solutions shall remain in storage until the equipment rinseate samples have been analyzed by the radiochemistry laboratory, or shown to be free from radioactive or chemical contamination by RP&HPS and Environmental Protection.

6. COMPLETION REVIEW AND APPROVAL

6.1 Procedure Complete:

Sampling Manager_____Date_____

Associate Program Manager_____Date_____

Quality Assurance_____Date_____

Appendix A Field Datasheet

FIELD DATASHEET

Date: _____ Time: _____

SAMPLING CREW _____ _____ _____
Health Physicist 2nd Crew Member 3rd Crew Member

LOCATION

Survey Block _____ Block Coordinates: _____ _____
North East

Location Data (if alternate method used): _____

_____

LOCATION SURVEY

_____ _____
Radiation Reading (cpm) Volatiles Reading (ppm)

SAMPLES

Time	Type	Sample Identification No.	Reading (cpm)
_____	_____	A4CM- ____ - _____	_____
_____	_____	A4CM- ____ - _____	_____
_____	_____	A4CM- ____ - _____	_____
_____	_____	A4CM- ____ - _____	_____

INSTRUMENTS USED

Instrument Electronics: _____ _____
Model No. Serial No.

Radiation Detector: _____ _____
Model No. Serial No.

HNU Detector: _____ _____
Model No. Serial No.

GENERAL COMMENTS

All required procedure steps were followed and completed and data entered are correct.

_____ _____ _____
Print name Sign Date

Appendix B Chain of Custody Form

This appendix contains the Chain of Custody Form provided by the analytical laboratory for controlling and documenting custody of samples collected using this procedure. The responsibilities for entering the information on the form are listed below.

1. Preprinted information
   a. Client name and address
   b. Project name
   c. Analysis types (in the "Parameters" columns)

2. Health physicist technician at the time of sampling
   a. Sample No (Enter the sample number from the collection bottle label)
   b. Date and Time
   c. Location (Enter "SSFL")
   d. Enter an "X" in the appropriate analysis columns for each sample to identify the analyses to be performed, or leave the columns blank for later entry by the Sample Collection Center Custodian. These analyses will be specified by the Sampling Manager.
   e. # containers (for the sample identified on the line; probably one in every case)

3. Health physicist technician and Sample Collection Center Custodian at the time of sample transfer to the Sample Collection Center
   a. Relinquished by (health physics technician) and Received by (Sample Collection Center Custodian)
   b. Date and page ___ of ___ in the upper right of the form

4. Sample Collection Center Custodian in preparation for shipment
   a. Enter an "X" in the appropriate analysis columns for each sample to identify the analyses to be performed if the entries were not made at the time of sampling. These analyses will be specified by the Sampling Manager.
   b. Enter "observations, comments, volumes, special or additional test" as specified by the Sampling Manager
   c. Sample type or matrix ("Water")
   d. Total number of containers (sum of "# containers" column entries)
   e. Method of shipment
   f. Special shipment - handling or storage requirements (as specified by the Sampling Manager - probably none)

5. Sample Collection Center Custodian and shipper at time of shipment
   a. Relinquished by (Sample Collection Center Custodian) and Received by (shipper)

TMA

Thermo Analytical

TMA/Richmond 2030 Wright Avenue P. O. Box 4040 Richmond, CA 94804-0040 (510) 235-2633 Fax No. (510) 235-0438

Chain of Custody

CLIENT Rocketdyne

ADDRESS P. O. Box 7930

Canoga Park, CA 91309-7930

PROJECT Area IV Characterization

SAMPLERS SIGNATURE:

DATE _____ PAGE___OF___

SAMPLE NO	DATE	TIME	LOCATION	PARAMETERS: Gamma Scan	Sr^{90}	Thorium Isotopes	Uranium Isotopes	Plutonium Isotopes	Tritium							SAMPLE TYPE OR MATRIX	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST

1) RELINQUISHED BY / DATE:	2) RECEIVED BY / DATE:	3) RELINQUISHED BY / DATE:	4) RECEIVED BY / DATE:	TOTAL NO. OF CONTAINERS:
COMPANY:	COMPANY:	COMPANY:	COMPANY:	METHOD OF SHIPMENT:
5) RELINQUISHED BY / DATE:	6) RECEIVED BY / DATE:	7) RELINQUISHED BY / DATE:	8) RECEIVED BY / DATE:	SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS
COMPANY:	COMPANY:	COMPANY:	COMPANY:	

Form SCP-1.5 09-15-94

"quality environmental services"

Appendix C Daily Instrument Qualification Report

RADIATION PROTECTION & HEALTH PHYSICS SERVICES
GAMMA INSTRUMENT QUALIFICATION REPORT

INSTRUMENT ELECTRONICS

RI#: _____ S/N: _____

MFR: _____ Mdl: _____

RADIATION DETECTOR

RI#: _____ S/N: _____

MFR: _____ Mdl: _____

GAMMA INSTRUMENT CALIBRATION

Last Calibrated: Next Cal Due:

FIELD CHECK SOURCE

Source ID: Isotope: Activity:

_____ _____ _____

BKGD GAMMA EXPOSURE STANDARD

RI#: _____ S/N: _____

MFR: _____ Mdl: _____

INSTRUMENT QUALIFICATION DATA

	@Shift Start:	@Mid-Shift:		@Shift End:
Check Time:				
QA&T:				
SCALER DIAGNOSTICS (CAL)				
( ) BAT:				
( ) HV:				
( ) THRSH:				
RS CUM CNT:				

BACKGROUND RESPONSE

Expected 1-Min Count: (RS): _____ uR/hr (Instr): _____ cpm

Measured 1-Min Count:

RS (uR/hr):				
Instr (cpm):				

CHECK-SOURCE RESPONSE

Expected 1-Min Count: (RS): _____ uR/hr (Instr): _____ cpm

Measured 1-Min Count:

RS (uR/hr):				
Instr (cpm):				

HP INIT'L: : : :

DAILY IQR AVERAGES

CHECK SOURCE RESPONSE:

Avg Msrd (Chk Src+Bkgd) Expsr Rate:

RS: _____ +/- _____ uR/hr

Avg (Chk Src+Bkgd) Count:

Instr: _____ +/- _____ cpm

x (0.00465 uR/hr/cpm) =

= _____ +/- _____ uR/hr

AMBIENT BACKGROUND RESPONSE:

Avg Msrd Bkgd Exposure Rate:

RS: _____ +/- _____ uR/hr

Avg Bkgd Count:

Instr: _____ +/- _____ cpm

x (0.00465 uR/hr/cpm) =

= _____ +/- _____ uR/hr

SIGNATURE:
HP: _____ INIT'L: _____ Date: _____

_____ _____

QA&T: _____ _____

SSFL Area IV
Radiological
Characterization
Study

jjc:sdf_IQR.(28jun94)

Appendix D Water Sampling Procedure Checklist

This checklist summarizes the steps in the water sampling procedure. The referenced sections of the procedure are the full procedure steps corresponding to each summary item.

1.0 Prerequisites

1.1. Ensure sampling equipment is clean before each sample collection.

1.2. If the HNU photoionization detector reading exceeds 2 ppm, stop sampling and notify the Health & Safety representative and the Sampling Manager.

1.3. If the Ludlum 2221 detector reading exceeds 21,500 cpm, stop sampling and notify RP&HPS management and the Sampling Manager.

2.0 Sampling

2.1. Prepare a map of the body of water. (Para. 5.2.1 through 5.2.3)

2.2. Complete preparations for field sampling operations. (Para. 5.3.1 through 5.2.8)

2.3. Find the sampling location, clear the area, and scan for radiation and volatiles. (Para. 5.3.9 through 5.3.12)

2.4. Transfer water to fill sample container for tritium analysis. (Para. 5.4.1.2)

2.5. Measure the sample gamma radiation and record the readings. (Para. 5.4.1.3)

2.6. Close, seal, and label the sample container. (Para. 5.4.1.4 through 5.4.1.6)

2.7. Complete the Chain of Custody Form. (Para. 5.4.1.7)

2.8. Place the sample container in the field transport container. (Para. 5.4.1.8)

2.9. Transfer water to fill sample container for other analyses. (Para. 5.4.1.9)

2.10. Repeat Steps 2.5 through 2.9. (Para. 5.4.1.10 through 5.4.1.16)

2.11. If a field blank sample is required, repeat Steps 2.4 through 2.10 to fill the sample bottles with deionized water. (Para. 5.4.1.17 through 5.4.1.21)

2.13. Finish the Field Datasheet and, if sampling is not complete, proceed to the next sampling location. (Para. 5.4.1.22)

2.14. When Sampling Crew members cannot continue physical custody of samples, transfer the samples to the Sample Collection Center. (Para. 5.4.1.23 thru 5.4.1.25)

3.0 Equipment Cleaning

3.1. Set up buckets in the cleaning area. (Para. 5.5.1)

3.2. Scrub the equipment with a scrub brush in the wash bucket (detergent and water). (Para. 5.5.2)

3.3. Rinse the tools by pouring water over them into the rinse bucket. (Para. 5.5.3)

3.4. Allow the equipment to air dry and seal it in clean plastic bags. (Para. 5.5.17)

3.5. Check the dried equipment for contamination using the Ludlum 12 detector. Repeat the tool cleaning if they are still contaminated. (Para. 5.5.18)

3.6. Pour the soak water and the rinse water into a designated container. Seal, label, and store the container per Environmental Protection instructions. (Para. 5.5.19)