



Southeast
Missouri State University

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September 7, 2010

Mike McCann
USNRC Region III
2443 Warrenville Road
Suite 210
Lisle, Illinois 60532-4352

Dear Mr. McCann:

Enclosed please find a copy of the *Decontamination and Survey Plan for Magill and Rhodes Halls - Revision 1* dated August 2010. We request that this document, which contains soil sampling procedures, replace the current *Decontamination and Survey Plan for Magill and Rhodes Halls* dated November 2006. The current document is cited in condition 21, part A, of our NRC materials license No. 24-09296-02 Amendment 15.

Attached also find the SAIC procedures referenced in the *Decontamination and Survey Plan for Magill and Rhodes Halls - Revision 1*.

As always, I and my institution appreciate your assistance. Feel free to call me if there is any other information you require.

Sincerely,

Walt W. Lilly
Radiation Safety Officer
Professor of Biology

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Decontamination and Survey Plan for Magill and Rhodes Halls

prepared for

Southeast
Missouri State University,
CAPE GIRARDEAU

prepared by



SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
St. Louis, Missouri

REVISION 1

August 2010

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
LIST OF TABLES	ii
LIST OF APPENDICES	ii
LIST OF ACRONYMS AND ABBREVIATIONS	iii
1.0 INTRODUCTION	1
1.1 SCOPE	1
1.2 SITE DESCRIPTION AND HISTORY	2
1.2.1 Historical Americium-241 Contamination	2
1.2.2 Previous Scoping Investigations	2
1.3 RADIOLOGICAL CONTAMINANT OF CONCERN	3
2.0 RADIOLOGICAL SURVEYS	0
2.1 RADIOLOGICAL INSTRUMENTATION	0
2.1.1 Instrument Selection	0
2.2 QUALITY CONTROLS.....	0
2.2.1 Field Survey Instrumentation Quality Controls.....	0
2.2.2 Soil Investigation Quality Controls	0
2.3 UNRESTRICTED USE CRITERIA.....	1
2.3.1 Unrestricted Use Criteria for Items and Materials to be Released from the University	1
2.3.2 Unrestricted Use Criteria for Building Surfaces	2
2.3.3 Action Level Requiring SAIC Involvement	3
2.3.4 Action Level Requiring NRC Notification	3
2.3.5 Soil Release Criteria	3
2.4 SURVEYING AND SAMPLING	3
2.4.1 Surveys of Items/Building Surfaces.....	3
2.4.2 Surface Soil Sampling.....	4
2.5 PROCESSING OF CONTAMINATED ITEMS AND BUILDING SURFACES	4
2.6 CONTROLS FOR SOILS IN EXCESS OF RELEASE CRITERIA	6
2.7 STORAGE AND DISPOSAL	6
2.8 SURVEY DOCUMENTATION	6
3.0 EXPOSURE EVALUATION	0
3.1 IDENTIFICATION OF POTENTIALLY EXPOSED PERSONNEL	0
3.2 EVALUATION TO DETERMINE REQUIREMENT TO MONITOR	0
4.0 SAFETETY AND HEALTH	0

TABLE OF CONTENTS (Continued)

<u>SECTION</u>	<u>PAGE</u>
5.0 REFERENCES.....	0
5.0 DATA EVALUATION	12

LIST OF TABLES

Table 2-1. Unrestricted Use Criteria for Items and Materials	1
Table 2-2. Scan Rates, Investigation Levels, and Fixed Point Count Times.....	2

LIST OF APPENDICES

Appendix A	Exposure Scenario Development for Table in Johnson Hall Room 222
Appendix B	Exposure Scenario Development and Determination of Unrestricted Use Criteria for Previously Inaccessible Surfaces in Magill Hall
Appendix C	Soil Survey Plan for Surface Soils Outside Magill and Rhodes Halls

LIST OF ACRONYMS AND ABBREVIATIONS

μCi	microcurie(s)
%	percent
σ	standard deviation
Δ	shift
Δ/σ	relative shift
A_f	area correction factor
Am	americium
ALARA	as-low-as-reasonably achievable
ALI	annual limit on intake
bgs	below ground surface
CFR	Code of Federal Regulations
cm	centimeter(s)
cm^2	square centimeter(s)
COC	Contaminant of Concern
cpm	counts per minute
Cs	cesium
CY	calendar year
D&D	decontamination and decommissioning
DCGL	Derived Concentration Guideline Level
DCGL_{EMC}	Derived Concentration Guideline Level used for elevated measurement comparison
$\text{dpm}/100 \text{ cm}^2$	disintegrations per minute per 100 square centimeters
DOD	Department of Defense
DOE	Department of Energy
DQA	Data Quality Assessment
DQO	data quality objectives
EPA	Environmental Protection Agency
FIDLER	Field Instrument for the Detection of Low-Energy Radiation
FM	Facilities Management
FSS	Final Status Survey
ft	foot/feet
FTP	Field Technical Procedure
g	gram(s)
GPS	Global Positioning Systems
GWS	Gamma Walkover Survey
H_a	alternative hypothesis
H_0	null hypothesis
hr/yr	hours per year
HVAC	heating, ventilation, and air conditioning
JH222	Johnson Hall Room 222
keV	kiloelectron Volts
LBGR	Lower Bound of the Grey Region
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
m	meter(s)
m^2	square meter(s)

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

mCi	millicuries
MDC	minimum detectable concentration
MDC _{Scan}	scan minimum detectable concentration
MH242	Magill Hall Room 242
mrem/yr	millirem per year
MS/MSD	matrix spike/matrix spike duplicate
NaI	Sodium Iodine
NIST	National Institute of Standards and Technology
NRC	Nuclear Regulatory Commission
pCi	picocurie(s)
QA	quality assurance
QAAP	Quality Assurance Administrative Procedure
QC	quality control
RESRAD	RESidual RADioactivity computer model
RSMA	radioactive material storage area
RPP	Radiation Protection Program
RRP	Radiation Protection Program procedure
RSO	Radiation Safety Officer
SAIC	Science Applications International Corporation
sec	second(s)
Sr	strontium
TEDE	total effective dose equivalent
Th	thorium
ZnS	zinc-sulfide

1.0 INTRODUCTION

The purpose of this document is to describe the protocol for survey, decontamination (if necessary) and disposition of equipment, materials, and building surfaces (e.g., walls and floors) that are potential radiologically contaminated with americium-241 (Am-241).

In August through November of calendar year 2000 (CY00), certain room/corridor building surfaces, equipment and materials within Magill Hall were decontaminated, surveyed, inspected by the Nuclear Regulatory Commission (NRC) and released for unrestricted use (NRC 2001). All of Magill Hall was released for unrestricted use in November 2000. However, during the characterization, decontamination and final status survey (FSS) of these areas in Magill Hall, 100 percent (%) of the room/corridor building surfaces, equipment and materials were not accessible for survey (i.e., large shelving cabinets, permanently installed lab benches, etc.). Therefore, this plan describes the protocol for survey and decontamination (if necessary) of these previously inaccessible areas.

There were some items that were discovered outside of Magill Hall, primarily in Rhodes Hall, that were contaminated above release limits. These were items that were thought to have originated from Magill Hall and were moved to other locations within the University in the normal conduct of University operations. A visual scoping survey was conducted across the University (all buildings except Magill Hall and residence halls) to identify any other items that might have been moved from Magill Hall and required survey. The visual scoping survey was completed in June of 2002. This plan also describes the protocol for survey, decontamination (if necessary) and disposition of items from Magill and Rhodes Halls identified for surplus within the University system.

In May 2010, a small area of elevated activity was identified south of Magill Hall near the radiological material storage bunker. A Gamma Walkover Survey (GWS) was performed to locate the source of the elevated activity and a sample was collected. The analytical results from the sample collected during the investigation identified the elevated radioactivity as Am-241. Therefore, a revision to this plan was necessary to address protocol for investigation of surface soil adjacent to Magill and Rhodes Halls.

1.1 SCOPE

The scope of this document is limited to building surfaces, equipment and materials within Magill Hall that were not accessible for survey during the CY00 effort. In addition to items mentioned above, surface soils around Magill and Rhodes Halls may require investigation for the presence of licensed materials. Appendix C has been added to this plan to describe how surface soils will be investigated, if necessary.

Survey, decontamination (if necessary), re-survey (if necessary) and release of these previously inaccessible items and surfaces will be investigated when the Radiation Safety Officer (RSO) is informed that they will become accessible due to movement of equipment, renovation of the room, etc. Room 242 is not included because all contents of the room were removed (including all permanently installed cabinetry and flooring) during the CY00 effort. Survey of building infrastructure (i.e., piping systems, electrical systems, heating, ventilation, and air conditioning [HVAC] systems, etc.) are also not included in the scope of this plan and are not required for routine maintenance or replacement activities or release of components disassembled from the system during maintenance.

In addition, the scope of this document also includes any items that the University intends to surplus from Magill or Rhodes Hall that were in place prior to the CY00 effort.

1.2 SITE DESCRIPTION AND HISTORY

Southeast is located in the town of Cape Girardeau, Missouri near the Mississippi River. Cape Girardeau is a community of approximately 40,000 people and is considered a hub for retailing, medicine, manufacturing, communications and cultural activities between St. Louis, Missouri and Memphis, Tennessee. There are approximately 8,500 students and 350 full-time faculty members at the university.

1.2.1 Historical Americium-241 Contamination

In CY00, Am-241 contamination was discovered in Magill Hall. The source of contamination was determined to be from a broken source vial in the source safe, which was being stored in the Magill Hall basement. Science Applications International Corporation (SAIC) was contracted to characterize, decontaminate, survey and release the building. Magill Hall was decontaminated, surveyed, inspected by the NRC and released for unrestricted use in November, 2000.

1.2.2 Previous Scoping Investigations

The Magill Hall basement was also used as a temporary storage location for surplus items being held for public auction and radioactive contamination was found in this surplus item storage area. The Magill storage area was radiologically released with the rest of the building as stated above.

As part of the CY00 survey and lab discharge system survey efforts, scoping surveys of ventilation (Magill Hall) and piping systems (Magill and Rhodes Hall) were conducted to determine if these systems had been impacted. Scoping surveys of ventilation systems within Magill Hall ducts left in place after the CY00 survey effort did not identify removable gross alpha contamination in excess of limits. Scoping surveys of laboratory hood exhausts in Rhodes and Magill Halls showed that these systems were not impacted. Survey of piping systems within Magill and Rhodes Halls (sink and floor drains) performed in 2002 did identify one drain system (RH303) which was decontaminated and released for unrestricted use.

In CY00, an investigation was conducted to link members of the public and auctioned surplus items that may have been stored in Magill Hall. No link could be established, however, several corrective actions were recommended. One action included, at a minimum, routine visual inspections of items awaiting auction to ensure that no radioactive or hazardous material is contained within any items to be surplus. If items are located during these inspections that contain (or are suspected to contain) radioactive or hazardous material, they were immediately removed from the items to be auctioned, evaluated, and an investigation was undertaken to determine why the item was not identified earlier in the surplus process.

In CY02, a Visual Scoping and Survey Plan (SAIC 2002a) was developed that described a strategy for the location of items that had a potential to be radiologically contaminated with Am-241 (suspect items) and were moved from Magill Hall to other areas of the Southeast campus including off-campus locations, survey items to determine if they have been impacted, determine the appropriate disposition of those items determined to be contaminated, and evaluate potential radiological exposure to individuals likely to have had contact with those items. This plan was implemented in April through June of 2002 and documented in a report (SAIC 2002b).

From CY02 to the present, radiological surveys have been conducted during renovation of classrooms and laboratories in Magill Hall. Surveys were conducted as described in Section 2.0 and survey results were compared to the release criteria in Table 2-1. Contaminated items and building surfaces were processed as described in Section 2.4.

In CY10, an investigation was performed on an area of surface soil which exhibited a small area of elevated activity south of Magill Hall near the radioactive material storage bunker. A GWS was performed using a Ludlum 44-10 Sodium Iodine (NaI) Detector. At the time of the GWS the Contaminant of Concern (COC) was unknown, however analytical results from the samples collected during the investigation have identified the elevated radioactivity as Am-241.

1.3 RADIOLOGICAL CONTAMINANT OF CONCERN

Am-241 is the primary radiological COC. Since other radionuclides [e.g., cesium-137 (Cs-137)] have been previously identified in a waste stream (e.g., acid dilution pit sediment) from University laboratories, radiological surveys of building and material surfaces will be conducted that are capable of detecting both alpha and beta contamination.

2.0 RADIOLOGICAL SURVEYS

2.1 RADIOLOGICAL INSTRUMENTATION

Calibration, maintenance, accountability, operation and quality control of radiation detection instruments will be performed in accordance with Southeast's Radiation Protection Program (RPP) procedures RP-11 "Radiological Monitoring", RP-30 "Radiological Instrumentation", and this plan, as appropriate.

2.1.1 Instrument Selection

The radiological instruments Southeast has selected to survey for alpha and beta contamination are able to detect Am-241 and Cs-137 at or below their respective screening levels. Instruments used for contamination monitoring will be calibrated by Southeast or qualified vendors under approved procedures using calibration sources traceable to the National Institute of Standards and Technology (NIST). The instruments will be calibrated with thorium-230 (Th-230) and strontium-90 (Sr-90) sources unless Am-241 and Cs-137 sources are available. Th-230 and Sr-90 sources underestimate instrument efficiency when surveying for Am-241 and Cs-137 since Am-241 gives off a higher energy alpha than Th-230 and Cs-137 gives off a higher energy beta than Sr-90. This ensures a conservative approach to detecting these radionuclides if instrumentation is calibrated with these radionuclide sources.

A Ludlum Model 2360 meter with a 43-93 zinc-sulfide (ZnS) probe or equivalent will be used for scan and fixed point surveys. A Ludlum Model 2929 bench scaler with a 43-10-1 ZnS probe or equivalent will be used to quantify removable contamination.

A Ludlum Model 2221 meter with a 44-10 2"x2" NaI scintillation detector will be used for GWSs. In addition, a Field instrument for the Detection of Low-Energy Radiation (FIDLER) will also be used to conduct GWSs due to the low energy gamma emitted by Am-241. The FIDLER is a thin-window (1.6 millimeter) NaI scintillation detector that is specifically designed for low energy gamma radiation monitoring and is capable of detecting the 59.5 kiloelectron Volts (keV) gammas associated with Am-241 at lower levels than a standard 2"x2" NaI scintillation detector.

2.2 QUALITY CONTROLS

2.2.1 Field Survey Instrumentation Quality Controls

Southeast's RPP procedure RP-30 requires daily quality controls (QC) checks on all in-use instruments. This includes pre-operational, background, and source checks. Results will be documented on the appropriate form.

2.2.2 Soil Investigation Quality Controls

To assess whether quality assurance (QA) objectives have been achieved, analyses of specific field and laboratory QC samples will be required. These QC samples include field duplicates, field splits, laboratory method blanks, laboratory control samples, laboratory duplicates, rinsate blanks, and matrix spike/matrix spike duplicate (MS/MSD) samples.

Rinsate blanks will be submitted for analysis along with field QC samples to provide a means to assess the quality of the data resulting from the field sampling program. Rinsate blanks are used to assess the effectiveness of field decontamination processes if reusable equipment is used.

Field duplicate samples are analyzed to determine sample heterogeneity and sampling methodology reproducibility.

Field QA split samples will be collected as co-located or homogenized replicates of field QA samples and distributed to the QA laboratory for analysis. Split samples are implemented for detection of problems with field sampling, documentation, packaging, or shipping. They also provide an independent referee laboratory analysis, allowing the project to check the primary analytical result sensitivity, accuracy, and precision. With the exception of screening samples, QA split samples should be collected and analyzed at a frequency of approximately once every twenty samples (5%), or a minimum of one split sample per matrix sampled.

Laboratory method blanks and laboratory control samples are employed to determine the accuracy and precision of the analytical method implemented by the laboratory. MS's provide information about the effect of the sample matrix on the measurement methodology. Laboratory sample duplicates and MS and MSDs assist in determining the analytical reproducibility and precision of the analysis for the analytes of interest.

The general level of QC effort should be at least one field duplicate for every 20 investigative samples and at least one per matrix if there are less than 20 samples collected for a given matrix.

MS/MSD samples are investigative samples. One MS/MSD sample should be designated in the field and collected for at least every 20 investigative samples per sample matrix (i.e., ground water, soil).

2.3 UNRESTRICTED USE CRITERIA

2.3.1 Unrestricted Use Criteria for Items and Materials to be Released from the University

The NRC has previously approved Regulatory Guide 1.86 (NRC 1974) limits during the initial decontamination and survey of items and materials in Magill Hall and therefore, these limits will be applied as the unrestricted use criteria (Table 2-1) for items and materials to be released from the University.

Table 2-1. Unrestricted Use Criteria for Items and Materials

Contaminant of Concern	Unrestricted Use Criteria ^a (dpm/100 cm ²)		
	Fixed ^b	Removable ^b	Maximum ^c
Am-241	100	20	300
Cs-137	5,000	1,000	15,000

^a As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the cpm observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

^b Measurements of average contaminant should not be averaged over more than 1 square meter (m²). For objects of less surface area, the average should be derived for each such object.

^c The maximum contamination level applies to an area of not more than 100 square centimeters (cm²).

Appropriate scan rates and fixed point count times (Table 2-2) have been set to ensure the selected instruments are able to detect minimum contaminant concentrations below the unrestricted use criteria.

The investigation levels (Table 2-2) for this plan are set at the count per minute (cpm) level equivalent to the fixed contamination unrestricted use criteria plus background. Investigation levels account for instrument, surface, and surveyor efficiencies, detector surface area, and appropriate background values.

Table 2-2. Scan Rates, Investigation Levels, and Fixed Point Count Times

Instrument	Surface Material	Scan Rate (inches/second)	Items/Material Investigation Level ⁽¹⁾ (cpm/126 cm ²)	Building Surfaces Investigation Level ⁽¹⁾ (cpm/126 cm ²)	Count Time (minutes)
43-93 w/2360 meter Alpha	Concrete	0.25	8	318	2
	Tile	0.5	12	633	1
	Counter Slate	0.5	16	637	1
	Steel	0.25	4	175	2.5
	Wood	0.5	9	428	1
43-93 w/2360 meter Beta	Concrete	0.25	404	N/A	2
	Tile	0.5	418	N/A	1
	Counter Slate	0.5	552	N/A	1
	Steel	0.25	514	N/A	2.5
	Wood	0.5	423	N/A	1
43-10-1 w/2929 meter Alpha	N/A	N/A	7	980 ⁽²⁾	1
43-10-1 w/2929 meter Beta	N/A	N/A	421	N/A	1

1 The investigation levels are based on an assumed instrument efficiency of 0.16 (α) and 0.27 (β), a surveyor efficiency of 0.7 and the following surface efficiency for concrete of 0.4, tile of 0.8, counter slate of 0.8, steel of 0.2, and wood of 0.5. The background for each surface listed is based on actual measurements and are as follows; concrete 2.1 cpm (α) and 308 cpm (β), tile 1.1 cpm (α) and 228 cpm (β), counter slate 4.8 cpm (α) and 361 cpm (β), steel 1.0 cpm (α) and 323 cpm (β), and wood 1.0 cpm (α) and 280 cpm (β).

2 The removable fraction of the total release criterion is assumed to be 50%.

2.3.2 Unrestricted Use Criteria for Building Surfaces

In accordance with 10 Code of Federal Regulations (CFR) Part 20 Subpart E, a site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent (TEDE) to an average member of the critical group that does not exceed 25 mrem/yr and is as-low-as-reasonably achievable (ALARA). The dose-based release criteria derived in this report is applicable for building surface contamination potentially present in previously inaccessible areas within Magill Hall.

On April 12, 2002, Southeast submitted a letter to NRC, Region III to present the results of a conservative dose assessment for potential exposures resulting from the contaminated table discovered in Johnson Hall Room 222 (JH222) at Southeast. RESidual RADioactivity computer model (RESRAD)-Build Version 3.1 was used for determining doses to three reasonable maximally exposed receptor scenarios. They include:

- Chemistry department staff who spends an entire work year at the contaminated table using it as a desk;
- Chemical department staff who teach a class or lab using the table during the school year; and
- Facilities Management (FM) personnel who moved the table then continually move boxes in and out of storage everyday for an entire work year.

Appendix A of this report includes the pertinent information related to that letter and includes all the necessary information related to three receptor scenarios, source terms, exposure pathways, and results of the assessments. The results of the assessment showed that the chemistry departmental staff who spends an entire year at the contaminated table receives the maximum dose of 10.2 millirem per year (mrem/yr).

This report utilizes that same receptor scenario for the derivation of release criteria for previously inaccessible building surfaces. Except for the receptor and source location, the assigned values for all other exposure parameters remain the same. The receptor is assumed to be present at the middle of the room and 1 meter (m) above the contaminated floor. Appendix B includes all the necessary information related to this receptor scenario, source terms, exposure pathways, and results of the assessment. The release criterion derived in Appendix B, for Am-241, of 5,600 disintegrations per minute per 100 square centimeters (dpm/100 cm²) total alpha activity represents an unrestricted use criteria for building surfaces that, if met, will ensure that the 25 mrem/yr dose criteria is satisfied and is ALARA. The RESRAD Build Version 3.3 output summary report is contained in Attachment B-1 to Appendix B of this document.

2.3.3 Action Level Requiring SAIC Involvement

Southeast will involve SAIC in the survey if any item or building surface is found to have removable alpha contamination levels exceeding 10,000 dpm/100 cm² averaged over 1 square meter (m²) (not to exceed 30,000 dpm/100 cm² in any single location) (SAIC 2002a).

2.3.4 Action Level Requiring NRC Notification

Southeast will notify the NRC in writing within 30 days if concentrations of radioactive material in excess of 10 times the 10 CFR 20 Appendix C value (i.e., 0.001 microcurie [μCi] Am-241) is found in an unrestricted area and when required by 10 CFR 20.2203.

Southeast will notify the NRC within 24 hours if contamination is found in an area where personnel are normally stationed during routine University operations with removable alpha contamination levels exceeding 110,000 dpm/100 cm² averaged over 1 m² (not to exceed 330,000 dpm/100 cm² in any single location) and when required by 10 CFR 20.2202. The 110,000 dpm/100 cm² action level was developed using RESRAD-BUILD Version 3.1 and very conservative input parameters listed in NUREG 6697, *Development of Probabilistic RESRAD 6.0 and RESRAD 3.0 Computer Codes* (NRC 2000a). This level of contamination is based upon the conservative assumption that if an individual were present for 24 hours, the individual could receive an intake greater than one occupational annual limit on intake (ALI) (SAIC 2002a).

2.3.5 Soil Release Criteria

Soil release criteria are provided in Table C-1 in Appendix C of this plan. Initially, the soil release criteria are defined as the NRC Screening Levels from *Consolidated NMSS Decommissioning Guidance – Characterization, Survey, and Determination of Radiological Criteria* (NUREG-1757) (NRC 2006); however, at a later time, Southeast may choose to calculate site specific soil release criteria for NRC review and approval.

2.4 SURVEYING AND SAMPLING

2.4.1 Surveys of Items/Building Surfaces

Items/building surfaces that require surveys should receive a 100% radiological scan survey of all accessible surfaces of the item/building surface. If the radiological scan identifies contamination above background, then fixed point survey measurements and a removable contamination survey will be conducted that is sufficient to determine average contamination levels. The term “surveys” as used in this plan indicates both alpha and beta contamination surveys. Scan rates and counting times are provided in Table 2-2.

- Scan survey results above the investigation level will require a fixed-point survey on the suspect area. Investigation levels and fixed-point count times are provided in Table 2-2.
- Smear surveys for loose surface contamination will be performed in conjunction with fixed-point surveys and as necessary to adequately determine average contamination levels.
- Smears will be analyzed at Southeast by the RSO or designee. Appropriate information will be recorded on the smear cover and/or survey form. Count times are provided in Table 2-2.

Note: Survey of building infrastructure (i.e., piping systems, electrical systems, HVAC systems, etc.) are not required for routine maintenance or replacement activities or release of components disassembled from the system during maintenance.

2.4.2 Surface Soil Sampling

Surface soil samples will be collected from 0 to 15 centimeters (cm) (0 to 0.5 foot [ft]) below ground surface (bgs) to determine if the soil satisfies soil release criteria. Soil sampling locations will be planned in accordance with the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM) (NRC 2000b) guidance as described in Appendix C of this plan. Soil samples will be collected using hand augers, trowels, or other appropriate collection method in accordance with Southeast or SAIC field technical procedures.

2.5 PROCESSING OF CONTAMINATED ITEMS AND BUILDING SURFACES

Survey, release, decontamination, transfer, storage, and/or disposition of contaminated items and building surfaces will be performed in accordance with the appropriate Southeast RPP procedures and this plan, as appropriate. The following actions will be taken based upon radiological survey results:

- If survey results are below the established unrestricted use criteria presented in Table 2-1 for items and materials and Table 2-2 for building surfaces, the item or building surface may be left unattended and considered released for unrestricted use.
- If survey results indicate contamination above the established unrestricted use criteria then one or more of the following actions will be taken:

Decontamination (process when removable contamination is between 20 and 10,000 dpm/100 cm²).

- The RSO will determine whether a decontamination attempt on an item will be performed or if the item will be contained and stored for disposal.
- If an item is small and easy to transport, the item will be wrapped to prevent the spread of contamination and transported to an approved Radioactive Material Storage Area to await decontamination. Decontamination will be performed at the Radiological Laboratory in Building RH212 in accordance with RPP procedure RP-10 and an approved Radiological Work Permit.
- For building surfaces or if the item is large, hard to transport, and/or movement of the contaminated item will likely spread contamination, and the RSO has determined that decontamination of the item is necessary, a "temporary job site" will be set up to perform decontamination. A "temporary job site" is defined as an area not currently listed on

Southeast's NRC license, secured and designated by the RSO or designee as an authorized location to perform radiological decontamination. Radiological controls will be maintained at "temporary job sites" in accordance with the Southeast RPP, including but not limited to appropriate radiological postings, contamination controls, use of proper personal protective equipment, and radiological monitoring.

- The item or building surface will be resurveyed after each decontamination attempt and either released for unrestricted use if survey results are below the established unrestricted use criteria or contained and stored as described below if survey results are above the established unrestricted use criteria.
- More than one decontamination attempt may be performed to determine appropriate disposition of the item or building surface.
- After decontamination is complete and/or the contaminated item has been removed from the temporary job site, the general area of the temporary job site will be surveyed to ensure contamination has not spread and de-posted in accordance with the Southeast RPP. The RSO will determine the necessary scope of the survey necessary to release and de-post the temporary job site.
- All decontamination attempts and surveys will be properly documented.

Contain and Store (process when removable contamination is between 20 and 10,000 dpm/100 cm² or fixed contamination above 100 dpm/100 cm²).

- If decontamination of an item is unsuccessful or the RSO has decided not to perform decontamination, the item will be contained such that no radioactive material will be released. The item will then be transported to the Magill Radioactive Materials Storage Bunker or other temporary radioactive material storage area (RMSA), inventoried, and stored for disposal. If moving the item is not immediately practical, then restrictive locks will be placed on doors to limit access until a decontamination attempt can be made by SAIC, or the item can be moved to an approved RMSA.
- It is not anticipated that decontamination of building surfaces will be unsuccessful. If decontamination of a building surface is unsuccessful, surfaces will be painted or covered to prevent the spread of contamination and the area will be posted in accordance with the Southeast RPP.
- All decontamination attempts and surveys will be properly documented.

Restrict Access (process when removable contamination greater than 10,000 dpm/100 cm²).

- When removable contamination is greater than 10,000 dpm/100 cm², restrictive locks will be placed on doors to limit access to the area or item. The RSO will coordinate with SAIC to make a determination on how to safely decontaminate or place the item in storage for disposal.
- A survey of the surrounding area near the contaminated item will be made to ensure contamination has not spread.
- All decontamination attempts and surveys will be properly documented.

NRC Notification (process when removable contamination is greater than 110,000 dpm/100 cm²).

- If the removable contamination is greater than 110,000 dpm/100 cm², the room/area will be evacuated and the doors secured with restrictive locks. Southeast will notify the NRC within 24 hours of discovery of removable contamination at this level.
- Decontamination and/or removal of the item will be conducted by the RSO and/or SAIC under an approved RWP.

2.6 CONTROLS FOR SOILS IN EXCESS OF RELEASE CRITERIA

In the event that soils in excess of release criteria are identified, the following controls will be put into place:

1. The NRC will be notified;
2. The area in question will be roped off or otherwise restricted for access;
3. Additional investigation will be conducted to determine the extent of contamination; and
4. The area will be posted as required by the Southeast RPP.

2.7 STORAGE AND DISPOSAL

Contaminated materials will be stored in the Magill Hall Radiation Bunker, which currently is an approved radioactive materials storage location on the Southeast NRC license. This room is double locked with restrictive cores and a padlock. Only the RSO and designee have access. Other temporary RMSAs may be set up if approved by the RSO.

Contaminated materials, not to exceed 1 mCi total Am-241 activity can be stored for up to 1 year. Storage will be conducted in accordance with RPP Procedure RP-25.

Disposition of contaminated materials, including packaging, transport, and disposal, will be performed by the RSO and/or an outside contractor in accordance with applicable RPP procedures.

Contaminated soils will be left in place and access restricted until such time that the NRC provides authorization for remediation of soil under the Southeast radioactive material license.

2.8 SURVEY DOCUMENTATION

All radiological surveys of item/building surfaces within the scope of this plan will be documented in accordance with the appropriate Southeast RPP procedures and this plan, as appropriate.

Soil investigations will be documented in reports following the general guidance in MARSSIM as described in Appendix C to this plan.

3.0 EXPOSURE EVALUATION

3.1 IDENTIFICATION OF POTENTIALLY EXPOSED PERSONNEL

The identification of potentially exposed personnel will be conducted on a case by case basis as determined by the RSO after review of the radiological survey results.

3.2 EVALUATION TO DETERMINE REQUIREMENT TO MONITOR

Southeast will monitor for internal exposure those non-occupational personnel identified in Section 3.1 that are likely to have received a total effective dose equivalent of 100 mrem/yr as determined by the RSO.

4.0 SAFETETY AND HEALTH

Personnel involved with the scope of this document will follow all applicable local, state, and federal regulations, and applicable Southeast RPP procedures.

5.0 REFERENCES

- Code of Federal Regulations (CFR), Title 10 Part 20, "Standards for Protection Against Radiation", Nuclear Regulatory Commission.
- EPA 2006. U.S. Environmental Protection Agency, Office of Environmental Information. *Data Quality Assessment: A Reviewer's Guide*. EPA QA/G-9R. EPA/240/B-06/002. February 2006.
- NRC 1974, Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors", United States Atomic Energy Commission, Directorate of Regulatory Standards, June.
- NRC 1998. *Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions*, NUREG-1507, U.S. Nuclear Regulatory Commission, June.
- NRC 2000a. *Development of Probabilistic RESRAD 6.0 and RESRAD 3.0 Computer Codes*, Nuclear Regulatory Commission, NUREG 6697.
- NRC 2000b. *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, 1575, USEPA 402-R-97-016, Revision 1, U.S. Department of Defense, U. S. Department of Energy, U.S. Environmental Protection Agency, and U.S. Nuclear Regulatory Commission, August.
- NRC 2001, NRC Inspection Report 030-33508/2000-002(DNMS) and Notice of Violation, Letter from NRC to Southeast Missouri State University dated January 19, 2001.
- NRC 2006. *Consolidated NMSS Decommissioning Guidance – Characterization, Survey, and Determination of Radiological Criteria*, NUREG 1757, Volume 2. Revision 1. September 2006.
- SAIC 2002a, "Visual Scoping and Survey Plan", Southeast Missouri State University, April.
- SAIC 2002b, Implementation of the Visual Scoping and Survey Plan – Final Report, Southeast Missouri State University, September.

APPENDIX A

**EXPOSURE SCENARIO DEVELOPMENT FOR TABLE IN JOHNSON
HALL ROOM 222**

1.0 INTRODUCTION

The purpose of this document is to develop conservative exposure scenarios for Chemistry department staff, Facilities Management employees, and other credible exposure groups who may have been potentially exposed to the Am-241 contaminated table found at Southeast in JH222.

2.0 HISTORY

On February 28, 2002, the Southeast Radiation Safety Officer (RSO) discovered a slate top table in JH222. He recognized the table as an item that may have come from the previously Am-241 contaminated laboratory in Magill Hall. The RSO performed an initial radiological survey on the table and found levels of fixed and loose radiological contamination above the release limits established in Southeast's Radiation Protection Program (RPP).

On March 14, 2002, a 100% radiological survey of the items in JH222 was performed to determine the magnitude and extent of contamination and determine the appropriate disposition of contaminated items. Two boxes were found with levels of contamination above release limits, however the majority of the contamination was located on the table itself. The survey results revealed two "hotspots" (each less than 100 square centimeters [cm^2] in size) on the table. One hotspot had a total alpha contamination level of 280,000 dpm/100 cm^2 and 261 dpm/100 cm^2 removable. The other hotspot had 9000 dpm/100 cm^2 total alpha and 210 dpm/100 cm^2 removable. The rest of the table had levels of fixed and removable contamination higher than background, but well below the lowest hotspot results.

JH222 is primarily used as a storage room for boxes of paperwork and other items from Johnson Hall. It is unlikely that any individual would have spent more than thirty minutes per workday in this room. However, the history of the location of the table prior to being located in JH222 and the date that the table became contaminated is unknown. Therefore, exposure scenarios should consider the table to be available in other more conservative settings (i.e., classroom, office, etc.) as well as the storage room.

3.0 METHODOLOGY

RESRAD-BUILD Version 3.1 was used to determine a conservative dose to the maximally exposed individuals identified in the exposure scenarios below.

4.0 REASONABLE SCENARIOS

Since the history of the table is unknown, there are an unlimited number of scenarios that can be developed. However, it is not likely that the table has been in a location outside of the College of Science and Mathematics buildings. Therefore, the hypothetically maximally exposed individual or group would be persons who frequent the science buildings regularly. These individuals would include science department staff (instructors, graduate students, etc.), students, and facilities management personnel. It is not likely that other groups or individuals would spend more time in the science buildings than those listed. Students and graduate students would likely spend less time in the science halls than instructors and they would likely spend their time in the same locations as the instructors. Also there is a specific concern about potential dose received by individuals involved in moving the table from one location to another. These individuals will be considered a subset of the facilities management scenario described below since it is likely that they spent less time per year around the table than the individual in the scenario. The concern that the table movers might have higher exposures due to potentially higher contact and indirect ingestion is negated because all scenarios use the conservative default value for indirect ingestion.

Therefore, there are three reasonable exposure scenarios for maximally exposed groups or individuals that have been modeled:

- Chemistry department staff who spend an entire work year at the contaminated table using it as a desk;
- Chemistry department staff who teach a class or lab at the table during a school year; and
- FM personnel who moved the table then continually move boxes in and out of storage every day for an entire work year.

Other scenarios (e.g., a student attending classes at the table) were considered, however, the three scenarios listed were determined to be the most limiting.

5.0 EXPOSURE MODELING

For the scenarios described above, the NRC approved RESRAD-BUILD Version 3.1 modeling code was used to conservatively determine exposures. The RESRAD-BUILD code uses conservative default values, but allows the user to change these values, as appropriate, to model a more realistic exposure. All the RESRAD-BUILD default values except indoor fraction, lifetime, and source geometry were used.

All values input into the RESRAD-Build code are listed in Table A-1.

Table A-1. RESRAD-BUILD Input Parameters

Scenario	Desk (Chemistry Staff)	Classroom Table (Chemistry Staff)	FM Person	Comments
Time Parameters				
Exposure Duration	365 days	365 days	365 days	Default
Indoor Fraction	0.23	0.082	0.014	See Below
Evaluation Time	1 year	1 year	1 year	Default
Building Parameters				
Number of Rooms	1	1	1	Default
Deposition Velocity	0.01 m/sec	0.01 m/sec	0.01 m/sec	5.1.1 Default

5.1.2	Resuspension Rate	5.1.3	5.0 E-07 sec ⁻¹	5.1.4	5.0 E-07 sec ⁻¹	5.1.5	5.0 E-07 sec ⁻¹	5.1.6	Def ault
5.1.7	Building Exchange Rate	5.1.8	0.8 hr ⁻¹	5.1.9	0.8 hr ⁻¹	5.1.10	0.8 hr ⁻¹	5.1.11	Def ault
5.1.12	Room Area	5.1.13	36 m ²	5.1.14	36 m ²	5.1.15	36 m ²	5.1.16	Def ault
5.1.17	Room Height	5.1.18	2.5 m	5.1.19	2.5 m	5.1.20	2.5 m	5.1.21	Def ault
5.1.22	Room Exchange Rate	5.1.23	0.8 hr ⁻¹	5.1.24	0.8 hr ⁻¹	5.1.25	0.8 hr ⁻¹	5.1.26	Def ault
5.1.27	In/Out Flow Rate	5.1.28	72 m ³ /hr	5.1.29	72 m ³ /hr	5.1.30	72 m ³ /hr	5.1.31	Def ault
5.1.32 Receptor Parameters									
5.1.33	Number of Receptors	5.1.34	1	5.1.35	1	5.1.36	1	5.1.37	Def ault
5.1.38	Room # Location	5.1.39	1	5.1.40	1	5.1.41	1	5.1.42	Def ault
5.1.43	Time Fraction	5.1.44	1	5.1.45	1	5.1.46	1	5.1.47	Def ault
5.1.48	Breathing Rate	5.1.49	18 m ³ /day	5.1.50	18 m ³ /day	5.1.51	18 m ³ /day	5.1.52	Def ault
5.1.53	Ingestion Rate	5.1.54	1 E-04 m ² /hr	5.1.55	1 E-04 m ² /hr	5.1.56	1 E-04 m ² /hr	5.1.57	Def ault
5.1.58	Receptor Location	5.1.59	5m, 3m, 1m	5.1.60	5m, 3m, 1m	5.1.61	5m, 3m, 1m	5.1.62	See Bel ow
5.1.63 Shielding Parameters									
5.1.64	Thickness	5.1.65	0	5.1.66	0	5.1.67	0	5.1.68	Def ault

5.1.69	Density	5.1.70	NA	5.1.71	NA	5.1.72	NA	5.1.73	Def ault
5.1.74	Material	5.1.75	NA	5.1.76	NA	5.1.77	NA	5.1.78	Def ault
5.1.79 Source Parameters									
5.1.80	Number of Sources	5.1.81	1	5.1.82	1	5.1.83	1	5.1.84	Def ault
5.1.85	Room # location	5.1.86	1	5.1.87	1	5.1.88	1	5.1.89	Def ault
5.1.90	Source Type	5.1.91	Area	5.1.92	Area	5.1.93	Area	5.1.94	See Bel ow
5.1.95	Direction	5.1.96	X	5.1.97	X	5.1.98	X	5.1.99	See Bel ow
5.1.100	Location	5.1.101	6m, 3m, 1m	5.1.102	6m, 3m, 1m	5.1.103	6m, 3m, 1m	5.1.104	See Bel ow
5.1.105	Geometry: Area	5.1.106	2 m ²	5.1.107	2 m ²	5.1.108	2 m ²	5.1.109	See Bel ow
5.1.110	Air Fraction	5.1.111	0.1	5.1.112	0.1	5.1.113	0 . 1	5.1.114	D e f a u l t
5.1.115	Direct Ingesti on	5.1.116	0 g / h r	5.1.117	0 g/hr	5.1.118	0 g / h r	5.1.119	D e f a u l t
5.1.120	Remov al Fractio n	5.1.121	0 . 5	5.1.122	0.5	5.1.123	0 . 5	5.1.124	D e f a u l t

				t
5.1.125 Lifetime	5.1.126 1 8 2 5 d a y s	5.1.127 1825 days	5.1.128 1 8 2 5 d a y s	5.1.129 S e e B e l o w
5.1.130 Radionuclides Concentration	5.1.131 4 . 7 E 5 p C i / m ²	5.1.132 4.7E 5 pCi/ m ²	5.1.133 4 . 7 E 5 p C i / m ²	5.1.134 S e e B e l o w

g – gram(s)

6.0 EXPLANATION OF NON-DEFAULT PARAMETERS

The RESRAD-BUILD default value for indoor fraction is set at 0.5. The indoor fraction is the fraction of time an individual spends inside the contaminated room during the exposure duration. The default value for exposure duration is 365 days (1 year). Since the contaminated room is located in the university, it is unlikely that any individual would spend 12 hours per day every day of the year in JH222 or any other room. Conservative indoor fractions have been calculated for the scenarios.

- Chemistry department staff using the table as a desk could spend 2000 hours per year (hr/yr) based upon 40 hours per week and 50 weeks per year. Therefore the indoor fraction for this scenario is 0.23 (2000 hr/yr at work / 8760 hr/yr total).
- Chemistry department staff who teach a class or lab at the table could spend 720 hr/yr based upon 9 months of class, 20 days per month, and 4 hours per day (hr/day). Therefore the indoor fraction for this scenario is 0.082 (720 hr/yr in the room / 8760 hr/yr total).
- A FM person moving the table and other material in and out of storage every day for an entire work year could spend 125 hr/yr based upon 50 weeks per year, 5 days per week, and 30 minutes per day in the contaminated room. Therefore the indoor fraction for this scenario is 0.014 (125 hr/yr in the room / 8760 hr/yr total).

The source location was set based upon as found conditions of the table in JH222. The receptor location was set assuming the individual was very close to the source (1 m away). Source type was set as an AREA and direction was set as X.

The RESRAD-BUILD default value for source geometry is set at 36 m², which is equivalent to the default value for room area. The actual room area is approximately 36 m², however, the extent of contamination was primarily limited to the table top. Although the majority of contamination was located at two hotspots on the table (each less than or equal to 100 cm²), the entire surface area of the table is modeled to be evenly distributed with levels of contamination at 10,355 dpm/100 cm², which is equivalent to the weighted average contamination level shown below. Conservative source geometry for all scenarios of 2 m² is assumed for the surface area of the table (1 m by 2 m).

The RESRAD-BUILD default value for source lifetime is set at 365 days (1 year). Source lifetime represents the time over which surface contamination is removed. It is likely that the table was contaminated in the 1970's in Magill Hall Room 242 (MH242) when it was used as a radiochemistry laboratory. However, the table may have been contaminated during the Am-241 source spill in the basement of Magill Hall. Since the Am-241 source spill in the basement of Magill Hall is assumed to have occurred in 1997 and MH242 has not been used as a radiochemistry laboratory since 1980, it is unlikely that the surface contamination would have been removed in 1 year. This statement is confirmed by the fact that, at least five years after the contamination event, survey results indicate that the surface contamination has not been removed completely. Therefore, conservative source lifetime values have been set at 1825 days (5 years) for all scenarios.

A conservative value for source concentration was calculated to be 4.7E05 picocuries per m² (pCi/ m²) based upon an average total alpha contamination level of 10,355 dpm/100 cm² evenly distributed over the entire area of the source. The average total contamination level was calculated by conservatively assuming that the entire table (except the most contaminated

hotspot) was contaminated at the same level as the least contaminated hotspot and then averaging the two areas as shown below:

Assume:

$$\text{Area}_{\text{total}} = 2 \text{ m}^2$$

Hotspot A:

- Area_a = 100 cm² (0.01 m²)
- Concentration (C_a) = 280,000 dpm/100 cm²
- Hotspot B:
- Area_b = Source area – Hotspot A area = 2 m² – 0.01 m² = 1.99 m²
- Concentration (C_b) = 9,000 dpm/100 cm²

$$C_{\text{ave}} = \frac{((C_{\alpha} \times \text{Area}_{\alpha}) + (C_{\beta} \times \text{Area}_{\beta}))}{\text{Area}_{\text{total}}} = \frac{((280,000 \times 0.01) + (9,000 \times 1.99))}{2} = 10,355 \text{ dpm}/100 \text{ cm}^2$$

$$C_{\text{RESRAD}} = \frac{10,355 \text{ dpm}}{100 \text{ cm}^2} \times \frac{1 \text{ pCi}}{2.22 \text{ dpm}} \times \frac{100(100 \text{ cm}^2)}{1 \text{ m}^2} = 4.7 \times 10^5 \text{ pCi}/\text{m}^2$$

7.0 EXPOSURE MODELING RESULTS

The conservative parameters were input into the RESRAD-BUILD code resulting in the following modeled exposures listed in Table A-2.

Table A-2. RESRAD-BUILD Exposure Results

Scenario	Desk (Chemistry staff)	Classroom Table (Chemistry staff)	FM Person
Exposure (mrem/yr)	10.2	3.6	0.6

APPENDIX B

**EXPOSURE SCENARIO DEVELOPMENT AND DETERMINATION OF
UNRESTRICTED RELEASE CRITERIA FOR PREVIOUSLY
INACCESSIBLE SURFACES IN MAGILL HALL**

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this appendix is to develop dose-based release criteria for potential contamination that may be present on previously inaccessible building surfaces within Magill Hall at Southeast. Americium is the COC for the Southeast Site, specifically the isotope Am-241. The release criterion derived for Am-241 meet the "radiological criteria for unrestricted use" requirements set forth by the NRC. These criteria can be found in the 10 CFR Part 20.1402. In accordance with 10 CFR 20 Subpart E, a site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent (TEDE) to an average member of the critical group that does not exceed 25 mrem/yr.

The 25 mrem/yr value is a primary limit. The release criterion represents cleanup goals that, if met, will ensure that the primary limit is satisfied. Demonstrating compliance with the release criterion presented in this report would allow release of the building surfaces without institutional controls.

1.2 SCOPE

The dose-based release criteria derived and documented in this appendix are applicable for potential surface contamination present on previously inaccessible building surface within Magill Hall.

1.3 BACKGROUND INFORMATION

On April 12, 2002, Southeast submitted a letter to USNRC, Region III to present the results of a conservative dose assessment for potential exposures resulting from the contaminated table discovered in JH222 on the Southeast. RESRAD-Build version 3.1 was used for determining doses to three reasonable maximally exposed receptor scenarios. They include:

- Chemistry department staff who spends an entire work year at the contaminated table using it as a desk;
- Chemical department staff who teach a class or lab the table during a school year; and
- FM personnel who moved the table then continually move boxes in and out of storage everyday for an entire work year.

Appendix A of this report includes details related to that letter. Appendix A includes all the necessary information related to three receptor scenarios, source terms, exposure pathways, and results of the assessments. The results of the assessment showed that the chemistry departmental staff who spends an entire year at the contaminated table receives the maximum dose (10.2 millirem per year (mrem/yr)).

2.0 DEVELOPMENT OF DOSE-BASED RELEASE CRITERION

2.1 SELECTION OF THE ANNUAL PUBLIC DOSE LIMIT

The annual dose limit for the site corresponds to the radiological criteria for unrestricted use given in 10 CFR Part 20.1402.

2.2 DEFINING THE SOURCE TERM

As a conservative assumption, this assessment assumed 25% of the floor of the hypothetical room in Magill Hall is uniformly contaminated and that 50% of the contamination identified is removable surface contamination. Therefore the source term is based upon surficial contamination. Except for the receptor and source area and location, the assigned values for all other source related parameters remain the same as that presented in Appendix A. Table B-1 includes the assigned values for the modeled parameters.

2.3 SELECTION OF CRITICAL RECEPTOR SCENARIO

As mentioned previously, among three receptor scenarios, the chemical staff who spends an entire work year at the contaminated table using it as a desk is the critical receptor. This report utilizes that same receptor scenario during the derivation of release criteria for the previously inaccessible building surfaces. Except for the source and receptor location, the assigned values for all other exposure parameters remain the same. Table B-1 presents the assigned value for each RESRAD-Build parameters.

Table B-1. RESRAD-Build Input Parameters

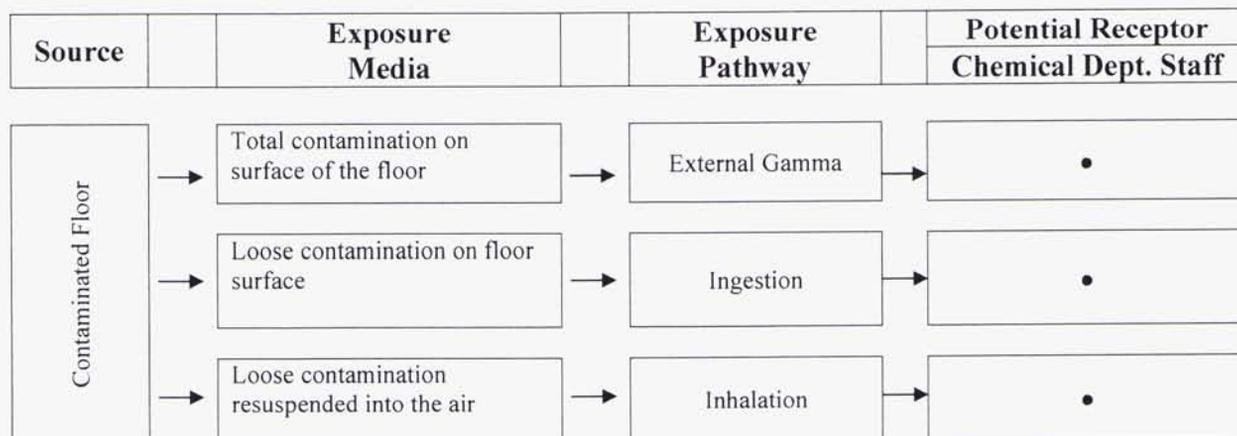
Scenario	Desk (Chemistry Staff)	Comments
Time Parameters		
Exposure Duration	365 days	Default
Indoor Fraction	0.23	Based on 2000 hour/yr occupancy rate
Evaluation Time	1 year	Default
Building Parameters		
Number of Rooms	1	Default
Deposition Velocity	0.01 m/sec	Default
Resuspension Rate	5.0 E-07 sec ⁻¹	Default
Building Exchange Rate	0.8 hr ⁻¹	Default
Room Area	36 m ²	Actual Size of the Room
Room Height	2.5 m	Default
Room Exchange Rate	0.8 hr ⁻¹	Default
In/Out Flow Rate	72 m ³ /hr	Default
Receptor Parameters		
Number of Receptors	1	Default
Room # Location	1	Default
Time Fraction	1	Default
Breathing Rate	18 m ³ /day	Default
Ingestion Rate	1 E-04 m ² /hr	Default
Receptor Location	3m, 3m, 1m	Middle of the room
Shielding Parameters		
Thickness	0	Default
Density	NA	Default
Material	NA	Default

Table B-1. RESRAD-Build Input Parameters

Scenario	Desk (Chemistry Staff)	Comments
Source Parameters		
Number of Sources	1	Default
Room # location	1	Default
Source Type	Area	Surface Contamination
Direction	Z	25% of the floor is contaminated, and the receptor is located just 1 meter above the source.
Location	3m, 3m, 0m	
Geometry: Area	9 m ²	
Air Fraction	0.1	Default
Direct Ingestion	0 g/hr	Default
Removal Fraction	0.5	Default
Lifetime	1,825 days	Same as Previous Assessment
Radionuclide	Am-241	
Radionuclides Concentration	1 pCi/m ²	

2.4 CONCEPTUAL SITE MODEL

The conceptual site model (CSM) identifies the relationship between the sources of contamination, source areas, transport mechanisms, exposure routes, and the receptor. The CSM provides a description of how contaminants enter into the environment, how they are transported within the environment, and the routes of exposures to humans. The CSM for JH222 structures is illustrated in Figure B-1. Figure B-1 identifies the contaminated medium considered in this report, potential receptor, and the exposure pathways that could lead to a radiological dose (in mrem/year) to potential receptor.

Figure B-1. Conceptual Site Model for JH222

Although not shown in Figure B-1, the CSM assumes that receptor is exposed in a single room with a contaminated source. It is also assumed that the ingestion pathway is completed through the re-deposition of suspended dust particles followed by inadvertent hand-to-mouth transfer. This approach represents the RESRAD-BUILD default pathway for ingestion. The direct ingestion pathway (without considering re-deposition) is assumed to be negligible.

The complete exposure pathways for the critical receptor scenario are:

- External gamma exposure,
- Indirect ingestion of re-deposited non-fixed contamination, and

- Inhalation of re-suspended non-fixed contamination.

The external gamma pathway is independent of the contaminant nature (loose or fixed). However, the ingestion and inhalation pathways are subject only to the quantity of loose contamination that may be inadvertently transferred to the mouth or re-suspended into the air.

2.5 DETERMINATION OF STRUCTURE RELEASE CRITERION

RESRAD-Build, Version 3.3 was used to perform the dose assessment for the surface contamination present on the floor of the room. A unit concentration of Am-241 (1 pCi/gram [g]) along with the assigned values for RESRAD-Build model input parameters provided in Table B-1 were used during the dose assessment. The dose resulting from a unit concentration for Am-241 is defined as the dose-to-source ratio (DSR). The maximum DSR (in units mrem/yr per pCi/g) over the 1000-year evaluation period for Am-241 was then divided into the 25 mrem/yr primary limit to determine the release criterion for Am-241.

3.0 RESULTS OF RELEASE CRITERION FROM RESRAD-BUILD OUTPUT

An assessment (for years 0, 1, 10, 100, and 1000) using Am-241 as the radionuclide COC was performed to determine when the maximum dose would occur during a 1000 year period. Attachment B-1 to this appendix represents the output RESRAD-Build run. Results of the assessment showed that the maximum dose for Am-241 occurred at year zero (0).

Table B-2 shows that the release criterion for Am-241 on previously inaccessible Magill Hall building surfaces is 5600 dpm/100 cm². This release criterion will be used to compare with surface measurements to be collected from the previously inaccessible building surfaces in Magill Hall as they become available for survey (i.e., during remodeling or renovation activities).

Table B-2. Release Criterion for Americium-241 on Magill Hall Building Surfaces

Radionuclide	Dose to Source Ratio (mrem/yr)/(pCi/m ²)	Surface Contamination (pCi/m ²)	Release Criterion (dpm/100 cm ²)
Am-241	9.78E-05	2.56E+05	5,676

ATTACHMENT B-1
RESRAD-BUILD VERSION 3.3 SCENARIO OUTPUT

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 2 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld

```

||||| |
|||||
|||      |||
||| RESRAD-BUILD Input Parameters |||
|||      |||
|||||
|||||

```

Number of Sources : 1
Number of Receptors: 1
Total Time : 3.65000E+02 days
Fraction Inside : 2.30000E-01

||||| Receptor Information |||||

Receptor	Room	x [m]	y [m]	z [m]	FracTime [m3/day]	Inhalation [m2/hr]	Ingestion (Dust) [m2/hr]
1	1	3.000	3.000	1.000	1.000	1.80E+01	1.00E-04

||| Receptor-Source Shielding Relationship |||

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 4 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld

|||||| Source Information ||||||

Source: 1
Location:: Room : 1 x: 3.00 y: 3.00 z: 0.00[m]
Geometry:: Type: Area Area:9.00E+00 [m2] Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 5.000E-01
Time to Remove: 1.825E+03 [day]

Contamination::

Nuclide Concentration	Dose Conversion Factor (Library: FGR 13 Morbidity)			
AAAAAAA	AAAAAAA	AAAAAAA	AAAAAAA	AAAAAAA
	Ingestion	Inhalation	Submersion	
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
AM-241	1.000E+00	3.640E-03	4.440E-01	9.554E-05
NP-237	0.000E+00	4.444E-03	5.400E-01	1.212E-03
U-233	0.000E+00	2.890E-04	1.350E-01	1.904E-06
TH-229	0.000E+00	4.027E-03	2.169E+00	1.741E-03

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 5 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 0.00000000E+00 years

```

||||| |
|||||
|||  Assessment for Time: 1  |||
|||  Time =0.00E+00 yr    |||
|||||
|||||

```

|||||| Source Information ||||||

Source: 1
Location:: Room : 1 x: 3.00 y: 3.00 z: 0.00 [m]
Geometry:: Type: Area Area:9.00E+00 [m2] Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 5.000E-01
Time to Remove: 1.825E+03 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	AM-241	1.000E+00
	NP-237	0.000E+00
	U-233	0.000E+00
	TH-229	0.000E+00

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 6 **

Title : Dose Assessment for Am-241 (1 pCi/m2)

Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld

Evaluation Time: 0.00000000E+00 years

```

|||||
|||||
|||
iii RESRAD-BUILDDose Tables iii
||| | |
|||||
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Source Contributions to Receptor Doses

|||||

[mrem]

	Source	Total
	1	
Receptor 1	9.77E-05	9.77E-05
Total	9.77E-05	9.77E-05

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 7 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 0.00000000E+00 years

Pathway Detail of Doses

|||||

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.36E-07	7.52E-10	3.13E-12	9.55E-05	0.00E+00	2.09E-06
Total	1.36E-07	7.52E-10	3.13E-12	9.55E-05	0.00E+00	2.09E-06

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 8 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 0.00000000E+00 years

Nuclide Detail of Doses

|||||

[mrem]

Source: 1

Nuclide Receptor Total

1

AM-241

AM-241 9.77E-05 9.77E-05

NP-237 1.94E-11 1.94E-11

U-233 6.88E-18 6.88E-18

TH-229 2.61E-21 2.61E-21

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 9 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 1.00000000 years

```

||||| |
|||||
|||  Assessment for Time: 2  |||
|||  Time =1.00E+00 yr    |||
|||||
|||||

```

||||| Source Information |||||

Source: 1
Location:: Room : 1 x: 3.00 y: 3.00 z: 0.00 [m]
Geometry:: Type: Area Area:9.00E+00 [m2] Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 4.444E-01
Time to Remove: 1.825E+03 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	AM-241	8.985E-01
	NP-237	2.913E-07
	U-233	6.350E-13
	TH-229	1.999E-17

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 10 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 1.00000000 years

```

||||| |
|||||
|||  RESRAD-BUILDDose Tables  |||
|||                               |||
|||||
|||||

```

Source Contributions to Receptor Doses
|||||
[mrem]

	Source	Total
	1	
Receptor 1	9.75E-05	9.75E-05
Total	9.75E-05	9.75E-05

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 11 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 1.00000000 years

Pathway Detail of Doses

|||||

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.22E-07	7.50E-10	3.13E-12	9.53E-05	0.00E+00	2.08E-06
Total	1.22E-07	7.50E-10	3.13E-12	9.53E-05	0.00E+00	2.08E-06

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 12 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 1.00000000 years

Nuclide Detail of Doses
|||||
[mrem]

Source: 1

Nuclide Receptor Total
1

	AM-241	
AM-241	9.75E-05	9.75E-05
NP-237	5.81E-11	5.81E-11
U-233	4.82E-17	4.82E-17
TH-229	3.92E-20	3.92E-20

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 13 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 10.0000000 years

```

||||| |
|||||
|||  Assessment for Time: 3  |||
|||  Time =1.00E+01 yr  |||
|||||
|||||

```

||||| Source Information |||||

Source: 1
Location:: Room : 1 x: 3.00 y: 3.00 z: 0.00 [m]
Geometry:: Type: Area Area:9.00E+00 [m2] Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 0.000E+00
Time to Remove: 1.825E+03 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	AM-241	4.920E-01
	NP-237	1.607E-06
	U-233	3.511E-11
	TH-229	1.106E-14

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 14 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 10.0000000 years

```

||||| |
|||||
||| RESRAD-BUILD Dose Tables |||
|||
|||||
|||||

```

Source Contributions to Receptor Doses
|||||
[mrem]

	Source	Total
	1	
Receptor 1	7.05E-08	7.05E-08
Total	7.05E-08	7.05E-08

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 15 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 10.0000000 years

Pathway Detail of Doses

|||||

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	7.05E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	7.05E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 16 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 10.0000000 years

Nuclide Detail of Doses

|||||

[mrem]

Source: 1

Nuclide Receptor Total

1

AM-241

AM-241 7.05E-08 7.05E-08

NP-237 1.39E-12 1.39E-12

U-233 2.18E-19 2.18E-19

TH-229 1.50E-20 1.50E-20

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 17 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 100.000008 years

```

||||| |
|||||
|||  Assessment for Time: 4  |||
|||  Time =1.00E+02 yr    |||
|||||
|||||

```

||||| Source Information |||||

Source: 1
Location:: Room : 1 x: 3.00 y: 3.00 z: 0.00 [m]
Geometry:: Type: Area Area:9.00E+00 [m2] Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 0.000E+00
Time to Remove: 1.825E+03 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	AM-241	4.259E-01
	NP-237	1.496E-05
	U-233	3.348E-09
	TH-229	1.065E-11

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 18 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 100.000008 years

```

||||| |
|||||
|||
||| RESRAD-BUILDDose Tables |||
|||
|||||
|||||

```

Source Contributions to Receptor Doses
|||||
[mrem]

	Source	Total
	1	
Receptor 1	6.11E-08	6.11E-08
Total	6.11E-08	6.11E-08

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 19 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 100.000008 years

Pathway Detail of Doses

|||||

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	6.11E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	6.11E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 20 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 100.000008 years

Nuclide Detail of Doses

|||||

[mrem]

Source: 1

Nuclide Receptor Total

1

AM-241

AM-241 6.10E-08 6.10E-08

NP-237 1.24E-11 1.24E-11

U-233 1.90E-17 1.90E-17

TH-229 1.27E-17 1.27E-17

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 21 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 1000.00000 years

```

||||| |
|||||
|||  Assessment for Time: 5  |||
|||  Time =1.00E+03 yr     |||
|||||
|||||

```

|||||| Source Information ||||||

Source: 1
Location:: Room : 1 x: 3.00 y: 3.00 z: 0.00 [m]
Geometry:: Type: Area Area:9.00E+00 [m2] Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 0.000E+00
Time to Remove: 1.825E+03 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	AM-241	1.005E-01
	NP-237	8.063E-05
	U-233	2.205E-07
	TH-229	7.573E-09

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 23 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 1000.00000 years

Pathway Detail of Doses

|||||

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.45E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	1.45E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 24 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Evaluation Time: 1000.00000 years

Nuclide Detail of Doses

|||||

[mrem]

Source: 1

Nuclide Receptor Total

1

AM-241

AM-241 1.44E-08 1.44E-08

NP-237 6.65E-11 6.65E-11

U-233 1.24E-15 1.24E-15

TH-229 8.87E-15 8.87E-15

** RESRAD-BUILD Dose Program Output, Version 3.3 06/23/06 14:47:17 Page: 25 **
Title : Dose Assessment for Am-241 (1 pCi/m2)
Input File : C:\Program Files\RESRAD_Family\BUILD\SEMO Dose Assessment.bld
Full Summary

```

||||| |
|||||
|||
||| RESRAD-BUILD Dose (Time) Tables |||
|||
|||||
|||||

```

Receptor Dose Received for the Exposure Duration

```

|||||
(mrem)

```

Evaluation Time [yr]				
0.00E+00	1.00E+00	1.00E+01	1.00E+02	1.00E+03
AAAAAAAA	AAAAAAAA	AAAAAAAA	AAAAAAAA	AAAAAAAA
9.77E-05	9.75E-05	7.05E-08	6.11E-08	1.45E-08

Receptor Dose/Yr Averaged Over Exposure Duration

```

|||||
(mrem/yr)

```

Evaluation Time [yr]				
0.00E+00	1.00E+00	1.00E+01	1.00E+02	1.00E+03
AAAAAAAA	AAAAAAAA	AAAAAAAA	AAAAAAAA	AAAAAAAA
9.78E-05	9.76E-05	7.06E-08	6.11E-08	1.45E-08

APPENDIX C
**SOIL SURVEY PLAN FOR SURFACE SOILS OUTSIDE MAGILL AND
RHODES HALLS**

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this Soil Survey Plan is to provide the basis for conducting surveys and sampling of the soils surrounding Magill and Rhodes Halls.

The ultimate objective of the survey plan is to determine if soil areas adjacent to Magill and Rhodes Hall have been impacted by licensed activities at Southeast.

1.2 SCOPE

This plan provides guidance in the following areas:

- MARSSIM classification of an impacted site or impacted portions of a site;
- Planning and execution of MARSSIM based characterization and/or FSSs (surveys);
- Survey data analysis; and
- Survey reporting.

The survey process for investigation of surface soils as described in this plan consists of the following general steps:

- Identify the Derived Concentration Guideline Levels (DCGLs);
- Classify impacted sites or impacted portions of sites based on contamination potential;
- Design the survey;
- Execute the survey;
- Evaluate the survey data; and
- Prepare a survey report.

The details of the planning and evaluation process are described in subsequent sections.

1.3 APPLICABILITY

This plan is applicable to impacted surface soils adjacent to Magill and Rhodes Halls.

1.4 RADIOLOGICAL CONTAMINANTS OF CONCERN

Am-241 is the primary radiological COC. Since other radionuclides (e.g., Cs-137) have been previously identified in a waste stream (e.g., acid dilution pit sediment) from Southeast laboratories, radiological surveys will be conducted that are capable of detecting the gamma energy associated with Am-241 and Cs-137.

2.0 DATA QUALITY OBJECTIVES

The data quality objectives (DQOs) for soil surveys are provided below to establish a systematic procedure for defining the criteria by which the data collection design is satisfied. The DQO process includes a description of when to collect samples, where to collect samples, the tolerable level of decision errors for the study, and how many samples to collect. The DQO process includes the following seven steps, which are found in the *Guidance for the Data Quality Objectives Process* (EPA 2000):

1. State the Problem;
2. Identify the Decision;
3. Identify Inputs to the Decision;
4. Define the Study Boundaries;
5. Develop the Decision Rule;
6. Specify Tolerable Limits on Decision Error; and
7. Optimize the Design for Obtaining Data.

The DQO process is described below as it applies to this Soil Survey Plan.

2.1 STATE THE PROBLEM

The surface soil adjacent to Magill and Rhodes Halls is potentially impacted as a consequence of licensed activities performed at Southeast.

2.2 IDENTIFY THE DECISION

This plan will be used to demonstrate that residual radionuclide concentrations within the surface soils comply with the DCGLs (Table C-1). Initially, DCGLs are defined as the NRC Screening Levels.

Table C-1. Radiological DCGLs

Radionuclide	Soil Surface
Am-241	2.1 pCi/g
Cs-137	11 pCi/g

At a later time, Southeast may choose to calculate site specific DCGLs for NRC review and approval. Compliance will be satisfied using guidance found in the MARSSIM and *Methods for Evaluating the Attainment of Cleanup Standards* (EPA 1989). Specifically, compliance will be demonstrated by:

- Collecting systematic/random and biased surface soil samples for radiological COCs consistent with MARSSIM;
- Performing GWS to identify gross radiological contamination and small areas of elevated activity;
- Comparing radiological sampling results from the analytical laboratory to DCGLs; and

2.3 IDENTIFY INPUTS TO THE DECISION

Guidance provided in MARSSIM is the basis for this Soil Survey Plan. The MARSSIM process was developed collaboratively by the NRC, Environmental Protection Agency (EPA), Department

of Energy (DOE), and Department of Defense (DOD), for use in designing, implementing, and evaluating radiological surveys. This process emphasizes the use of DQO and Data Quality Assessment (DQA) processes, along with a sound program of quality assurance/quality control. The "graded approach" concept is also used to assure that survey efforts are maximized in those areas where there is the highest probability for residual contamination or greatest potential for adverse impacts of residual contamination. Examples of integrating the graded approach into the MARSSIM process include the use of site history, site conditions, equipment capabilities, and the results as the survey progresses to establish or adjust the degree of scanning coverage of a survey area, survey unit size, sampling frequency, and criteria for evaluation of elevated measurements.

Field activities for characterization and FSSs will consist of:

- Surface gamma scans of soil to identify gross contamination and any areas of elevated activity;
- Collecting systematic samples of surface soil;
- Collecting biased surface soil samples to investigate areas of elevated activity;
- Performing statistical tests; and
- Reviewing the data to verify that it is of sufficient quality and quantity.

The data generated by these field activities will be used to compare the radiological conditions to the radiological DCGLs identified in Table C-1. Survey activities will be conducted in accordance with the Southeast Health Physics procedures and Radiation Protection Plan and the following SAIC Field Technical Procedures (FTPs) and Quality Assurance Administrative Procedures (QAAP):

- FTP-405 - Cleaning and Decontaminating Sample Containers and Sampling Equipment,
- FTP-451 - Field Measurement Procedures: Operation of Radiation Survey Instruments,
- FTP-525 - Soil Sampling using an Auger,
- FTP-625 - Chain of Custody,
- FTP-650 - Labeling, Packaging and Shipping of Environmental Field Samples,
- FTP-1215 - Field Logbooks and Field Forms,
- FTP-1220 - Documenting and Controlling Field Changes to Approved Work Plans,
- QAAP 2.1 - Indoctrination and Training,
- QAAP 2.2 - Readiness Review,
- QAAP 2.3 - Project Kickoff Checklist, and
- QAAP 12.1 - Control of Measuring and Test Equipment.

Additional procedures may be used as necessary to accomplish required sampling. Modifications, additions, or other changes to meet project-specific requirements as the survey progresses will be documented according to Southeast direction.

2.3.1 Concerns Related to the Radiological COCs

The weak gamma emission (i.e., 59.5 keV) given off by Am-241 poses several challenges in scanning large areas. Due to the weak gamma emission, a FIDLER will be used to scan for the presence of Am-241 in surface soil. Besides the scanning for Am-241, a NaI 2"x 2" detector will be used to scan surface soils for Cs-137. Any areas found to exhibit count rates greater than 1.5 times background will be rescanned with a FIDLER. A biased sample may be collected.

The DCGL for Am-241 is such that the scan MDCs cannot be reliably met. However, when area factoring is taken into account, the scan MDCs are anticipated less than the

Derived Concentration Guideline Level used for elevated measurement comparison (DCGL_{EMC}).

The decision to apply scanning for weak gamma radiation is highly dependent on the DCGLs and an assessment of the available survey instrument's ability to meet the DQOs for the DCGLs. This decision will be made when the DCGLs are available. Screening level DCGLs approved for use by the NRC are listed in Attachment A. If screening level DCGLs are not adequate for the purposes of the individual project, site specific DCGLs may need to be derived and approved by NRC.

As a result of the inability to scan at levels below the DCGL, sampling density will be increased sufficiently to minimize the chance of missing small areas of elevated activity.

2.3.2 Gamma Walkover Survey Procedure

To investigate surface soil areas adjacent to Magill and Rhodes Halls for the potential presence of contamination, GWSs are performed using a FIDLER and a 2" x 2" sodium iodide (NaI) detector tied to Global Positioning Systems (GPS) and a data logger. The surveyor will advance at a speed of approximately 1.6 ft/sec (0.5 m/sec) while passing the detector in a serpentine pattern about 10 cm (4 inches) above the ground surface. Audible response of the instrument will be monitored by the surveyor and locations of elevated audible response investigated. Scanning results will be recorded in cpm. The ambient background for the soil areas will be determined at the start of the survey and a scanning response that is detectable above the background level (e.g., 1,500 to 2,000 cpm above background) will be set as the GWS investigation level. GWS results that are evaluated will be plotted on a map of the area involved with color coding to depict the count rates present.

2.3.3 Gamma Walkover Survey Scan MDCs

GWS MDCs are a function of several variables including gamma emissions of the radionuclides of interest, detector characteristics, and surveyor efficiency. The assumptions used to calculate walkover survey MDCs in the NRC's NUREG-1507, *Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions* (NRC 1998), are appropriate for this survey. Using a 2 x 2 (NaI) detector, the following assumptions apply:

- NaI 2"x 2" background count-rate of 10,000 cpm.
- NaI 2"x 2" detector count-rate vs. exposure rate values in NUREG-1507, Table 6.4.
- An observation interval of 1 second (based on a scan rate of 1.6 ft/s (0.5 m/s).
- A level of performance to yield a d' of 1.38

Based on these assumptions, the walkover survey scan MDC for the NaI 2"x 2" detector applicable at Southeast is 31.5 pCi/g for Am-241 and 6.4 pCi/g for Cs-137.

2.3.4 GWS Coverage

Prior to conducting sampling, screening gamma scans will be performed for surface soils of Class 1, Class 2, and Class 3 areas (see Section 4.1.1 for information regarding area classification) at the percentage listed in Table C-2.

Table C-2. GWS Coverage Guidelines

Area Classification	Amount of Coverage	Notes
Class 1	100%	-----
Class 2	10% to 100%	Value based on the amount of concern for the presence of small areas of elevated activity.
Class 3	0 to 10%	Scans are biased towards areas that are most likely to have a contamination potential.

Locations exceeding the GWS investigation levels (typically 1,500 to 2,000 cpm above background) will be investigated by collecting representative biased samples (i.e., biased samples which represent an area of elevated activity). Gamma scan data may also be recorded in real time, using position and data recording methods.

Table C-3 lists radiological field survey instruments that are commonly used (functional and performance equivalents may be used, as determined by a Health Physicist). Refinements to these detection sensitivity estimates will be made, as necessary, on the basis of instrument response and background data gathered during site survey activities.

Table C-3. Typical Gamma Scan Instruments

Description	Application	Approximate Detection Sensitivity (pCi/g)
Ludlum Model 44-10; 2-inch × 2-inch sodium iodide (NaI) gamma scintillation detector	Gamma scans of all surfaces	Am-241 (31.5), Cs-137 (6.4) ^a
Ludlum Model 2221; Scaler/ratemeter (with earphones)	Readout instrument for gamma scintillation detector	N/A
G5 FIDLER NaI Gamma scintillation detector	Gamma scans of all surfaces	Able to detect weak gamma emissions given off by Am-241

^a Value from NUREG 1507, Table 6.4.

Instrumentation will have current calibration (within the past 12 months, or more frequently if recommended by the manufacturer). Daily field performance checks will be conducted in accordance with instrument use procedures. These performance checks will be performed prior to and following daily field activities and at any time the instrument response appears questionable. Only data obtained using instruments that satisfy the performance requirements will be accepted for use in the evaluation.

2.3.5 Surface Soil Samples

Soil samples will be collected from 0 to 15 cm (0 to 0.5 ft) bgs to determine if the soil satisfies the DCGL.

Random measurement patterns are used for soil sampling within MARSSIM Class 3 areas to ensure that the measurements are independent while still supporting the assumptions of the statistical tests. Systematic grids are used for soil sampling within MARSSIM Class 2 and Class 1 areas because there is an increased probability of encountering small areas of elevated activity. See Sections 4.1 and 4.2 for the number of samples required to be collected within each survey area and the grid spacing, respectively.

3.0 DEFINE THE STUDY BOUNDARY

Study boundaries for impacted areas are defined by both horizontal (areal) and vertical parameters. The vertical boundary of any study area is limited to the top 6 inches (in) of surface soil.

Areal boundaries are defined in this plan by the potential for containing contaminated soil (i.e., the class). An area is Class 1 if prior to excavation activities, it is known to contain contamination above DCGL. An area is Class 2 if contamination above DCGL is *not* believed to exist. An area is Class 3 if contamination is not expected or is expected at a small fraction of the DCGLs.

MARSSIM recommends limiting areas of Class 1, Class 2, and Class 3 survey units to 2,000 m² (0.5 acres), 10,000 m² (2.5 acres), and no limit, respectively.

3.1 DEVELOP THE DECISION RULE

MARSSIM guidance is used to determine whether a survey area is acceptable for unrestricted use or if remediation is required. This determination is made by performing surface scans, collecting soil samples, testing sample results against applicable DCGLs, and performing statistical tests, and performing risk and dose assessments to confirm compliance with the appropriate requirements from all sources (as described in Appendix I, Section 11 of MARSSIM). A detailed discussion of the steps is presented in Section 4.0 of this plan.

If results indicate contamination levels in excess of the DCGLs are encountered in the surrounding areas around Magill and Rhodes Halls, further investigation will be performed which may include additional measurements, reclassification, and/or resurvey, as appropriate to determine if soil remediation is necessary.

3.2 SPECIFY TOLERABLE LIMITS ON DECISION ERROR

As part of the DQO process, the null hypothesis (H_0) for demonstrating compliance of the data with the DCGL is assessed. There are two scenarios that can be used for hypothesis testing. Scenario A can be used at any time. Scenario B can be used when the residual radioactivity consists of radionuclides that have a relatively large variability in the background reference areas. When using Scenario A, a typical H_0 that residual contamination exceeds the DCGLs is tested. By disproving the H_0 , the alternative hypothesis (H_a) must be accepted and the finding of the assessment is that the survey unit satisfies the DCGLs. Typically, the Sign Test will be used since potential contaminants are not present in the background. For the second scenario, Scenario B, a different survey design method can be used. Scenario A will be the typical method used at Southeast. A separate planning package should be written if Scenario B is used.

To enable testing of data relative to the DCGL, the following decision errors have been established for the Southeast. The Type I (alpha) decision error to be used in data testing is 0.05; this provides a confidence level of 95% that the statistical tests will not incorrectly determine that a surveyed unit satisfies the DCGL when, in fact, it does not. The Type II (beta) decision error used to determine sample quantity per survey unit will range from 0.25 to 0.05; this provides a confidence level of 75-95% that the statistical tests will not incorrectly determine that a survey unit does not satisfy criteria when, in fact, it does. The Type II error has been set at 0.20. Type II errors do not adversely impact public safety and health and thus are subject to change.

3.3 OPTIMIZE THE DESIGN FOR OBTAINING DATA

Field screening techniques, soil sampling, surface activity measurements and the DQA process will be used, as appropriate, throughout the survey to focus efforts and minimize survey/sampling efforts using a graded approach.

4.0 SURVEY PLANNING AND DESIGN

4.1 DETERMINE THE NUMBER OF DATA POINTS

The number of data points to be collected in a survey area is estimated using the Sign test, a non-parametric statistical test for contaminants that are not present in background. The following steps ensure an adequate number of samples are taken to represent contamination levels for individual survey units at Southeast.

4.1.1 Classify Survey Units

Consistent with MARSSIM, survey areas are classified based on a historical site assessment and the results of scoping and characterization surveys. If an adequate amount of historical information and data exists, then the survey unit may be classified without performing scoping and characterization surveys.

Survey units under MARSSIM are broken into three classes. A survey unit is classified as a Class 1 unit when it has or had prior to remediation, a potential for radioactive contamination or known contamination above the DCGL. Class 1 survey units should not exceed 2,000 m².

A survey unit is classified as a Class 2 unit when it has a potential for radioactive contamination or known contamination, but is not expected to exceed the DCGL. Class 2 survey units should not exceed 10,000 m².

A survey unit is classified as a Class 3 unit when it is not expected to contain any residual radioactivity, or is expected to contain levels of residual radioactivity at a small fraction of the DCGL, based on site operating history and previous radiation surveys. There is no limitation to the size of Class 3 survey units.

4.1.2 Specify Decision Errors

SAIC has established acceptable decision errors for Southeast in order to enable testing of survey data relative to the acceptance criteria. The Type I (α) decision error to be used is 0.05. This provides a confidence level of 95% that the statistical tests will not incorrectly determine that a survey unit satisfies criteria when, in fact, it does not. The Type II (β) decision error is set at 0.20. Type II errors, which would result in excess uncontaminated materials being removed, do not adversely impact public safety or health and thus are subject to change.

4.1.3 Estimate Sample Standard Deviation

Site specific data should be used, when available, to estimate the survey unit standard deviation (σ). The use of previous survey data to estimate the σ for a survey unit is discussed in MARSSIM. Choosing an appropriate value for σ is very important. If the value is grossly underestimated, the number of samples will be too few to obtain the desired power for the statistical test, and a resurvey may be recommended. If the value is overestimated, the number of samples determined will be unnecessarily large. Historical, characterization, and preliminary design investigation sample data may be used to estimate the σ .

4.1.4 Calculate Relative Shift

The relative shift (Δ/σ) is an expression of the resolution of the measurements in units of measurement uncertainty. The shift (Δ) is set equal to the DCGL minus the Lower Bound of the Grey Region (LBGR). The DCGL has been set as 2.1 for Am-241. MARSSIM recommends

initially setting the LBGR to one half of the DCGL. The LBGR may be set at the mean concentration of the survey unit if it is known. When calculating the Δ/σ , MARSSIM recommends a value between 1 and 3. When using one half of the DCGL as the LBGR, the Δ is stated as:

$$\Delta = \text{DCGL} - \text{LBGR} = 2.1 - 1.05 = 1.05$$

Using a LBGR value of 1.05 and an estimated value of 0.6 as the σ , the Δ/σ is:

$$\Delta/\sigma = 1.05/0.6 = 1.8$$

4.1.5 Estimating the Number of Samples

The number of samples for statistical testing can be obtained directly from MARSSIM Table 5.3 or may be calculated by using the equation listed below:

$$N = \frac{(Z_{1-\alpha} - Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2}$$

$$N = \frac{(1.645 - 0.842)^2}{4(0.964070 - 0.5)^2} = 7 \text{ Samples}^*$$

where:

N = Number of Samples

$Z_{1-\alpha}$ = Percentile represented by selected α decision error (0.05) = 1.645 (MARSSIM Table 5.2)

$Z_{1-\beta}$ = Percentile represented by selected β decision error (0.20) = 0.842 (MARSSIM Table 5.2)

Sign p = Probability that a random measurement from the survey unit will be less than DCGL_W when the survey unit median is equal to LBGR. (MARSSIM Table 5.4). Since $\Delta/\sigma = 1.8$, Sign $p = 0.964070$

* This number is based on a SU area of 2,000 m².

Increasing the number of samples by 20%, then rounding up to the next even number as recommended by MARSSIM results in 9 samples.

4.2 DETERMINE SAMPLE SPACING

The grid spacing (L) is estimated in one of two ways, depending on the intended shape of the grid. Using the preferred method of a triangular grid, L is estimated using the following equation.

$$L = \sqrt{\frac{(A)}{(0.866)(n)}}$$

where: A = the surface area in the survey unit

n = the number of data point to be taken

Area units or measurements must be used consistently throughout this equation. Grid spacing should generally be rounded down to the nearest distance that can be measured conveniently in the field.

4.3 SMALL AREAS OF ELEVATED ACTIVITY

For conditions where contamination is fairly uniform across a SU, systematic sampling density (i.e., grid spacing) shown above will provide sufficient information to determine whether or not the residual radioactivity at a site exceeds the DCGL. However, the survey also needs to determine if any small areas of elevated activity are present that are significant as compared to the DCGL or $DCGL_{EMC}$. The $DCGL_{EMC}$ takes into account the difference in area between the whole survey unit and the small area of elevated activity and the resulting change in dose.

When the GWS instrument scan MDC (MDC_{Scan}) used for the scanning survey is greater than the DCGL, the systematic sampling noted in previous sections may not be sufficient for detecting small areas of elevated activity. "Instead, systematic sampling and biased sampling, in conjunction with surface scanning (i.e., GWS), are used to obtain adequate assurance that small areas of elevated radioactivity will still satisfy the release criterion or the $DCGL_{EMC}$." (MARSSIM, Section 5.5.2.4). This is applicable for Class 1 SUs since small pockets of activity above DCGLs are only likely in Class 1 units.

The method used for determining values for the $DCGL_{EMC}$ is to modify the existing DCGL using an area correction factor (A_f) that corresponds to the difference in area and the resulting change in dose or risk. The A_f is defined as; the magnitude by which the concentration within the small area of elevated activity can exceed the DCGL while maintaining compliance with the release criteria (MARSSIM, Section 5.5.2.4 and Figure 5.3).

Once the $DCGL_{EMC}$ is determined for the area represented by each systematic sample, it should be compared to the MDC_{Scan} for the detector being used for the GWS. If the $MDC_{Scan}/DCGL_{EMC} < 1.0$, then the systematic sample grid spacing is sufficient. If the $MDC_{Scan}/DCGL_{EMC} > 1.0$, then the grid spacing must be reduced so that the $DCGL_{EMC}$ times the area representing each sample in the grid is greater than or equal to the MDC_{Scan} .

4.3.1 Example Calculation

The NRC Screening Levels (initially adopted as DCGLs) listed in Table C-1 of this plan, represent soil concentrations that are deemed to be compliant with the 25 mrem/year dose standard in 10 CFR 20 Subpart E. These screening levels were derived based on the residential scenario pathways and parameters set forth in NUREG-5512, Volume 3 and the decontamination and decommissioning (D&D) Computer Code. The A_f listed in Table C-4 were developed using RESRAD default parameters and pathways (i.e., residential scenario) with the exception of the following RESRAD non-default parameters that were changed to be consistent with assumptions used during development of screening levels using D&D:

- Am-241 soil concentration was set to 2.1 pCi/g;
- Contaminated zone thickness was set at 0.15 m (0.5 ft); and
- Contaminated area was set at 2,500 m².

Table C-4. Outdoor Area Dose Factors

Nuclide	Area Factor				
	0.24 m ²	2.4 m ²	24 m ²	100 m ²	2,500 m ²
Am-241	56	30	15	12	1.0

If the area of the survey area being investigated is 24 m² and 10 samples are being collected, then the DCGL_{EMC} for the area represented by each systematic grid sample is 63 pCi/g. Since the DCGL_{EMC} (63 pCi/g) is greater than the MDC_{Scan} using a 2"x2" NaI scintillation detector (31.5 pCi/g) as shown in Table C-5, then the grid spacing is more than sufficient to ensure that a small area of activity is not missed that would result in an exposure greater than the 25 mrem/yr dose criterion.

Table C-5. Southeast Scan MDCs

Nuclide	Scan MDC in pCi/g for 2"X2" NaI Detector
Am-241	31.5

^a NUREG-1507, Table 6.4

5.0 DATA EVALUATION

Survey data is examined using DQA guidance to ensure two things: (1) that the data met quality requirements (see Section 2.2) and (2) that the data provides the necessary basis for determining whether the survey area can be released for unrestricted use.

The DQA involves scientific and statistical evaluations to determine if data are of the right type, quality, and quantity to support the intended use. The DQA process is based on guidance from Chapter 8 and Appendix E in MARSSIM and follows EPA's *Data Quality Assessment: A Reviewer's Guide* (EPA 2006). The five steps in the DQA process are:

- Review the survey design, including DQOs.
- Conduct a preliminary data review.
- Select a statistical test.
- Verify the assumptions of the statistical test.
- Draw conclusions from the data.

5.1 SCAN SENSITIVITY/SMALL AREAS OF ELEVATED ACTIVITY

The Sign test evaluates whether the residual radioactivity in an area exceeds the DCGL for contamination that is approximately uniform across the survey unit; it may not correctly assess compliance with DCGLs when small areas of contamination are present. GWS are used to obtain assurance that small areas of elevated activity are identified. If the scan sensitivity based on survey unit ratios is inadequate, then the systematic sampling grid (L) may need to be reduced in order to increase the probability of detecting the small areas of elevated activity.

5.2 STATISTICAL TESTING

The Sign Test should be used when the COC is not present in background or present at such a small fraction of the $DCGL_w$ to be considered insignificant. This is the case for Am-241 and Cs-137 at Southeast; therefore, the Sign test will be performed for each survey unit. The Sign Test is applied to the sample data in accordance with the guidance and examples provided in the MARSSIM.

6.0 LABORATORY ANALYSIS

Samples will be transferred to a Southeast approved radio-analytical laboratory for analyses in accordance with documented laboratory-specific standard methods. Specific analyses for each sample will generally include gamma spectrometry. Concentrations of COCs will be determined. In accordance with MARSSIM, analytical techniques will provide a minimum detection level of 50% of the individual radionuclide DCGLs for all primary contaminants, with a preferred target minimum detection level of 10% of these individual radionuclide DCGLs (see Table C-6).

Table C-6. Target Detection Limits

Radionuclide	Minimum Detection Limit	Preferred Detection Limit
Am-241	1.05 pCi/g	0.21 pCi/g
Cs-137	5.5 pCi/g	1.1 pCi/g

Soil samples of approximately 1,000 grams will be obtained; samples will be packaged and uniquely identified in accordance with chain-of-custody and site-specific procedures. Analysis of samples will be performed on dried and homogenized soil. High-resolution gamma spectrometry will be used for quantification of Am-241 and Cs-137. Concentrations will be reported in units of pCi/g.

7.0 REPORT OF SURVEY FINDINGS

Survey procedures and results will be documented in a report following the general guidance in MARSSIM. Data packages and reports will typically contain the following information:

- Survey maps that show GWS data, locations of elevated gamma scan levels and biased sample locations;
- Tables of radionuclide concentrations for soil sample collected during the investigation;
- Summary statistics for soil sample data; and
- Dose estimates, if required.

8.0 REFERENCES

- ANSI/HPS 1999. *Surface and Volume Radioactivity Standards for Clearance*, ANSI/HPS N13.12, American National Standard Institute/Health Physics Society.
- DOD 2000. *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, NUREG 1575, USEPA 402-R-97-016, Revision 1, U.S. Department of Defense, U. S. Department of Energy, U.S. Environmental Protection Agency, and U.S. Nuclear Regulatory Commission.
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- EPA 1992. *Supplemental Guidance to RAGS: Calculating the Concentration Term*, Publication 9285.7-081, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.
- EPA 1995. 40 CFR 192.12, *Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings*, Subpart B, U.S. Environmental Protection Agency.
- EPA 2000. *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, U.S. Environmental Protection Agency, Quality Assurance Management Staff, Washington, D.C.
- NRC 1992. *Manual for Conducting Radiological Surveys in Support of License Termination*, NUREG/CR-5849 (draft), U.S. Nuclear Regulatory Commission.
- NRC 1997. 10 CFR 20 Subpart E, *Radiological Criteria for License Termination*, U.S. Nuclear Regulatory Commission.
- NRC 1998a. *Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions*, NUREG-1507, U.S. Nuclear Regulatory Commission.
- NRC 1998b. *A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys*, NUREG-1505, Rev. 1, U.S. Nuclear Regulatory Commission.
- NRC 1998c. *Demonstrating Compliance with the Radiological Criteria for License Termination*, Regulatory Guide DG-4006, Draft, U.S. Nuclear Regulatory Commission.

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

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Manual Name: Quality Assurance Technical Procedures Volume II: Field Standard Operating Procedures

Document Number: FTP-405

Revision Number: 2

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**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
FIELD TECHNICAL PROCEDURE**

Title: Cleaning and Decontaminating Sample Containers and Sampling Equipment

Procedure No: FTP-405

Revision: 2

Date: 11/18/2008

Page 1 of 11

Business Unit General Manager: Date:

A. Chumbari

12/8/08

QA/QC Officer:

Date:

C. D. Cowart

11/18/2008

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1.0 PURPOSE

The purpose of this procedure is to describe decontamination methods and related issues involving the physical removal of chemical and radioactive contaminants from sample containers and sampling equipment.

2.0 SCOPE

This procedure is specifically applicable to the decontamination of the surfaces of sample containers and equipment that come in direct contact with actual samples during sample collection and processing. FTP-400 addresses the decontamination of sampling and field equipment that does not directly contact samples.

3.0 REFERENCES, RELATED READING, AND DEFINITIONS

3.1 REFERENCES

3.1.1 See Common References at the front of the FTP Manual.

3.1.2 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, U.S. Environmental Protection Agency.

3.1.3 Science Applications International Corporation, Field Technical Procedure (SAIC FTP) 400, Equipment Decontamination.

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3.2 DEFINITIONS

3.2.1 Deionized Water - Tap water treated by passing through a standard deionizing resin column. The deionized water should contain no heavy metals or other inorganic compounds (i.e., at or above analytical detection limits) as defined by a standard Inductively Coupled Argon Plasma Spectrophotometer scan.

3.2.2 Equipment Those items (variously referred to a "field equipment" or "sample equipment") necessary for sampling activities which do not directly contact the samples.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-405	Revision: 2	Page: 2 of 11
--------------------------------------	------------------------------	--------------------	----------------------

R

3.2.3 Laboratory Detergent - A standard brand of phosphate-free laboratory detergent, such as Liquinox, or the equivalent.

3.2.4 Organic-free Water - Tap water treated with activated carbon and deionizing units or water from a Milli-Q water purification system (or equivalent). This water should not contain pesticides, herbicides, extractable organic compounds, and less than 50 µg/l of purgeable organic compounds as measured by a low-level GC/MS scan. Organic free water should be stored only in glass or Teflon containers and dispensed from only glass, Teflon, or stainless steel containers.

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3.2.5 Sampling Devices - Utensils and other implements used for sample collection and processing that directly contact actual samples.

3.2.6 Solvent - Pesticide grade isopropanol is the standard solvent used for decontamination in most instances. The use of any other solvent must be justified and approved by the responsible project personnel and documented in the field logbooks.

3.2.7 Tap Water - This refers to tap water from a tested and approved water system.

4.0 RESPONSIBILITIES

4.1 See Common Responsibilities at the front of the FTP Manual.

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4.2 FIELD MANAGER

The Field Manager or designee is responsible for:

4.2.1 ensuring compliance with the Sampling and Analysis Plan (SAP);

4.2.2 ensuring that all personnel perform their assigned duties in accordance with this procedure when it is applicable;

4.2.3 overall management of field activities; and

4.2.4 ensuring that decontamination activities are performed safely.

5.0 GENERAL

5.1 Deviations from requirements will be sufficiently documented to allow re-creation of the modified process.

5.2 Refer to the site- or project-specific Health and Safety (H&S) plan for relevant H&S requirements.

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SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-405	Revision: 2	Page: 3 of 11
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R

- 5.3 Refer to the SAP for project/task-specific sampling and analysis requirements.
- 5.4 SAIC and subcontractor personnel who use this procedure must provide documented evidence of having been trained in the procedure to the Program or Project Manager for records purposes.
- 5.5 The objectives of decontamination are: to remove contamination from contaminated surfaces; to minimize the spread of contamination to uncontaminated surfaces; to avoid any cross-contamination of samples; and to minimize personnel exposures. The intent is to accomplish the required level of decontamination while minimizing the generation of additional solid and liquid waste.
- 5.6 As a minimum, safety glasses or goggles, and nitrile or equivalent gloves will be worn while decontaminating equipment. Uncoated Tyvek coveralls, laboratory coat, or splash apron will be worn if justified by contaminant concentration and potential adverse effects. Face shield, heavy duty PVC or equivalent gloves, coated Tyvek or equivalent coveralls will be worn while cleaning with steam or high temperature water. Ground fault circuit interrupters will be used to supply power to any portable electrical equipment in the equipment decontamination area. Solvent rinsing will be conducted in an open, well ventilated area or under a fume hood. No eating, smoking, drinking, chewing, or hand to mouth contact will be permitted during decontamination activities. Refer to the site- or project-specific H&S plan for other relevant H&S requirements. A fifteen minute eyewash will be available within 100 feet of corrosive (concentrated acids or bases) decontamination fluids are used.
- 5.7 Refer to the SAP for project specific decontamination methods and schedules.
- 5.8 Procedures for packaging and disposal of all waste generated during field activities will be described in the project-specific SAP, Waste Management Plan (WMP), or other applicable guidelines.
- 5.9 Decontamination of sampling devices will be performed in a designated decontamination area, removed from any sampling location. This designated area must also be in a location free of direct exposure to airborne and radiological surface contaminants.
- 5.10 Decontamination activities will be conducted downwind of the location where clean field equipment, clean sample devices, and sample containers are stored.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-405	Revision: 2	Page: 4 of 11
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R

- 5.11 Contaminated or dirty sampling devices/sample containers are not stored with clean (decontaminated) sampling devices/sample containers.
- 5.12 Sample containers and sampling devices are segregated from all other equipment and supplies.
- 5.13 Paint or any other coatings must be removed from any part of a sampling device which may either contact a sample or which may otherwise affect sample integrity. After removal of such coatings, the sampling device will then require decontamination by the appropriate method.
- 5.14 The brushes used to clean sampling devices must not be of the wire-wrapped type.
- 5.15 For any of the specific decontamination methods that may be used, the substitution of a higher grade water is permitted (e.g., the use of organic-free water in place of deionized water). However, it must be noted that deionized water and organic-free water are less effective than tap water in rinsing away the detergent during the initial rinse.
- 5.16 When appropriate, it may be required that decontaminated equipment be surveyed, inspected, and tagged by designated personnel.
- 5.17 Decontaminated sampling devices and all filled and empty sample containers will be stored in locations that are protected from exposure to any contaminant.
- 5.18 The method for decontamination of sampling devices and the exterior of sample containers which have been exposed to radioactive material is based on the material contaminated, the sample medium, the radiation levels, and the specific radionuclides to be removed.
- 5.19 In reference to decontaminated sampling devices and sample containers, their release for unrestricted use is based on site-specific criteria. These site-specific criteria should be found in the project work plans.
- 5.20 Rags used during decontamination may become a hazardous waste and require segregation. Refer to the project work plans for hazardous waste requirements.
- 5.21 An optional field equipment checklist is provided as a full size form immediately following this procedure.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-405	Revision: 2	Page: 5 of 11
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6.0 PROCEDURE

6.1 DECONTAMINATION SCHEDULES

- 6.1.1 Sampling devices must be decontaminated prior to being used in the field, in order to prevent potential contamination of a sample.
- 6.1.2 Sampling devices must be decontaminated between samples to prevent cross-contamination.
- 6.1.3 Sampling devices must be decontaminated on site or brought to a designated off-site decontamination area in a properly marked and sealed container for decontamination prior to being released from the site.
- 6.1.4 An acceptable alternative to cleaning and decontaminating sampling devices is the use of items cleaned or sterilized by the manufacturer that are discarded after use. Care must be exercised to ensure such previously cleaned or sterilized items do not retain residues of chemical or radioactive sterilizing agents that might interfere with analytical techniques.
- 6.1.5 Whenever visible dirt, droplets of liquid, stains, or other extraneous materials are detected on the exterior of a sample container, the exterior surfaces must be decontaminated. This should be done before placing in a sample cooler or shipping container.
- 6.1.6 For sample containers used in controlled access areas, a more rigorous cleaning and/or radiation monitoring may be required before removal from the site. Refer to the project-specific work plan for details.

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6.2 DECONTAMINATION METHODS

The following decontamination methods are examples of some of those most commonly used in field investigations. For the specific procedural requirements for any one project, task, or site, refer to the appropriate SAP.

Note: The decontamination methods described in this section are for guidance only; the Field Operations Manager will adjust decontamination practices to fit the sampling situation and applicable requirements.

6.2.1 Decontaminating the Exterior of Sample Containers in Use

- 6.2.1.1 Wipe the exterior surfaces of the sample container with disposable rags/toweling or rinse with deionized water.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-405	Revision: 2	Page: 6 of 11
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R

6.2.1.2 If rinsing with deionized water, then the exterior of the sample container must be wiped dry with disposable rags/ toweling.

6.2.1.3 All visible dirt, droplets of liquid, or other extraneous materials must be removed.

6.2.1.4 For containers used in controlled access areas or where the sample media is difficult to remove (e.g., sludge), a more rigorous cleaning and/or radiation monitoring may be required. Refer to the project-, task-, or site-specific Work Plan for details.

6.2.1.5 This decontamination procedure will be performed at the sample location before placing the sample container in the sample cooler or shipping container.

6.2.2 Decontaminating Stainless Steel, Teflon, or Metal Sampling Devices Used to Collect Samples for Trace Organic Compounds and /or Metals Analyses.

6.2.2.1 Clean with a tap water and laboratory detergent solution. Use phosphate-free detergent, such as Liquinox, or equivalent. Use a brush to remove particulate matter and surface film.

6.2.2.2 Rinse thoroughly with organic-free water.

6.2.2.3 Rinse twice with solvent (pesticide-grade isopropanol).

6.2.2.4 Allow to air dry for 24 hours, if possible.

6.2.2.5 If it is not possible to air dry for 24 hours, then rinse twice with organic-free water and allow to air dry as long as possible.

6.2.2.6 Wrap sampling devices with aluminum foil (with shiny side facing outward). This is done to prevent contamination of sampling devices during transport and storage.

6.2.2.7 When a sampling device is used to collect samples that contain oil, grease, or other hard to remove materials, it may be necessary to rinse the device several times with an approved solvent (one which meets the requirements of the SAP) before initiating decontamination. In extreme cases it may be necessary to steam clean, wire brush, or sandblast

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-405	Revision: 2	Page: 7 of 11
--------------------------------------	------------------------------	--------------------	----------------------

R

the sampling device prior to using this decontamination method. If the sampling device cannot be adequately cleaned utilizing the above means, it must be discarded.

6.2.3 Decontaminating Glass Sampling Devices Used for the Collection of Samples for Trace Organic Compounds and/or Metals Analyses.

6.2.3.1 Glass sampling devices will be washed thoroughly with laboratory detergent and hot water using a brush to remove any particulate matter or surface film.

6.2.3.2 Rinse thoroughly with hot tap water.

6.2.3.3 Rinse thoroughly with tap water.

6.2.3.4 Rinse twice with solvent and allow to air dry for at least 24 hours.

6.2.3.5 Wrap with aluminum foil (with shiny side facing outward). This is done to prevent contamination during storage and/or transport to the field.

Note: When a sampling device is used to collect samples that contain oil, grease, or other hard to remove materials, it may be necessary to rinse the device several times with an approved solvent (one which meets the requirements of the SAP) before initiating decontamination. In extreme cases it may be necessary to steam clean, wire brush, or sandblast the sampling device prior to using this decontamination method. If the sampling device cannot be adequately cleaned utilizing the above means, it must be discarded.

6.2.4 Decontamination of Silastic Rubber Pump Tubing Used in Automatic Samplers and Other Peristaltic Pumps.

New cleaned tubing must be used for each automatic sampler set-up. The silastic rubber pump tubing need not be replaced in peristaltic pumps where the sample does not contact the tubing or where the pump is being used for purging purposes (i.e., not being used to collect samples).

Note: New tubing (certified clean by the manufacturer, or medical grade) may be used in lieu of cleaning. New tubing may be dedicated to a well or new tubing used for each sampling event or location.

6.2.4.1 Flush tubing with hot tap water and phosphate-free laboratory detergent.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-405	Revision: 2	Page: 8 of 11
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R

6.2.4.2 Rinse tubing thoroughly with hot tap water.

6.2.4.3 Rinse tubing with deionized water.

6.2.4.4 Install tubing in automatic sampler or peristaltic pump.

6.2.5 Decontamination of Teflon Sample Tubing.

Use only new Teflon tubing decontaminated as follows for collection of samples for organic compounds analyses:

6.2.5.1 Teflon tubing may be pre-cut in convenient lengths before cleaning to simplify handling.

6.2.5.2 Rinse outside of tubing with solvent.

6.2.5.3 Flush interior of tubing with solvent.

6.2.5.4 Dry overnight using a drying oven, if applicable.

6.2.5.5 Wrap tubing and cap ends with aluminum foil, or store in a plastic bag to prevent contamination during storage.

6.2.6 Decontamination of Polyvinyl Chloride (PVC) Sample Tubing

Use only new tubing

6.2.6.1 Polyvinyl chloride tubing will be used selectively where organic compounds are not of concern.

6.2.6.2 Tubing will be stored in its original container and not removed from this container until needed.

6.2.6.3 The tubing will be flushed immediately before use to remove any residues from the manufacturing or extruding process.

6.2.6.4 Discard tubing after use in sampling.

6.2.7 Decontamination of Stainless Steel Tubing

6.2.7.1 Wash with laboratory detergent and water using a long, narrow, bottle brush. Use hot water, if available.

6.2.7.2 Rinse thoroughly with tap water. Use hot water, if available.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-405	Revision: 2	Page: 9 of 11
--------------------------------------	------------------------------	--------------------	----------------------

R

6.2.7.3 Rinse thoroughly with deionized water.

6.2.7.4 Rinse twice with solvent.

6.2.7.5 Allow to air dry for 24 hours, if possible.

6.2.7.6 If it is not possible to air dry for 24 hours, then rinse thoroughly with organic-free water and allow to dry for as long as possible.

6.2.7.7 Wrap with aluminum foil (with the shiny side facing outward). This is done to prevent contamination of tubing during transport and storage.

Note: When the tubing is used to collect samples that contain oil, grease, or other hard to remove materials, it may be necessary to rinse it several times with an approved solvent before initiating decontamination. In extreme cases, it may be necessary to steam clean, wire brush, or sandblast the tubing prior to using this decontamination method. If it cannot be adequately cleaned utilizing the above means, it must be discarded.

6.2.8 Decontamination of Glass Tubing

Use only new glass tubing, decontaminated as follows prior to use:

6.2.8.1 Rinse thoroughly with approved solvent.

6.2.8.2 Air dry for at least 24 hours.

6.2.8.3 Wrap tubing with aluminum foil (with shiny side facing outward) to prevent contamination during storage.

6.2.8.4 Discard tubing after use in sampling.

6.2.9 Decontamination of stainless steel and metal sampling devices use to collect samples of radioactive materials.

6.2.9.1 Clean with tap water and detergent solution. Use phosphate-free detergent, such as Liquinox or equivalent. Use brush to remove particulate matter and surface file, as necessary.

6.2.9.2 Rinse with tap water.

6.2.9.3 Dry sampling devices prior to reuse.

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SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-405	Revision: 2	Page: 10 of 11
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6.3 QUALITY CONTROL

6.3.1 The quality of the deionized and organic-free water used may be monitored by collecting samples in standard precleaned, sample containers and submitting them to the laboratory for a standard ICP scan. Organic-free water should be submitted for low-level pesticide, herbicide, extractable, or purgeable compounds analyses, as appropriate.

6.3.2 Effectiveness of the decontamination procedures is monitored by submitting rinse water to the laboratory for low-level analysis of the parameters of interest. An attempt should be made to select different sampling devices, each time devices are washed, so that a representative sampling of all devices is obtained over the length of the project. Note in the field logbook the devices being used for the QC rinsate.

7.0 RECORDS

Documentation generated as a result of this procedure is submitted to the designated records system in accordance with Section 17 of the Business Unit QAP.

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8.0 ATTACHMENTS

8.1 Attachment I - Allowable Residual Surface Contamination Limits for Unrestricted Release

Attachment I
Allowable Residual Surface Contamination Limits for Unrestricted Release

Nuclide	Average ^{b,c} (dpm/100 cm ²)	Maximum ^{b,d} (dpm/100 cm ²)	Removeable ^{b,e} (dpm/100 cm ²)
U-nat, U-235, U-238, and associated decay products	5,000 alpha	15,000 alpha	1,000 alpha
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231	100	300	20
Ac-227, I-125, I-129, Th-nat, Th-232, Sr-90, Ra-223, Ra-234, U-232, I-126, I-131, I-133	1,000	3,000	200
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except SR-90 and others noted above.	5,000 beta- gamma	15,000 beta- gamma	1,000 beta- gamma

- a Where surface contamination by both alpha- and beta-gamma emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.
- b As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- c Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.
- d The maximum contamination level applies to an area of not more than 100 cm².
- e The amount of removable radioactive contamination per 100 cm² of the surface area should be determined by wiping the area with dry filter paper or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface area should be wiped.

Source: US NRC Regulatory Guide 1.86, June 1974.

Field Checklist

- Logbook
- Safety Glasses or Monogoggles
- Gloves
- Safety Shoes
- Black, Indelible Pen
- Plastic Sheets
- Decontamination Equipment
- Health and Safety Plan
- Sampling and Analysis Plan
- Appropriate Containers for Waste and Equipment
- Monitoring Instruments

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Manual Name: Quality Assurance Technical Procedures Volume II: Field Standard Operating Procedures

Document Number: FTP-451

Revision Number: 3

Date Printed: _____

Person Checking the Revision Number: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
FIELD TECHNICAL PROCEDURE**

Title: Field Measurement Procedures: Operation of Radiation Survey Instruments

Procedure No: FTP-451 Revision: 3 Date: 11/18/2008 Page 1 of 4

Business Unit General Manager: <i>A. G. Munsak</i>	Date: <i>12/8/08</i>	QA/QC Officer: <i>C. D. Cowart</i>	Date: <i>11/18/2008</i>
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1.0 PURPOSE

The purpose of this procedure is to describe the operation of selected radiation survey instruments.

2.0 SCOPE

This procedure is limited to ionization chambers, proportional counters, Geiger-Mueller (GM) counters, and scintillation detectors. Radiation survey instruments are capable of responding to different types and levels of ionizing radiation. This procedure should be considered supplementary to the respective instrument's instruction manual.

3.0 REFERENCES, RELATED READING, AND DEFINITIONS

3.1 REFERENCES

3.1.1 See Common References at the front of the FTP Manual.

3.1.2 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, U.S. Environmental Protection Agency.

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3.2 DEFINITIONS

3.2.1 Calibration Standard - Radioactive source appropriate to check instrument response.

3.2.2 Ionizing Radiation - Electromagnetic waves or particles with sufficient energy to ionize matter (i.e., to remove or displace electrons from atoms or molecules).

4.0 RESPONSIBILITIES

4.1 See Common Responsibilities at the front of the FTP Manual.

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4.2 FIELD MANAGER

The Field Manager is responsible for:

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-451	Revision: 3	Page: 2 of 4
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- 4.2.1 ensuring compliance with the Sampling and Analysis Plan (SAP);
- 4.2.2 ensuring that all personnel perform their assigned duties in accordance with this procedure when it is applicable;
- 4.2.3 overall management of field activities; and
- 4.2.4 selecting the proper radiation survey instrument.

5.0 GENERAL

- 5.1 Any deviations from specified requirements will be justified to and authorized by the Project Manager and/or the relevant Program Manager.
- 5.2 Deviations from requirements will be sufficiently documented to allow re-creation of the modified process.
- 5.3 Refer to the site- or project-specific H&S Plan for relevant H&S requirements.
- 5.4 Refer to the SAP for project/task-specific sampling and analysis requirements.
- 5.5 SAIC and subcontractor personnel who use this procedure must provide documented evidence of having been trained on the procedure to the Program or Project Manager for transmittal to the designated records system.
- 5.6 The manufacturer's operating instructions should be available for each instrument on site.
- 5.7 The only types of ionizing radiation are x-rays, gamma rays, alpha particles, beta particles, and neutrons.
- 5.8 Radiation survey instruments will be portable, rugged, sensitive, simple in design and operation, reliable, and intrinsically safe for use in explosive atmospheres.
- 5.9 In most cases, more than one kind of instrument is needed to ensure that an area is free of radioactive sources or contamination.
- 5.10 The instrumentation to be discussed herein is limited to ionization chambers, proportional counters, GM Counters, and scintillation detectors.
 - 5.10.1 An Ionization Chamber consists of a gas filled envelope (usually air at atmospheric pressure) with two electrodes at different electrical potential. Ionizing radiation entering the chamber produces ions that

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SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-451	Revision: 3	Page: 3 of 4
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migrate toward the electrode because of the applied potential, producing a current. The current requires an amplification to a measurable level before it can be recorded on a meter. These are high-range instruments (low sensitivity) and are used extensively for measuring high intensity beta, gamma, or x-radiation. If no audio indication is possible with the instrument, the operators must be constantly aware of the meter to determine radiation intensity. Ionization chambers do not record individual radiation particles but integrate all signals produced as an electric current to drive the meter. They should be calibrated to the type and intensity of radiation desired to be measured in milliroentgens/hour (roentgens/hour).

- 5.10.2 The Proportional Counter has a probe with an extremely thin window that allows alpha particles to enter, and so is used extensively for this type of radiation by adjusting instrument parameters to discriminate against beta and gamma radiation. The meter is read in counts per minute, and usually has several sensitivity scales. It should be noted that because of the nature of alpha particles, it is important to hold the probe as close as possible to (though not in contact with) the surface being monitored. The window of the proportional counter is delicate in construction, requiring care when being used as a field instrument.
- 5.10.3 GM Counters operate principally in the same manner as ionization chambers except that secondary electrons are formed allowing greater sensitivity. They are very sensitive and are commonly used to detect low level gamma and/or beta radiation. Meters are read in counts/sensitivity. They are very sensitive and are commonly used to detect low level gamma and/or beta radiation. Meters are read in counts/minute or milliroentgens/hour. The gas amplification process inherent to this type of detector allows a single beta particle or gamma photon to be detected. It should be noted that these devices are sensitive instruments and care should be taken not to exceed their maximum capacity to prevent damage to the GM tube.
- 5.10.4 Scintillation Detectors depend upon light produced when ionizing radiation interacts with a media (solid crystal used in survey instruments). They are extremely sensitive instruments used to detect alpha, beta, or gamma radiation simply by choosing the correct crystal. Alpha particles are detected with a silver activated zinc sulfide screen, beta radiation with an anthracene crystal (covered with a thin metal foil to screen alpha particles), and gamma or x-ray with a sodium iodide crystal. The instrument can be calibrated in the same manner as for ion chambers and GM instruments. The operator should keep in mind that in older models the detector may be damaged if directly exposed to light without first disconnecting the voltage.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-451	Revision: 3	Page: 4 of 4
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5.11 An optional field equipment checklist is provided as a full size form immediately following this procedure.

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6.0 PROCEDURE

6.1 Choose an instrument that is consistent with the investigative requirements. The selection of the appropriate instrument is based on the suspected contaminant radionuclide, the type of radiation emitted, and the efficiency of the instrument to detect the radiation.

6.2 See the manufacturer's operating instructions prior to use. Operate the instrument as per manufacturer's instructions and note in the field logbook which instrument is being used. Also note in the field logbook the method of calibration if more than one choice exists.

6.3 Check the last calibration date to determine if it is current. Return the instrument to the calibration lab if the calibration is out of date.

6.4 Record measurements in the appropriate field logbook.

7.0 RECORDS

Documentation generated as a result of this procedure is submitted to the designated records system in accordance with Section 17 of the Business Unit QAP.

8.0 ATTACHMENTS

None

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Field Checklist

- Appropriate Radiation Survey Instruments
- Calibration Standard-Radiation Source
- Safety Glasses or Monogoggles*
- Gloves*
- Safety Shoes*
- Logbook
- Black Indelible Pen
- Sampling and Analysis Plan
- Health and Safety Plan
- Manufacturer's Instrument Calibration and Maintenance Manual
- Decontamination Equipment

*When specified by the site-specific H&S plan.

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Manual Name: Quality Assurance Technical Procedures Volume II: Field Standard Operating Procedures

Document Number: FTP-525

Revision Number: 2

Date Printed: _____

Person Checking the Revision Number: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
FIELD TECHNICAL PROCEDURE**

Title: Soil Sampling using an Auger

Procedure No: FTP-525

Revision: 2

Date: 11/18/2008

Page 1 of 4

Business Unit General Manager: Date:

A. H. ... 12/8/08

QA/QC Officer: Date:

C. J. ... 11/18/2008

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1.0 PURPOSE

The purpose of this procedure is to describe the standard method and equipment used to collect soil samples at the surface or in shallow excavations using an auger.

2.0 SCOPE

This procedure provides a disturbed sample. This procedure applies to a wide variety of soil types including sands, clays, and silts. The use of an auger is of limited value in rocky soil.

3.0 REFERENCES, RELATED READING, AND DEFINITIONS

3.1 REFERENCES

3.1.1 See Common References at the front of the FTP Manual.

3.1.2 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, U.S. Environmental Protection Agency.

3.1.3 Science Applications International Corporation Field Technical Procedure (SAIC FTP) 650, Labeling, Packaging and Shipping of Environmental Field Samples.

3.1.4 Science Applications International Corporation Field Technical Procedure (SAIC FTP) 625, Chain-of-Custody.

3.1.5 Science Applications International Corporation Field Technical Procedures (SAIC FTP) 691, Composite Procedures.

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3.2 DEFINITIONS

3.2.1 Hand-Operated Auger - A small, lightweight, metal auger. Diameters typically range between 1 and 4 inches. Augers normally are used in conjunction with 3 to 4 foot long metal shafts and T-handles.

3.2.2 Motor-Operated Auger - A metal auger attached to a shaft and powered by an internal combustion or electric motor. Typical auger diameters range from 1 to 48 inches. This auger may be hand held.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-525	Revision: 2	Page: 2 of 4
--------------------------------------	------------------------------	--------------------	---------------------

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4.0 RESPONSIBILITIES

4.1 See Common Responsibilities at the front of the FTP Manual.

R

4.2 FIELD MANAGER

The Field Manager is responsible for:

4.2.1 ensuring that all personnel perform their assigned duties in accordance with this procedure when it is applicable;

4.2.2 ensuring compliance with the Sampling and Analysis Plan (SAP); and

4.2.3 overall management of field activities.

5.0 GENERAL

5.1 Any deviations from specified requirements will be justified to and authorized by the Project Manager and/or the relevant Program Manager.

5.2 Deviations from requirements will be sufficiently documented to allow re-creation of the modified process.

5.3 Refer to the site- or project-specific Health and Safety (H&S) Plan for relevant H&S requirements.

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5.4 SAIC and subcontractor personnel who use this procedure must provide documented evidence of having been trained on the procedure to the Program or Project Manager for records purposes.

5.5 This procedure is not appropriate for taking samples at a discrete depth, but may be used to take samples at an approximate depth.

5.6 Sampling tools and equipment are protected from sources of contamination prior to sampling and decontaminated prior to, and between sampling, as specified in FTP-400, Equipment Decontamination.

5.7 The equipment required may include hand-operated, spiral-type, ship-type, open tubular, orchard-barrel, open spiral, closed spiral, post hole, clam shell, or machine-operated augers.

5.8 Augers plated with chrome or other materials, except Teflon, must be cleaned of those materials prior to use. Stainless steel is preferred.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-525	Revision: 2	Page: 3 of 4
--------------------------------------	------------------------------	--------------------	---------------------

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5.9 An optional field equipment checklist is provided as a full size form immediately following this procedure.

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6.0 PROCEDURE

6.1 SOIL SAMPLING USING AN AUGER

- 6.1.1 Don clean gloves and using a stainless steel spoon, or other approved utensil, remove surface vegetation and debris from the immediate area around the marked sampling point.
- 6.1.2 Use plastic sheeting around work area, as necessary, to prevent equipment from coming in contact with potentially-contaminated surfaces.
- 6.1.3 Record the appropriate information and observations about the sample location in the field logbook.
- 6.1.4 Assemble decontaminated auger, extension, and T-handle, if necessary, and advance the auger into the soil to the desired depth.
- 6.1.5 Withdraw the auger from the soil.
- 6.1.6 If a sample is not desired, remove the soil from the auger and repeat steps 6.1.3 & 6.1.4. If a sample is to be taken in the next boring, replace the auger bucket with a decontaminated bucket and repeat steps 6.1.2 through 6.1.4.
- 6.1.7 Perform any H&S measurements as specified in the H&S plan.
- 6.1.8 Using a stainless steel Teflon spoon, spatula, or disposable scoop remove soil from the auger and place in a stainless steel bowl on a polyethylene sheet or a glass tray. The top two or three inches of soil in the auger are discarded. Remove aliquot for volatile organic analysis. Mix or composite soil in accordance with FTP-691, Composite Procedures and the project-specific SAP. Using a spoon or other approved utensil, remove any large rocks or other organic material (i.e., worms, grass, leaves, roots, etc.).
- 6.1.9 Using a decontaminated stainless steel or Teflon spoon, spatula, or disposable scoop, as appropriate, place soil samples in compatible containers. Packaging, labeling, and preparation for shipment are implemented in accordance with FTP-650, Labeling, Packaging and Shipping of Environmental Field Samples.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-525	Revision: 2	Page: 4 of 4
--------------------------------------	------------------------------	--------------------	---------------------

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6.1.10 Samples are placed in containers defined according to analytical needs specified in the SAP, and then, when appropriate, packed in ice as soon as possible.

6.1.11 If changes in lithology are observed, consult the sampling and analysis plan.

6.1.12 Complete the field logbook and chain-of-custody forms in accordance with procedures, FTP-1215, Field Logbooks and Field Forms and FTP-625, Chain-of-Custody.

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6.1.13 The hole is filled with materials prescribed in the SAP, Waste Management Plan or other applicable guidelines to avoid future safety problems. Excavated materials are placed in containers for disposal or dealt with as specified.

7.0 RECORDS

Documentation generated as a result of this procedure is submitted to the designated records system in accordance with Section 17 of the Business Unit QAP.

R

8.0 ATTACHMENTS

None.

Field Checklist

- Auger
- Auger Shafts and Handles
- Wrench
- Logbook
- Sample Containers with Lids
- Safety Glasses or Monogoggles
- Gloves
- Safety Shoes
- Ice/Cooler, as required
- Black, Indelible Pen
- Bowls
- Labels and Tags
- Plastic Sheets
- Lab Wipes
- Decontamination Equipment
- Chain-of-Custody Forms
- Custody Seals or Evidence Tape
- Sampling and Analysis Plan
- Health and Safety Plan
- Appropriate Containers for Waste and Equipment
- Monitoring Instruments
- Spoons, Scoops, etc.

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Manual Name: Quality Assurance Technical Procedures Volume II: Field Standard Operating Procedures

Document Number: FTP-625

Revision Number: 2

Date Printed: _____

Person Checking the Revision Number: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
FIELD TECHNICAL PROCEDURE**

Title: Chain-of-Custody

Procedure No: FTP-625

Revision: 2

Date: 11/18/2008

Page 1 of 9

Business Unit General Manager: Date:

A. H. [Signature]

12/8/08

QA/QC Officer:

C. G. Cowart

Date:

11/18/2008

R

1.0 PURPOSE

The purpose of this procedure is to outline methods to ensure the integrity of environmental samples, from collection to final disposition, by documenting possession. The documentation traces possession of samples from their collection through all transfers of custody until final disposition, including archiving, when required.

2.0 SCOPE

This procedure applies to all sampling activities in which the samples leave the sampler's possession.

3.0 REFERENCES AND DEFINITIONS

3.1 REFERENCES

3.1.1 See Common References at the front of the FTP Manual.

3.1.2 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, U.S. Environmental Protection Agency.

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3.2 DEFINITIONS

3.2.1 Chain-of-Custody Form - A form (usually pressure sensitive and duplicate or triplicate) used to document all transfers of possession of an environmental sample from time of collection until final disposition. A chain-of-custody form is identified by a unique number printed or entered on the form.

3.2.2 Field Logbook - A bound book with sequentially numbered pages that is used to create a permanent, real-time record of activities and conditions, significant events, observations, and measurements which occur during each day of field activities.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-625	Revision: 2	Page: 2 of 9
--------------------------------------	------------------------------	--------------------	---------------------

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3.2.3 Sample Container - Either an individual sample container, such as a bottle, or a shipping container, such as an ice chest, which may have or require an associated certification lot number.

3.2.4 Sample Container Label - A waterproof paper or plastic, pressure-sensitive, gummed label placed on the sample container bottle. Information regarding the sampling activity is recorded on the label, and the label is attached to the appropriate bottle.

3.2.5 Sample Identification (ID) Number - A unique number assigned to a sample that is used to trace the sample from its origin to final reporting of data. Features of the ID may be used to identify the sampling location, installation type, sequential sample number, the media (air, water, or soil) sampled, or other pertinent descriptive information.

4.0 RESPONSIBILITIES

4.1 See Common Responsibilities at the front of the FTP Manual.

R

4.2 FIELD MANAGER

The Field Manager is responsible for:

4.2.1 ensuring that all personnel perform their assigned duties in accordance with this procedure when it is applicable;

4.2.2 ensuring compliance with the Sampling and Analysis Plan (SAP);

4.2.3 overall management of field activities;

4.2.4 assuming custody of the collected samples in the field (if appropriate) until he or she properly transfers them to a Sample Manager, to a courier, or directly to the laboratory; and

4.2.5 ensuring that sample custody is maintained from the time of sample collection until release to a courier or a laboratory.

4.2.6 ensuring that field chain-of-custody forms are provided to data management personnel.

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5.0 GENERAL

5.1 Any deviations from specified requirements will be justified to and authorized by the Project Manager and/or the relevant Program Manager and will be documented on the appropriate field change forms.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-625	Revision: 2	Page: 3 of 9
--------------------------------------	------------------------------	--------------------	---------------------

R

- 5.2 Deviations from requirements will be sufficiently documented to allow re-creation of the modified process.
- 5.3 Refer to the site- or project-specific Health and Safety (H&S) Plan for relevant H&S requirements.
- 5.4 Refer to the site or project/task-specific SAP for relevant sampling and analysis requirements.
- 5.5 SAIC and subcontractor personnel who use this procedure must provide documented evidence of having been trained on the procedure to the Program or Project manager for records purposes.
- 5.6 All field team members entering data will use indelible black ink. All entries must be legible. If an error is made, the field team member draws one line through the incorrect entry so that data is not obliterated, and initials and dates each correction. Dates and times are recorded using the format "mm/dd/yy" for the date and the military or 24-hour clock to record the time. Zeros in the sample identification number will be recorded with a slash (/) to distinguish them from the letter "O".

R

6.0 PROCEDURE

6.1 SAMPLES UNDER CUSTODY

- 6.1.1 A sample is considered to be under a specific person's custody if any of the following conditions are met:
 - a) the sample is in the person's physical possession;
 - b) the sample is in line of sight of the person after he/she has taken possession;
 - c) the sample is secured by that person so any tampering can be detected; and
 - d) a sample is secured by the person in possession, in an area which only authorized personnel can enter.
- 6.1.2 Chain-of-custody requirements are necessary whenever a sample leaves the sampling team's custody or when samples are collected and archived.

6.2 SAMPLE LABELS

- 6.2.1 Sample container labels are completed by entering the required information.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-625	Revision: 2	Page: 4 of 9
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6.2.2 Sample containers shall be labeled (e.g., marked) using printed labels or by marking directly on sample containers prior to or at the time of sampling. To the extent practicable, sample bottles are labeled prior to filling.

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6.2.3 Labels are completed with black indelible ink and typically include the following information:

- a) unique field study or sampling activity name and/or number;
- b) unique sample identification number;
- c) sample location (station) or appropriate identification as identified in the sampling program;
- d) sample preservation used;
- e) media sampled;
- f) sample type;
- g) analyses requested;
- h) destination laboratory name;
- i) sampling date and time;
- j) collector's name; and
- k) comments and special precautions as needed.

6.2.4 Labels may be preprinted with most of the information. It is suggested that after sample labels are filled out and affixed to the sample container, the label will be covered with wide clear tape to preserve the label during shipment, if water proof labels are not used.

6.3 SAMPLE SEALS

6.3.1 Sample seals are used to detect tampering following sample collection and prior to the time of analysis.

6.3.2 The seal is attached in such a way that it is necessary to break the seal in order to open the sample container. ("Sample containers" may refer to either individual sample containers or a shipping container such as an ice chest.)

6.3.3 Seals are affixed to the containers as soon as possible following collection, before they leave the custody of the sampling personnel.

6.3.4 Sample seals will be waterproof paper or plastic with gummed backs.

6.3.5 All samples designated for shipment which leave the sampler's custody will have a sample seal affixed which includes the date the sample was collected and the initials of the person who collected the samples.

6.3.6 Alternately, evidence tape with collector's initials and date may be used.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-625	Revision: 2	Page: 5 of 9
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6.4 FIELD LOGBOOKS

6.4.1 A field logbook entry is made at the time the chain-of-custody is generated when the sample is taken to record the chain-of-custody number.

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6.4.2 Any additional chain-of-custody information required by the project-specific SAP or QAPjP is also entered in the field logbook as required.

6.5 CHAIN-OF-CUSTODY FORMS

6.5.1 The chain-of-custody form is completed by the sampling personnel at the time of the sampling event.

6.5.2 The chain-of-custody form includes the following information:

- a) unique field study or sampling activity name and/or number;
- b) sampling personnel signatures and printed names;
- c) unique sample identification number(s);
- d) analyses required for each sample;
- e) date and time the sample was collected;
- f) sample media;
- g) comments regarding the sampling event;
- h) shipping information including (1) number of shipping containers; (2) method of shipment; and (3) special handling requirements, if any.
- i) number of bottles/vials for each sample number/analysis;
- j) signatures of person relinquishing custody and person accepting custody each time custody is transferred from one individual to another; and
- k) date and time of each transfer.

6.5.3 One sample is entered on each line and a sample is not split on multiple lines.

6.5.4 If QA samples are provided to another laboratory facility or government agency, a separate chain-of-custody form will be filled out in the field by a sampling team member when the sample is taken.

6.5.5 Copies of chain-of-custody forms will be maintained by the Field Manager and/ or Data Management.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-625	Revision: 2	Page: 6 of 9
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6.6 DELIVERY OF SAMPLES TO THE LABORATORY

- 6.6.1 The field sampling team member places the sample in an identified container for storage until all samples have been collected for that sampling activity.
- 6.6.2 A Shipping Coordinator, Field Sampling Leader, or field sampling team member who ships samples from the field to the laboratory completes the chain-of-custody form, including referencing all QC samples, signs the form, and notes the date and time of shipment.
- 6.6.3 A field sampling team member inspects the form for completeness and accuracy. He or she makes any needed corrections.
- 6.6.4 A field sampling team member detaches the proper copies of the form or makes copies as appropriate.
- 6.6.5 A field sampling team member places the chain-of-custody form in a reclosable plastic bag and tapes it to the inside of the cooler lid. The sample shipping container is then sealed, and custody seals are placed on the container so that it cannot be opened without breaking the seals. The seal must be signed and dated.
- 6.6.6 The person who is going to deliver the samples to a courier takes custody of the samples.
- 6.6.7 If the samples must be shipped to a distant laboratory, the Shipping Coordinator or field sampling team member arranges by phone for a courier pickup or transports the sealed containers to a commercial air courier for overnight delivery to the laboratory. He or she records the airbill number and signs his or her name and records the company name, date, and time in the relinquished block on the chain-of-custody form. He or she writes in the name of the courier company, date, and time in the received by block. The airbill is retained as part of the chain-of-custody documentation.
- 6.6.8 If a local laboratory will perform analysis, the Field Sampling Leader, Shipping Coordinator, or a field team member may transport the samples to the laboratory facility directly from the field either throughout the day or at the end of each day's sampling effort. The Field Sampling Leader, Shipping Coordinator, or field team member delivering the samples to a local laboratory will relinquish custody to the laboratory and sign, and write in the date and time of the transfer in the appropriate box on the chain-of-custody form.

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SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-625	Revision: 2	Page: 7 of 9
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6.6.9 If samples are not immediately transported to the analytical laboratory, they remain in the custody of the Shipping Coordinator or the Field Sampling Leader. Samples with the need for temperature controls are stored under refrigeration with a custody seal affixed. Samples with no need for temperature controls are kept in a dry location with a custody seal affixed.

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6.7 LABORATORY RECEIPT

6.7.1 Upon receipt of the samples at the laboratory, the laboratory receiving staff member signs his or her name, company name, date, and time in the received by block of the chain-of-custody form.

6.7.2 On the chain-of-custody form, the laboratory sample receiving personnel document the condition of the samples in regard to temperature, integrity of chain-of-custody seals, and proper preservation.

6.7.3 The laboratory personnel verify that information on the chain-of-custody form and labels is complete and accurate.

6.7.4 The laboratory follows chain-of-custody procedures as required by its Quality Assurance Plan. The laboratory may initiate a laboratory internal chain-of-custody form to track the sample throughout the laboratory process.

6.7.5 If problems are identified, the laboratory contacts the designated SAIC contact to inform them of the type of problem and actions to prevent recurrence.

6.7.6 The laboratory provides a receiving report to the Project Manager or designee, which contains the information specified in the laboratory's Statement of Work or in the Sampling and Analysis Plan (SAP).

7.0 RECORDS

As noted in this procedure, there are several items that are part of the system for documenting chain-of-custody. The following is a listing of all items that must be used to document chain-of-custody:

- a) chain-of-custody forms tracing possession of samples from their collection to final disposition;
- b) field logbooks documenting information pertaining to the actual sample collection event; and
- c) laboratory receiving report verifying receipt of samples and their requested analysis.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-625	Revision: 2	Page: 8 of 9
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Documentation generated as a result of this procedure is submitted to the designated records system in accordance with Section 17 of the Business Unit QAP.

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8.0 ATTACHMENTS

8.1 Attachment I - Chain-of-Custody Form (Example)

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

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Manual Name: Quality Assurance Technical Procedures Volume II: Field Standard Operating Procedures

Document Number: FTP-650

Revision Number: 3

Date Printed: _____

Person Checking the Revision Number: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
FIELD TECHNICAL PROCEDURE**

Title: Labeling, Packaging and Shipping of Environmental Field Samples

Procedure No: FTP-650

Revision: 3

Date: 5/29/2009

Page 1 of 10

Business Unit General Manager: Date:

A. H. ... 6/1/09

QA/QC Officer: Date:

C. A. ... 5/29/2009

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1.0 PURPOSE

The purpose of this procedure is to describe the minimum requirements to properly label and package containers of samples for transport.

2.0 SCOPE

This procedure applies to samples collected in the course of environmental field investigations and monitoring activities.

3.0 REFERENCES, RELATED READING, AND DEFINITIONS

3.1 REFERENCES

- 3.1.1 See Common References at the front of the FTP Manual.
- 3.1.2 Code of Federal Regulations, Title 40, Protection of Environment.
- 3.1.3 Code of Federal Regulations, Title 49, Transportation.
- 3.1.4 Dangerous Goods Regulations, International Air Transport Association (IATA), latest revision.
- 3.1.5 Science Applications International Corporation, Field Technical Procedure (SAIC FTP) 405, Cleaning and Decontaminating Sample Containers and Sample Equipment.
- 3.1.6 Science Applications International Corporation, Field Technical Procedures (SAIC FTP) 625, Chain of Custody.
- 3.1.7 Science Applications International Corporation, Field Technical Procedures (SAIC FTP) 651, Hazardous Materials/ Dangerous Goods Shipping

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3.2 DEFINITIONS

None.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-650	Revision: 3	Page: 2 of 10
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4.0 RESPONSIBILITIES

4.1 See Common Responsibilities at the front of the FTP Manual.

4.2 FIELD MANAGER

The Field Manager is responsible for:

- 4.2.1 ensuring that all personnel perform their assigned duties in accordance with this procedure when it is applicable;
- 4.2.2 ensuring compliance with the Sampling and Analysis Plan (SAP);
- 4.2.3 overall management of field activities; and
- 4.2.4 ensuring that sample packaging and shipping is performed safely.

5.0 GENERAL

- 5.1 Any deviations from specified requirements will be justified to and authorized by the Project Manager and/or the relevant Program Manager.
- 5.2 Deviations from requirements will be sufficiently documented to allow re-creation of the modified process.
- 5.3 Refer to the site- or project-specific Health and Safety (H&S) Plan for relevant H&S requirements.
- 5.4 SAIC and subcontractor personnel who use this procedure must provide documented evidence of having been trained on the procedure to the Program or Project Manager.
- 5.5 Receivers and carriers should be contacted prior to packaging to ascertain any specific restrictions, such as weight limits, delivery and pick up schedules, receiving hours, or sample disposal terms.
- 5.6 A unique sample identification will be assigned to each sample. The identification scheme will be presented and approved in the Sampling and Analysis Plan. The identification scheme will be designed such that at a minimum the site, sample location within the site, sample matrix, sample interval, and sample type (i.e. environmental, duplicate, split, etc.) can be ascertained from the sample identification. Frequently you cannot include all of this information in a sample number. Some programs may have requirements for sample numbers that must be followed. The requested

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-650	Revision: 3	Page: 3 of 10
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analysis, sample date and time, and preservative will also be presented on the sample label.

- 5.7 Individual sample containers are checked against accompanying chain-of-custody and analytical request forms prior to signing for receipt from sample collection personnel.
- 5.8 Site samples are placed in strong exterior shipping packages and surrounded with compatible cushioning/absorbent material, if necessary.
- 5.9 The shipping package is labelled and marked in accordance with U.S. Department of Transportation (DOT) and/ or International Air Transport Association (IATA) regulations and carrier or receiver-specific instructions. DOT applies primarily to ground transport and IATA applies to air cargo transport.
- 5.10 The chain-of-custody form must accompany the package as specified in the approved Chain-of-Custody procedure. The package is closed and sealed, as appropriate, and any required shipping papers prepared.
- 5.11 An example (non-mandatory) Cooler Shipping Description Log is provided as Attachment III, which may be useful for projects which require detailed cooler contents information in a logbook.

6.0 PROCEDURE

6.1 SAMPLE CLASSIFICATION

The sample team leader classifies each sample as environmental or one of several categories of hazardous material/ dangerous goods as defined by the DOT (49 CFR) and the IATA Dangerous Goods Regulations.

6.1.1 Environmental Samples

A sample that does not meet the criteria for any of the nine hazard classes identified in this section is an environmental sample.

Note: The vast majority of soil, groundwater, and surface water samples are environmental samples.

6.1.2 Hazardous Materials/ Dangerous Goods

A sample that meets the criteria for one or more of the following classes of hazardous materials/ dangerous goods must be shipped per the requirements of 49 CFR if a surface shipment or by the

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-650	Revision: 3	Page: 4 of 10
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requirements of the IATA Dangerous Goods regulations if an air shipment.

Note: There are additional requirements beyond the mechanics of shipping including hazardous materials awareness, safety, and function specific training every two years.

Class 1. Explosives- any substance or article which is designed to explode or capable of exploding. If the sample team leader has knowledge that a sample contains a sufficient quantity/ concentration of explosive compound(s) to meet this criterion, the sample must be shipped as an explosive.

Note: Notification must be made to the Project Manager and Group H&S Officer prior to shipment or handling. Under no circumstances ship or otherwise handle explosive devices.

Class 2. Gases- cylinders of compressed gasses such as acetylene, nitrogen, air, oxygen, etc.

Note: Field samples do not normally include compressed gases.

Class 3. Flammable liquids- liquids with flash points less than 140°F such as gasoline, toluene, isopropyl alcohol, or a mixture known to contain more than 1% (10,000 ppm) of a flammable liquid [49 CFR 173.120(ii)].

Note: A useful field indicator that a sample may be a flammable liquid is a reading with a combustible gas indicator greater than 20% LEL in the head space of the sample container.

Class 4. Flammable solids- substances liable to spontaneous combustion, substances which, in contact with water, emit flammable gases- wetted explosives, self reactive materials, readily and spontaneously combustible materials. If the sample team leader has knowledge that a sample contains a sufficient quantity/ concentration of such materials to meet any of these criteria, the sample must be shipped as Class 4.

Note: These are highly reactive materials and will generally not be encountered in an unreacted state during environmental sampling unless samples are collected from intact containers. Notification must be made to the Project Manager and Group H&S Officer prior to shipment or handling.

Class 5. Oxidizing substances and organic peroxides- materials such as swimming pool chlorine, that will release oxygen in contact with organic materials and organic compounds containing the -O-O- structure which may be considered as derivatives of hydrogen peroxide (at greater than 1% concentration). If the sample team leader has

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-650	Revision: 3	Page: 5 of 10
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R

knowledge that a sample contains a sufficient quantity/ concentration of such materials to meet either of these criteria, and has not previously reacted with materials in the immediate environment, the sample must be shipped as Class 5.

Note: These are highly reactive materials and will not generally be encountered in an unreacted state in environmental sampling unless samples are collected from intact containers. Notification must be made to the Project Manager and Group H&S Officer prior to shipment or handling.

Class 6. Poisonous and infectious substances- materials with an acute oral LD₅₀ of not more than 500 mg/kg (liquid) or 200 mg/kg (solid) or a viable organism that causes or may cause disease in humans or animals.

Note: Potentially poisonous samples are samples known to contain percent (not ppm) concentrations of mercury, tetrachloroethane, or other DOT defined poisonous materials. Potentially infectious substances are hospital (and related) wastes, and biological warfare agents.

Class 7. Radioactive materials- a material with > 0.002 µCi/ gram.

Note: A sample may meet the definition of radioactive material if it produces a radiological survey instrument reading (in counts per minute) in excess of 200% of regional background readings. Note that this is a conservative number and should be considered as a flag indicating the need for further investigation. Notification must be made to the Project Manager and Group H&S Officer prior to shipment.

Class 8. Corrosive material- materials capable of causing destruction or irreversible skin damage from a contact period of four hours or less.

Note: Generally, this applies to materials with a pH of less than 2 or more than 12. Preservation of samples of water with corrosive materials does not make those water sample DOT regulated corrosive materials. DOT letters of interpretation specifically exclude preserved water samples from this class if the samples are preserved per EPA method.

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Class 9. Miscellaneous Hazardous Material- a material that has a property that would impair the performance of an aircraft crew member, a hazardous waste requiring a manifest, a hazardous substance that exceeds the reportable quantity in one package, and dry ice, among many other things.

Note: A soil or water sample containing unknown concentrations of contaminants does not meet this definition. Samples of a material that is known (identified) as hazardous waste do meet this definition. A sample preserved with dry ice also fits this class.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-650	Revision: 3	Page: 6 of 10
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6.2 SAMPLE PACKAGING, LABELING, AND MARKING

6.2.1 Environmental Samples

Samples shipped to a laboratory for the purpose of testing are exempt from the requirements of 40 CFR 261 through 268 or Part 270 or Part 124 or the notification requirements of section 3010 of the Resource Conservation and Recovery Act (RCRA). Environmental samples will be packaged as follows:

- a) Verify all sample containers contain the correct preservative and are of appropriate type and volume;
- b) Clean the exterior of filled sampled container (See FTP-405);
- c) Attach a label with unique sample identification (completed with indelible black ink) to the sample bottle;
- d) Seal the tops of bottles, except VOA vials, with appropriate tape or other secure fastening;
- e) Apply custody seals;
- f) Place each sample bottle in a plastic bag, squeeze as much air as possible from the bag, seal the bag;
- g) Wrap glass containers in bubble wrap;
- h) Prepare the shipping container (cooler) by taping the drain plug shut from the inside and outside, lining the cooler with a large heavy-duty plastic bag, and placing approximately 1 inch of packing material such as vermiculite, perlite, or bubble wrap in the bottom of the bag liner;
- i) Place the sample containers upright in the cooler, do not stack sample containers;
- j) Add sufficient ice to maintain the samples at the required temperature and include a temperature blank, at a minimum, all containers are covered with ice. Ice should be placed inside two zip-seal bags to prevent breaking, when required;
- k) Fill the cooler with appropriate sorbent/ padding, not required if containers are wrapped in bubble wrap;
- l) Tape the liner shut;
- m) Seal the laboratory paperwork inside a plastic bag and tape it to the inside of the cooler lid;
- n) Tape the lid of the cooler with duct tape, apply around the seam. Strapping tape should be wrapped around the cooler in two locations, if samples are shipped via commercial carrier;
- o) Place signed custody seals on the front and back of the cooler; and

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-650	Revision: 3	Page: 7 of 10
--------------------------------------	------------------------------	--------------------	----------------------

R

p) Assure that the following information accompanies the samples: sample collector's name, mailing address, and telephone number, laboratory's name, mailing address, and telephone number, quantity of sample, date of shipment, and description of the samples.

Note: The steps described in a) through o) above are typical, but may be modified by the Field Operations Manager in accordance with a project-specific Sampling and Analysis Plan.

6.2.2 Hazardous Materials/ Dangerous Goods/ Radioactive Materials

Packaging for samples of hazardous materials/ dangerous goods/ radioactive materials must meet the requirements for environmental samples as well as additional requirements of DOT and IATA (if the sample will be shipped by air).

Note: This procedure cannot address all the requirements of the regulations. Expert advice must be obtained prior to shipping hazardous materials/ dangerous goods. Shipping firms such as Federal Express and UPS have hazardous materials/ dangerous goods departments which can provide specific guidance on packaging and other shipping requirements. Refer to FTP-651 for additional information.

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6.3 ASSOCIATED DOCUMENTATION

6.3.1 Environmental Samples

Chain of Custody Record (See FTP-625)
Custody Seal (See Attachment I)
Sample Label (See Attachment II)

6.3.2 Hazardous Materials/ Dangerous Goods

See FTP-651

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7.0 RECORDS

Documentation generated as a result of this procedure is submitted to the designated records system in accordance with Section 17 of the Business Unit QAP.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-650	Revision: 3	Page: 8 of 10
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8.0 ATTACHMENTS

8.1 Attachment I - Custody Seal and Sample Label (Examples)

8.2 Attachment II- Cooler Shipping Description Log (Example)

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SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-650	Revision: 3	Page: 9 of 10
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Attachment I

Sample Label (Example)

Lab: Southwest Laboratory of



Sample ID: B12as-001-0378-SO
 Area: Building 1208
 Station: B12as-001
 Media: Surface Swab
 Type: Grub Counter
 Analyte: SVOC, PAH/PCB, Explosives
 Preserv: Cool, AC

Rad Screen: _____
 Collection Date/Time: _____
 Comment: _____
 Collected by: _____

Custody Seal (Example)

SECURITY SEAL DO NOT TAMPER	DATE _____ INITIALS _____
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SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-650	Revision: 3	Page: 10 of 10
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**Attachment II
(Example)**

COOLER SHIPPING DESCRIPTION LOG

PROJECT NAME: _____ PROJECT NO: _____

LER NO: _____ AIR BILL NO: _____ DATE: _____

COOLER CONTENT INFORMATION

TOTAL NUMBER OF SAMPLES IN COOLER: _____

SAMPLES CLASSIFIED AS ENVIRONMENTAL: YES _____ NO _____

NUMBER OF SAMPLES IN THE FOLLOWING CATEGORIES:

Flammable liquid - DOT/IATA Class 3 _____

Toxic material - DOT/IATA Class 6 _____

Infectious material - DOT/IATA Class 7 _____

Corrosive material - DOT/IATA Class 8 _____

Hazardous waste/ substance - DOT/IATA Class 9 _____

APPROVAL TO SHIP: YES ___ NO ___

SIGNATURE _____
(Shipper)

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Manual Name: Quality Assurance Technical Procedures Volume II: Field Standard Operating Procedures

Document Number: ETP-1215

Revision Number: 2

Date Printed: _____

Person Checking the Revision Number: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
FIELD TECHNICAL PROCEDURE**

Title: Field Logbooks and Field Forms

Procedure No: FTP-1215

Revision: 2

Date: 11/18/2008

Page 1 of 9

Business Unit General Manager: Date:

A. J. [Signature] 12/8/08

QA/QC Officer: Date:

C. D. [Signature] 11/18/2008

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1.0 PURPOSE

The purpose of this procedure is to establish minimum requirements for the development, content, use, review, protection, and disposition of field logbooks and field forms.

2.0 SCOPE

This procedure applies to all types of logbooks and field forms used for environmental field studies and for other types of field activities that capture project technical data or administrative data that support the project objectives.

3.0 REFERENCES AND DEFINITIONS

3.1 REFERENCES

3.1.1 See Common References at the front of the FTP Manual.

3.1.2 SAIC Quality Assurance Administrative Procedure, QAAP 2.2, Readiness Review.

3.1.3 SAIC Quality Assurance Technical Procedures, Volume II, Field Standard Operating Procedures.

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3.2 DEFINITIONS

3.2.1 Field Forms – a project-specific collection of forms that are not bound into a logbook, but which serve a similar purpose to a bound field logbook, in that field data is captured in real time in a specific format relevant to the objectives of the investigation or other site activity.

3.2.2 Field Logbook – A bound book with sequentially numbered pages that is used to create a permanent, real time record of activities and conditions, significant events, observations, and measurements which occur during each day of field activities. The minimum requirements for a bound logbook are described in Section 5.0 of this procedure.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1215	Revision: 2	Page: 2 of 9
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3.2.3 Force Majeure – an extraordinary event or circumstance beyond the control of the responsible person, such as war, strike, riot, crime, flood, earthquake, volcano, which prevents fulfillment of an obligation. However, Force Majeure is not intended to excuse negligence or other malfeasance, as where non-performance is caused by the usual and natural consequences of external forces (e.g., predicted rain stops an event).

3.2.4 Logbook Type – Identification of bound logbooks by purpose or area of coverage. Examples include but are not limited to Project, Field Manager, Soil Sampling, Groundwater Sampling, Well Installation, Well Development, Soil Boring, Calibration, Decontamination and Health & Safety.

3.2.5 Quality Control (QC) Review – The act of verifying the accuracy, completeness, legibility, consistency, and clarity of a field logbook and/or field forms.

4.0 RESPONSIBILITIES

4.1 See Common Responsibilities at the front of the FTP Manual.

4.2 PROJECT MANAGER

In addition to the Common Responsibilities the Project Manager is responsible for:

4.2.1 Ensuring that field personnel are trained to the requirements of this procedure, and are familiarized with the specific logbook and/or field form requirements for the project.

4.2.2 Determining the project-specific requirements for the field logbook(s) and/or field forms, including the extent of use of pre-printed forms in the logbook(s).

4.2.3 Identifying the field forms that will be used for the project.

4.2.4 Ensuring that logbooks are copied for records as specified in paragraph 5.6 of this procedure.

4.2.5 Ensuring that logbook QC is performed as specified in paragraph 5.11 of this procedure.

4.3 FIELD MANAGER

The Field Manager is responsible for:

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SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1215	Revision: 2	Page: 3 of 9
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- 4.3.1 Ensuring that field personnel implement the field logbook and field form requirements detailed in this procedure and those requirements determined to be applicable to the specific project.
- 4.3.2 Ensuring that logbooks and forms are assembled to meet project requirements, including the use of pre-printed forms, when applicable.
- 4.3.3 Ensuring that project-specific requirements for field logbooks and field forms are implemented in the field.
- 4.3.4 Ensuring that field forms are completed in accordance with project objectives.
- 4.3.5 Ensuring that field personnel who will use logbooks or field forms are trained in their use as described in this procedure and in the specific logbook/field form requirements for the project. Ensuring that training is documented and forwarded to the identified records system.
- 4.3.6 Ensuring that field logbooks and field forms are protected from loss, damage or deterioration and are copied for record as specified in paragraph 5.6 of this procedure.
- 4.3.7 Ensuring that field logbooks and field forms are given a QC review by a qualified person other than the person(s) making logbook entries and at a frequency specified in paragraph 5.11 of this procedure.

4.4 FIELD TEAM MEMBERS

Field team members are responsible for:

- 4.4.1 Using and making entries in field logbooks and field forms in accordance with this procedure and project-specific training.
- 4.4.2 Ensuring that field logbooks and forms are protected from loss, damage or deterioration.
- 4.4.3 Making corrections to logbooks as necessary including those noted during QC review.

4.5 QC REVIEWER

The QC Reviewer is responsible for:

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1215	Revision: 2	Page: 4 of 9
---	--	-----------------------------	------------------------------

4.5.1 Conducting a thorough review of the field logbook(s) and field forms on the schedule established by the Project Manager. This includes the general requirements in section 5.0 below as well as the technical and general information.

4.5.2 Documenting the review by initialing or signing each page reviewed along with the date reviewed.

5.0 GENERAL

5.1 This procedure is written to include Project Manager and Field Manager functional positions; however, where the same person fills both positions, the coordination steps noted in the procedure are considered to be consolidated.

5.2 This procedure is followed by a variety of form(s) which could be used in a field logbook depending on the needs of the project. These forms are provided as information only and do not represent a comprehensive set of forms. These forms may be used 'as is' or modified as necessary to meet specific project needs. Other forms or formats may also be used to meet project-specific needs.

5.3 Field logbooks will be structured and used according to the following criteria:

- Controlled by the Field Manager who will ensure that the logbooks are identified by project name or number, by logbook type (see definition 3.2.4), and if there is more than one logbook for a project, by sequential number.
- Bound with sequentially numbered pages (It is recommended that field logbooks include a table of contents, when appropriate).
- It is recommended that logbooks and field forms should be produced on waterproof (Rite in the Rain[®]) paper when possible.
- Entries are to be made in indelible ink, and must be clear, objective and legible. No entries are to be made in pencil or other erasable form.
- Each page used is signed (or initialed) and dated by the person making the entries.
- Dates recorded in the month/day/year format; time recorded in the 24-hour military clock format (e.g., 1500 hours rather than 3:00 p.m.)
- Changes made by striking through the original entry in a manner which does not obliterate the original entry. The initials of the person making the change and the date will be written next to the change.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1215	Revision: 2	Page: 5 of 9
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- Unused portions of completed logbook pages and completed logbooks will be indicated in a positive, clearly recognizable manner. Typical methods include:
 - › drawing a line through the unused area(s) and providing the initials of the person making the entry and date the entry was made.
 - › writing a notation such as " INTENTIONALLY LEFT BLANK" and providing the initials of the person making the entry and date the entry was made.

5.4 Field forms will be structured and used according to the following criteria:

- Controlled by the Field Manager who will ensure that they are identified by project name or number.
- Entries made in indelible ink that are clear, objective and legible. No entries are to be made in pencil or other erasable form.
- Dates recorded in the month/day/year format; time recorded in the 24-hour military clock format (e.g., 1500 hours rather than 3:00 p.m.). Time is always location specific.
- Changes made by striking through the original entry in a manner which does not obliterate the original entry. The initials of the person making the change and the date will be written next to the change.

5.5 It is recommended that logbooks and field forms containing entries never be shipped to and from the field; however, if this is necessary, copies must be made to protect the data from loss during shipment.

5.6 Logbooks and field forms will be copied for record purposes on the frequency established by the Project Manager at the beginning of field activities but at no longer than 30 calendar day intervals when in use in the field.

- The frequency will be appropriate to the risk of loss of the data contained in the logbooks.
- Customer requirements regarding logbook copying and protection will be followed, when applicable.
- Exceptions to the frequency requirements for record copies may be made on a project-specific basis; however, an alternate frequency must be specified in writing, approved by the responsible manager (Project or Division) or higher line management authority, and captured in the designated records system.
- Allowance will also be made for Force Majeure events that are uncontrollable and prevent meeting the specified requirements.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1215	Revision: 2	Page: 6 of 9
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- 5.7 The use of pre-printed field logbooks is a best practice; however, in all cases the Project Manager and/or Field Manager will determine and document the types of information to be recorded in each field logbook. The types of entries and level of detail must comply with applicable laws, regulations and any customer-specified requirements, as well as being consistent with the information requirements necessary for writing the report(s) for the project.
- 5.8 When field forms and a log book are both used, the log book entry should note what field forms were used, and include a daily inventory of the forms.
- 5.9 The names of the individuals authorized to write in the field logbook will be printed in the front of the logbook, including the QC Reviewer. It is also recommended that each individual's signature or initials be included by their printed name.
- 5.10 The QC Reviewer will be a person with an appropriate level of experience and knowledge to perform a review, as determined by the Project Manager.
- 5.11 QC review will be completed on a schedule determined by the Project Manager but at no greater than seven (7) calendar day intervals when in use in the field.
- 5.12 Exceptions to the frequency requirement for QC review may be made on a project-specific basis; however, an alternate frequency must be specified in writing, approved by the responsible manager (Project or Division) or higher line management authority, and captured in the designated records system. Allowance will also be made for Force Majeure events that are uncontrollable and prevent meeting the specified requirements.

6.0 PROCEDURE

6.1 BOUND LOGBOOK AND FIELD FORM DEVELOPMENT

- 6.1.1 The Project Manager determines the logbook and field form requirements for the project including the types of entries required, number of logbooks and forms needed, and the extent of use of pre-printed forms in the logbook(s). Where pre-printed forms are to be included in the logbooks, they may be either selected from existing examples or developed specifically for the project.
- 6.1.2 The Project Manager coordinates project logbook and field form needs with the Field Manager and arranges for assembly of the correct number and types of logbooks and forms for the project.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1215	Revision: 2	Page: 7 of 9
--------------------------------------	-------------------------------	--------------------	---------------------

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6.1.3 The logbook(s) and forms are forwarded to the Field Manager for control and use.

6.2 LOGBOOK AND FIELD FORM ENTRIES GUIDANCE

6.2.1 Logbook and field form entries should be a compilation of relevant, factual events as they occur. Keep in mind that logbooks and field forms are work products that belong to the client; therefore, they should only include entries that are appropriate to share with the client or third parties. Logbooks and field forms are subject to subpoena, made legal exhibits, read in court and become permanent legal records.

6.2.2 The following should not be included in a logbook or field form:

- unsubstantiated opinions (best professional judgment may be necessary in some cases)
- editorializing
- language that is derogatory or that would not be acceptable in front of the client or in a public forum
- events that are not relevant to the work

6.2.3 Words to avoid unless absolutely necessary and appropriate:

<u>Not recommended</u>	<u>Alternative words</u>
approve	work is in general conformance
inspection *	periodic observation of work in progress
supervision *	periodic observation of work in progress
or equal	or equivalent

* *Inspect and supervise are potentially dangerous words. Court decisions have interpreted these words to mean: superintend, oversee, control, manage, direct, restrict, regulate, govern, administer, and conduct.*

Also, definitive words such as: Final, Any, All, None, Full, Every, Will and Shall should be avoided.

6.2.4 Words of promise such as: Guarantee, Warrant, Certify, Ensure or Insure should be avoided unless absolutely necessary and appropriate for the scope of work.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1215	Revision: 2	Page: 8 of 9
--------------------------------------	-------------------------------	--------------------	---------------------

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6.3 LOGBOOK AND FIELD FORM CONTROL

- 6.3.1 The Field Manager takes control of the logbook(s) and field forms, and ensures that the type and content meet project requirements.
- 6.3.2 The Field Manager prepares the logbook(s) for use by inscribing each logbook with the identifying information required in paragraph 5.3 above. An example logbook cover page is included in the forms following this procedure.
- 6.3.3 The Field Manager prepares and assembles the appropriate types and quantities of field forms.
- 6.3.4 The Field Manager prepares and maintains a logbook inventory to ensure that the number and type of logbooks in use is known at any time.

Note: Alternatively, a centralized logbook inventory may be utilized providing continuity is maintained by having an individual designated in charge of the inventory at all times.

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- 6.3.5 The Field Manager ensures that logbooks and field forms are protected during use and are put under appropriate control when not in use.

6.4 LOGBOOK USE AND PROTECTION

- 6.4.1 The Field Manager ensures that each field team member who will use a logbook and/or field forms is provided instruction on the use and control of, as well as the entries required in, each type of logbook and form the person will use.
- 6.4.2 The Field Manager and field team members make entries in logbooks and forms in accordance with the general requirements in Sections 5.0 and 6.2 of this procedure and any project-specific requirements.
- 6.4.3 When not in use, logbooks and forms are secured, controlled, stored and protected in accordance with the methods established for the project. As a minimum, logbooks and field forms should be kept in the personal custody of the field manager (or designee) or locked up.
- 6.4.4 The Field Manager ensures that copies of logbook pages and field forms are made at the intervals specified in paragraph 5.6 above, and submitted to the identified records system. This includes

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1215	Revision: 2	Page: 9 of 9
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extended intervals between field activities and upon conclusion of field activities.

6.5 QUALITY CONTROL OF LOGBOOKS AND FIELD FORMS

- 6.5.1 On the schedule established by the Project Manager, the Field Manager ensures that each logbook and field form used are reviewed to verify the accuracy, completeness, legibility, consistency, and clarity of these documents.
- 6.5.2 The QC Reviewer indicates acceptance of the logbook and field form entries by writing his/her initials at the bottom of each page as well as the date reviewed.
- 6.5.3 If errors, omissions, or uncertainties are found, the QC Reviewer resolves them with the person responsible for making entries on that day in the logbook or field form. Corrections to any logbook and field form entries are made by striking through the original entry and providing the initials of the person making the change and date the change was made.

7.0 RECORDS

Logbooks and/or field forms, or copies will be submitted to the designated records system in accordance with Section 17 of the Business Unit QAP.

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8.0 ATTACHMENT

None

WELL DEVELOPMENT FORM

PROJECT NAME: _____

PROJECT NUMBER: _____

Date: _____

Time: _____

Task Team Members: _____

Well Number and Location: _____

Development Crew: _____

Driller (if applicable): _____

Water Levels / Time: Initial: _____ / _____ Pumping: _____ / _____
 Final: _____ / _____

Total Well Depth: Initial: _____ feet BTOC Final: _____ feet BTOC

Date and Time: Begin: _____ / _____ Completed: _____ / _____

Development Method(s): _____

Total Quantity of Water Removed: _____ gallons

FIELD MEASUREMENT	SERIAL NUMBER	DATE OF LAST CALIBRATION
Temperature		
Specific Conductivity		
pH		
Turbidity		

QA performed by: _____

TELESCOPED WELL

PROJECT NAME:

PROJECT NO:

WELL NUMBER:

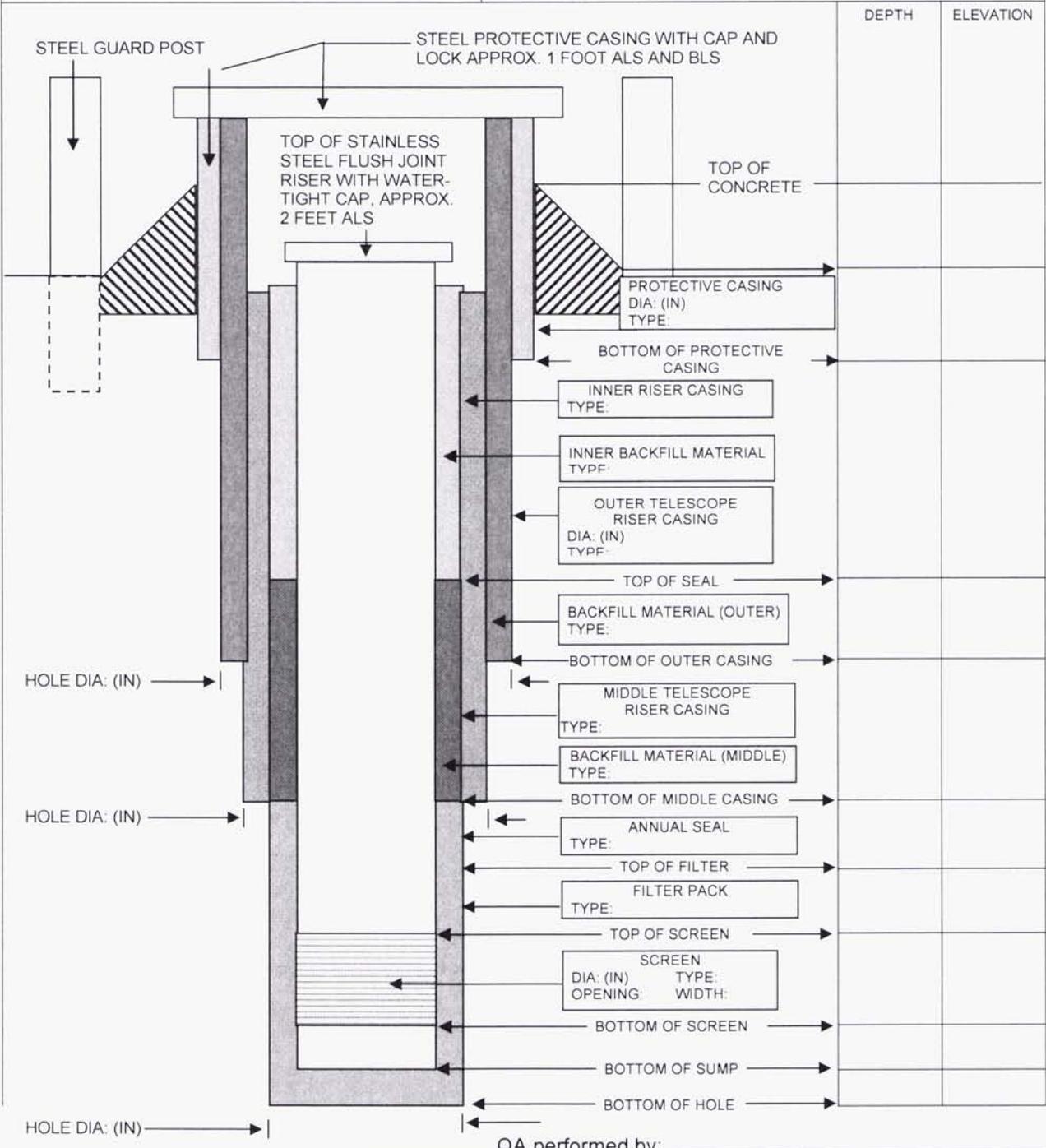
BEGIN:

END:

COORDINATES: **N:**
 E:

REFERENCE POINT:

ELEVATION: MSL



QA performed by: _____

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SAMPLE LOCATION SKETCH	HOLE NUMBER
PROJECT	ELEVATION TOP OF HOLE
LOCATION STATION	DATUM FOR ELEVATION SHOWN

LOCATION SKETCH

SCALE:

COMMENTS		
SIGNATURE OF INSPECTOR/DATE	PROJECT	HOLE NO.

QA performed by: _____

R

MONITORING WELL

PROJECT NAME:

PROJECT NO:

WELL NUMBER:

BEGIN:

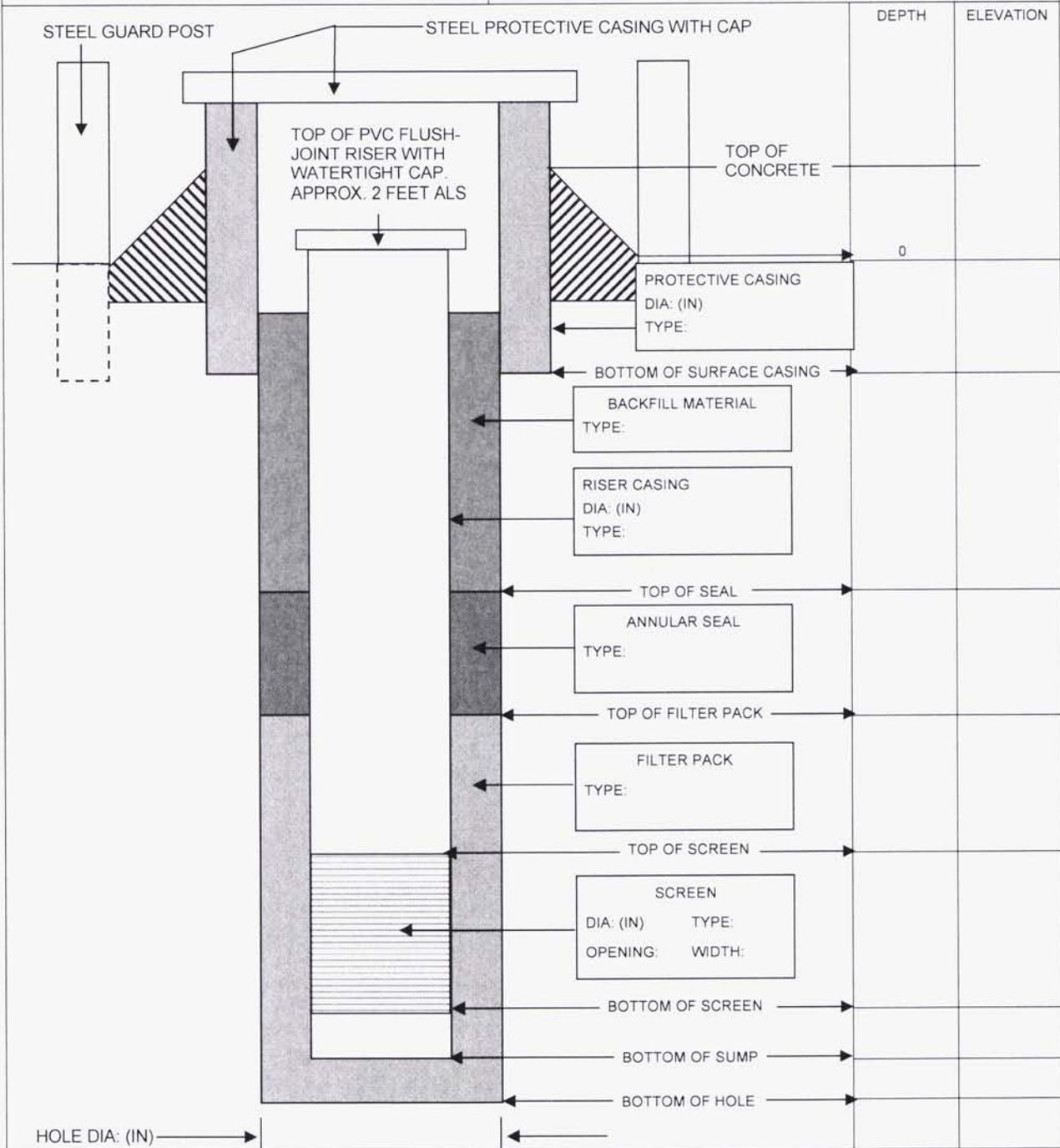
END:

COORDINATES:

N:
E:

REFERENCE POINT:

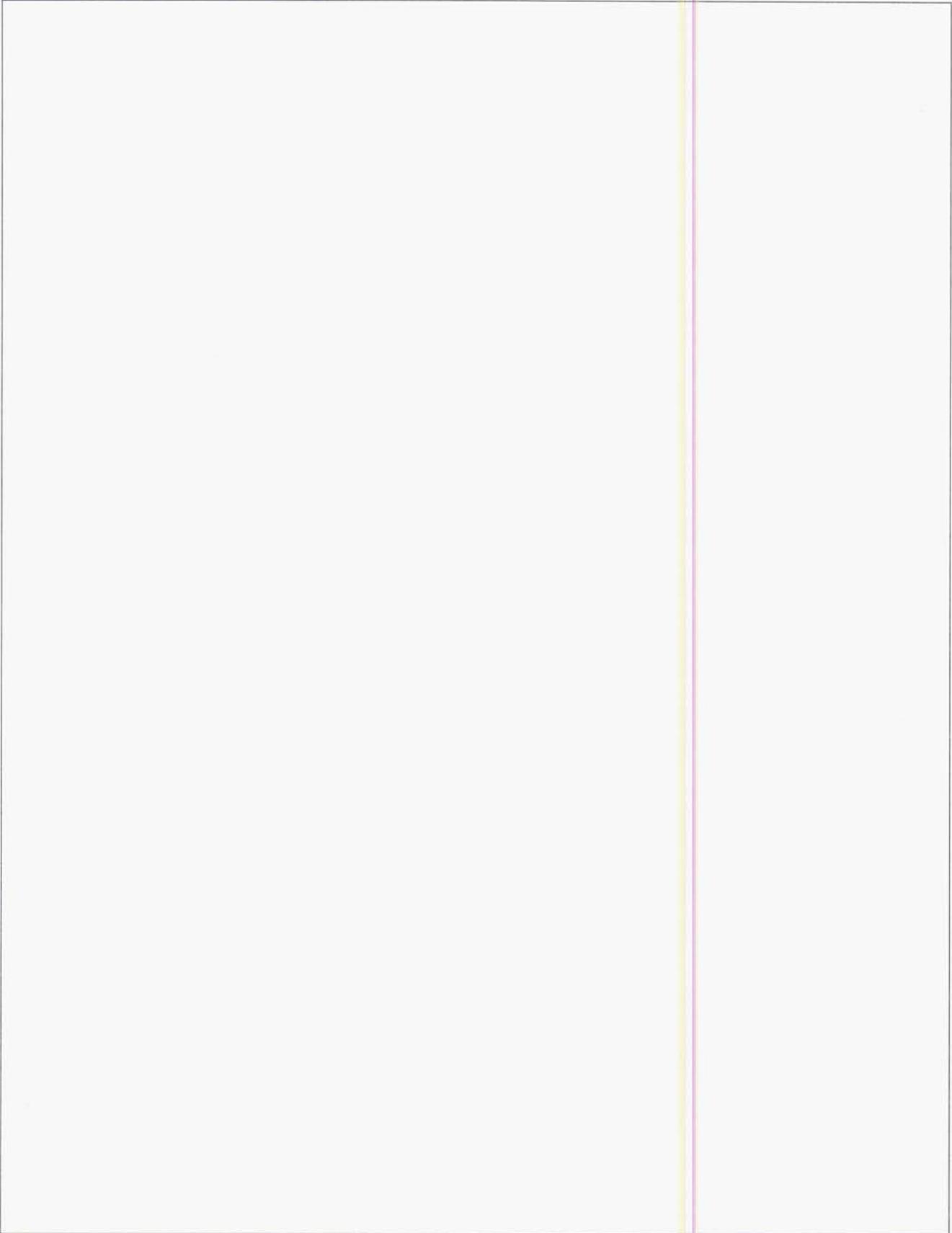
ELEVATION: MSL



HOLE DIA: (IN) →

QA performed by: _____

FTP-1215, Revision 1, 11/01/07



EXAMPLE SAMPLE MEDIA CODES

SOLID MATRICES

SOIL

- [01] Surface (0-6 inches)
- [02] Subsurface (>6 inches)
- [03] Other

SEDIMENT/SLUDGES

- [11] Lake/Pond
- [12] River/Stream
- [13] Impoundment/Pond
- [14] Drum/Tank
- [19] Other

AIR SAMPLE

- [21] Filter
- [22] Sorbent
- [23] Sweepings/Fugitive Dust
- [24] Gases
- [29] Other

BIOLOGICAL/TERRESTRIAL

- [31] Biota
- [39] Other

GEOTECHNICAL

- [41] Retained on #40
- [42] Retained on #200
- [43] Passed through #200
- [49] Other

LIQUID MATRICES

SURFACE WATER

- [51] Lake/Pond
- [52] River/Stream
- [53] Impoundment/Pond
- [54] Discharge
- [55] Spring/Seep
- [59] Other

GROUNDWATER

- [61] Lake/Pond
- [62] River/Stream
- [63] Impoundment/Pond
- [64] Drum/Tank AIR SAMPLE
- [65] Lysimeter
- [66] Monitoring Well
- [67] Observation Well
- [68] Piezometer
- [69] Other
- [6A] Public Water Supply
- [6B] Purge Well
- [6C] Test Well
- [6D] Vapor Well
- [6E] Leachate Well

CONTAINERIZED

SEALED

- [71] Drum/Tank
- [72] Other

UNSEALED

- [81] Drum/Tank
- [82] Other

DRILLING/CORE LOG

PROJECT NAME: _____

PROJECT NO: _____

Page _____ of _____

Site Location: _____

Drilling Date/Time: _____

Boring/Well ID: _____

Started (mm/dd/yy) _____

Completed (mm/dd/yy) _____

Depth Drilled _____ feet

Hole Diameter _____ inches

Depth to Water _____ feet

Hammer Weight _____ inches

Drilling Method _____

Hammer Drop _____ inches

Drilling Fluid Used _____

Drilling Contractor _____

Logged by _____

Driller _____

Company _____

Helper _____

Drill Make & Model _____

Type of Sample/Coring Device** _____

No.	Sample/Core Depth (feet below land surface)		Core Recovery %	Blow Counts per 6 inches	OVA/HNU (ppm)	RAD (CPM)	Sample/Core Descr./Notes
	FROM	TO					
				/ / /			
				/ / /			
				/ / /			
				/ / /			
				/ / /			
				/ / /			
				/ / /			
				/ / /			
				/ / /			

*Define color, minor constituents, soil type, trace constituents, plasticity, moisture content

MOISTURE CONTENT:

DRY—Very low moisture content

MOIST—Intermediate moisture content, grains darkened by surface water

WET—Visible free water, soil sample from water-bearing zone

- ** S= Split spoon
T = Shelby tube
D = Dennison
P = Pitcher
O = Other

Prepared By: _____ Date: _____

QC By: _____ Date: _____

FOR DATA COORDINATOR USE ONLY

DATA ENTRY PERFORMED BY: _____

DATE ENTERED: _____

NOTES: _____

DATA ENTRY PERFORMED BY: _____

DATE ENTERED: _____

NOTES: _____

DATA ENTRY PERFORMED BY: _____

DATE ENTERED: _____

NOTES: _____

QA performed by: _____

R

BOREHOLE OR WELL PLUGGING/ ABANDONMENT

PROJECT NAME: _____

PROJECT NUMBER: _____

SITE ID NUMBER: _____

DATE PLUGGED: ____/____/____

SITE COORDINATES: N: _____

DEPTH BLS (feet) _____

E: _____

TYPE OF CASING: _____

CASING DIAMETER (ID) (inches) _____

GROUND ELEVATION (feet MSL) _____

SCREENED ELEVATION (feet MSL) _____

GEOLOGIC MATERIAL AT SCREEN _____

AMOUNT OF CASING REMOVED (feet) _____

PLUGGING MATERIAL _____

APPROX. VOLUME OF PLUGGING MATERIAL (cubic feet) _____

PLUGGING METHOD _____

REMARKS _____

RECORDED BY: _____
(Signature)

QC CHECKED BY: _____
(Signature)

WELL INSTALLATION ACTIVITY/PROGRESS REPORT

PROJECT NAME:

PROJECT NO:

WELL ID: _____ Date Started: _____ Time: _____

Finished: _____ Time: _____

Drilling Method:

Borehole Diameter:

Supervisor/Geologist:

Driller:

Drilling Company:

Helper:

Footage Drilled/Augered/Cored: _____ feet to _____ feet

MATERIAL USED:	Bentonite: _____ bags	Bentonite: _____ buckets
----------------	-----------------------	--------------------------

	Cement (grout): _____ bags	
--	----------------------------	--

	Sand: _____ bags	
--	------------------	--

Water Used: _____ Source: _____ Quantity: _____ gallons

Lubricants Used:

Well Construction Materials Used:

_____ Inch Well Casing _____ feet _____ Inch Well Casing _____ feet

_____ Inch Outer Casing _____ feet

Well Caps & Plugs _____ pair Number of Guard Posts _____

Drain Hole (yes/no) _____ Stamped ID (yes/no) _____

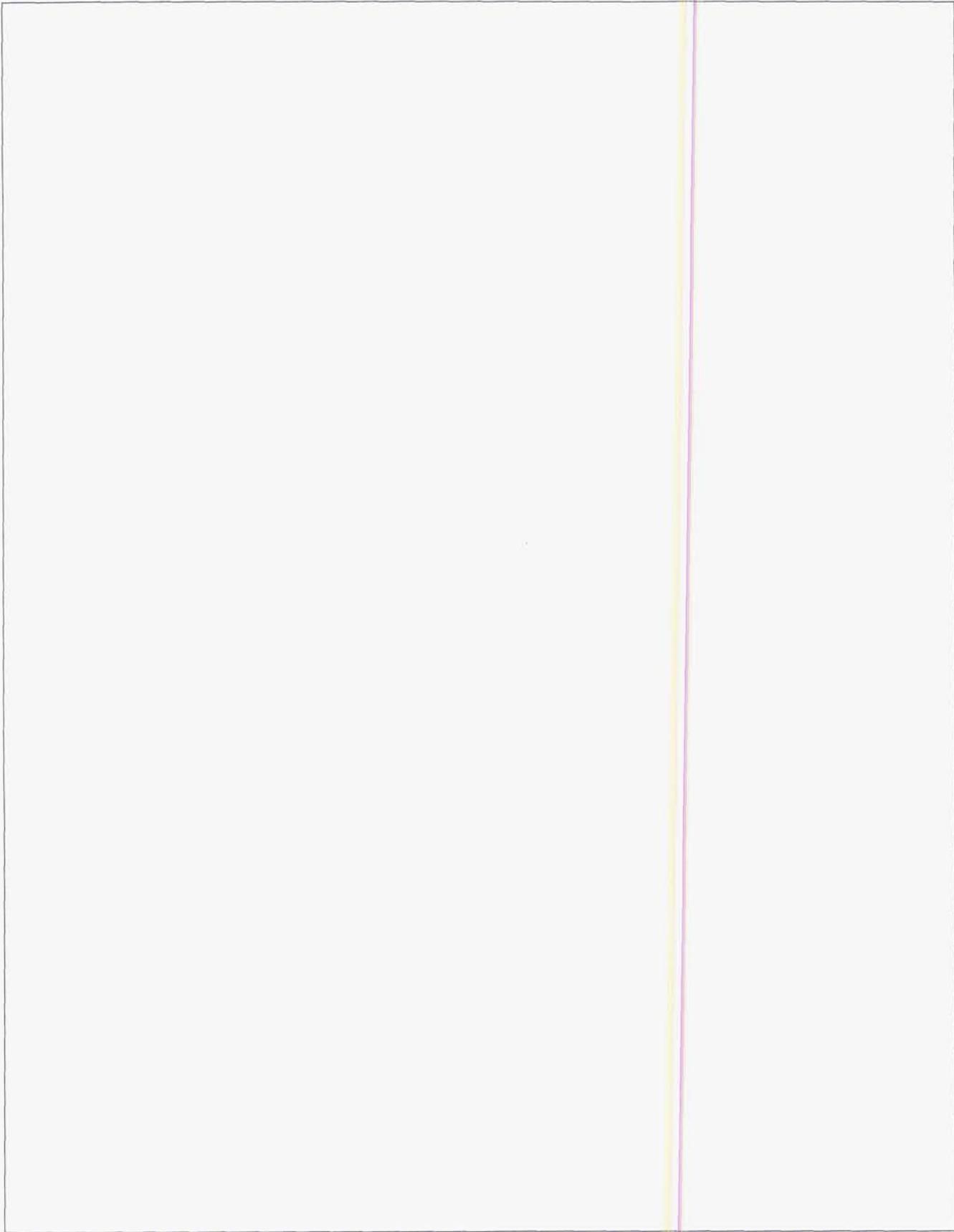
Activities/Comments:

Driller's Signature: _____ Date: _____

Supervisory Geologist's Signature: _____ Date: _____

Field Supervisor's Signature: _____ Date: _____

QC Checked By: _____ Date: _____



SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

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Manual Name: Quality Assurance Technical Procedures Volume II: Field Standard Operating Procedures

Document Number: FTP-1220

Revision Number: 3

Date Printed: _____

Person Checking the Revision Number: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
FIELD TECHNICAL PROCEDURE**

Title: Documenting and Controlling Field Changes to Approved Work Plans

Procedure No: FTP-1220

Revision: 3

Date: 11/18/2008

Page 1 of 6

Business Unit General Manager: Date:

A. H. Hamilton

12/8/08

QA/QC Officer: Date:

C. A. Cowart

11/18/2008

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1.0 PURPOSE

The purpose of this procedure is to establish a method for documenting and controlling field changes to approved work plans.

2.0 SCOPE

This procedure applies to SAIC personnel and subcontractors involved in field efforts which are governed by an approved work plan. This procedure should be used and specified within the work plan when no other programmatic procedure for the completion of field changes exists.

3.0 REFERENCES, RELATED READING, AND DEFINITIONS

3.1 REFERENCES

3.1.1 See Common References at the front of the FTP Manual.

3.1.2 SAIC Quality Assurance Administrative Procedures (QAAP) 15.1, Control of Nonconforming Items and Services

3.2 DEFINITIONS

3.2.1 Field Change: For the purposes of this procedure, a field change is a planned deviation from a procedure or requirement established in the approved work plan. Examples of typical field changes include the following:

- a) A change in the number of samples to be collected.
- b) A change in sample depth, location, or interval.
- c) A change in method of sample collection.
- d) A clarification to conflicting or confusing work plan or procedural requirements.
- e) The discovery of unanticipated hazards or changes in site hazards, hazard monitoring, or hazard controls.

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SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1220	Revision: 3	Page: 2 of 6
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- 3.2.2 Field Change Request (FCR): A form used to request and document signature approval of the field change.
- 3.2.3 Field Change Control Log: A log used to track the status of requested field changes.
- 3.2.4 Field Logbook: The site logbook, typically maintained by the Field Team Leader, which summarily documents all project field activities.

4.0 RESPONSIBILITIES

4.1 See Common Responsibilities at the front of the FTP Manual.

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4.2 FIELD TEAM MEMBERS

Field Team Members are responsible for:

- 4.2.1 identifying items which may require field change; and
- 4.2.2 correctly implementing changed procedures.

4.3 FIELD TEAM LEADER

The Field Team Leader is responsible for:

- 4.3.1 identifying items which may require field change;
- 4.3.2 properly completing the FCR form prior to submittal for approval;
- 4.3.3 notifying the SAIC Project Manager of the FCR;
- 4.3.4 completing and maintaining the field change control log;
- 4.3.5 maintaining updated copies of FCRs with the field change control log; and
- 4.3.6 notifying affected field personnel of approved FCRs.

4.4 CONTRACTS MANAGER

The Contracts Manager, or designee, is responsible for:

- 4.4.1 assisting the Project Manager with obtaining agreement from the client as to how field changes will be proposed, approved and controlled; and

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1220	Revision: 3	Page: 3 of 6
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4.4.2 assisting the Project Manager to assure that changes are not out of scope.

4.5 SAIC HEALTH AND SAFETY (H&S) OFFICER

The SAIC Health and Safety Officer who approved the project or program health and safety plan or similar hazard assessment is responsible for reviewing and approving FCRs which request or document changes in the H&S Plan, or which may affect the health or safety of the field team.

5.0 GENERAL

5.1 This procedure is intended to be used on field projects where a program process (e.g., client directed) for documenting, approving, and controlling changes to approved work plans is not in place.

5.2 The Program Manager, Project Manager, and/ or Contracts Manager determines if a client process is required. If not, this procedure is specified in the project Work Plan.

5.3 The Program Manager or Project Manager in coordination with the SAIC Contracts Manager, determines how the client wants to process field changes and if this procedure is acceptable.

5.4 Verbal or signature approval for a FCR must be obtained from the client before the FCR is implemented.

5.5 A deviation from the requirements (cost, scope, milestone or method) of a project work plan or procedure, without an approved FCR or prior to approval of a FCR, constitutes a nonconformance and should be documented in a nonconformance report (NCR).

5.6 The Project Manager may designate a Field Change Coordinator, when necessary.

6.0 PROCEDURE

6.1 FCR Processing

6.1.1 The Field Team Leader completes a FCR form (a full size form is provided immediately following this procedure) in accordance with paragraph 6.2 below and notifies the Project Manager.

6.1.2 The Field Team Leader initiates an entry in the Field Change Control Log (a full size form is provided immediately following this procedure) by inserting the assigned FCR number, the date

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1220	Revision: 3	Page: 4 of 6
--------------------------------------	-------------------------------	--------------------	---------------------

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initiated, the status, the procedure number or work plan section (s) affected, and the name of the person requesting the changes.

- 6.1.3 The original FCR or a copy is sent to the Project Manager and either the original or a copy is kept with the Field Change Control Log. The handling of original and copies is at the discretion of the Field Team Leader and Project Manager.
 - 6.1.4 The Project Manager discusses the FCR with appropriate members of the project team (QA/QC Officer, Program Manager, Contracts Manager, H&S Officer, field team members, etc.) as appropriate to the change, and makes any corrections needed.
 - 6.1.5 If the FCR includes a change in the project H&S Plan or has a potential effect on the health or safety of the field team, the SAIC H&S Officer must approve the FCR.
 - 6.1.6 The Project Manager or designee then notifies the client Project Manager and if required, other client staff such as the QA representative or Health and Safety representative, of the scope, justification and impacts of the request. The FCR form is then sent to the client Project Manager for approval.
- Note:** To expedite the process, the changes may be implemented after verbal client approval is obtained and documented. Verbal approval is documented by the Field Team Leader in the field logbook and in the Field Change Control Log.
- 6.1.7 If the client Project Manager and others (if required) approve the FCR (and no other approval is necessary), the change is signed as approved, and sent to the Field Team Leader. A record copy is retained by the Project Manager.
 - 6.1.8 After the FCR form is signed by the client, the form (original or copy) is inserted in the Field Change Control Log in place of the FCR noted in 6.1.3 above. The "Status" and "Date FCR Approved" columns are updated in the Field Change Control Log to indicate that the field change is complete.
 - 6.1.9 At the first opportunity, the Field Team Leader notifies all affected personnel of the field change. This notification is documented in the field logbook. If the FCR affects health or safety, the SHSO includes notification of the changes in one or more site safety briefings.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1220	Revision: 3	Page: 5 of 6
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6.2 COMPLETION OF THE FCR FORM

- 6.2.1 FCR NO.- An FCR number is assigned to the change request. Numbers are project coded and sequential.
- 6.2.2 Date Initiated- The date change was first requested is entered in this field.
- 6.2.3 Project- The name of the affected project.
- 6.2.4 Contract Number- The contract number under which the project operates.
- 6.2.5 Requestor Identification- Print the name of the person requesting the change, organization, phone number, and title. The requestor then signs in the signature block.
- 6.2.6 Baseline Identification- Check each affected baseline, i.e., does the change affect the cost of the project, is there an increase or decrease in scope, is an established milestone (due date) affected, or is one or more of the methods (procedures) used to conduct the work affected.
- 6.2.7 Affected Document- The exact title, revision number, section number, etc. of the affected work plan or procedure is entered in this field.
- 6.2.8 Description of Change- This field includes sufficient information for the reviewer to determine exactly how the affected work plan or procedure will be changed.
- 6.2.9 Justification- Include all reasons for the change request. These may include reduction in cost, minimization of health and safety risks, etc.
- 6.2.10 Impact of Not Implementing Request- Often, the reciprocal of the justification may be entered in this field. In some cases this statement may justify the change.
- 6.2.11 Participants Affected by Implementing Request- Include all participants affected. These may include the field personnel implementing the change, the data managers, data users, subcontractors etc.
- 6.2.12 Cost Estimate- The Field Team Leader or Project Manager includes an estimate of the cost effects based on implementing the request.

SAIC FIELD TECHNICAL PROCEDURE	Procedure No: FTP-1220	Revision: 3	Page: 6 of 6
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The person providing the cost estimate signs in this block and prints the appropriate phone number and date.

6.2.13 Previous FCR Affected- Check the appropriate box. If the yes box is checked, indicate the number(s) of the previous FCR(s) in the space provided to the right.

7.0 RECORDS

Documentation generated as a result of this procedure is to be submitted to the designated records system, in accordance with Section 17 of the Business Unit QAP.

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8.0 ATTACHMENTS

None

Field Change Request (FCR)

FCR NO. _____	DATE INITIATED _____
PROJECT _____	
CONTRACT NO. _____	
REQUESTOR IDENTIFICATION	
NAME _____	ORGANIZATION _____ PHONE _____
TITLE _____	SIGNATURE _____
BASELINE IDENTIFICATION	
BASELINE(S) AFFECTED <input type="checkbox"/> Cost <input type="checkbox"/> Scope <input type="checkbox"/> Milestone <input type="checkbox"/> Method of Accomplishment	
AFFECTED DOCUMENT (TITLE, NUMBER AND SECTION) DESCRIPTION OF CHANGE:	
JUSTIFICATION:	
IMPACT OF NOT IMPLEMENTING REQUEST:	
PARTICIPANTS AFFECTED BY IMPLEMENTING REQUEST:	
COST ESTIMATE (\$) _____	ESTIMATOR SIGNATURE _____
PHONE _____	DATE _____
PREVIOUS FCR AFFECTED <input type="checkbox"/> YES <input type="checkbox"/> NO; IF YES, FCR NO. _____	
CLIENT PROJECT MANAGER _____	DATE _____
CLIENT QA SPECIALIST _____	DATE _____
SAIC H&S MANGER SIGNATURE (IF APPLICABLE) _____	DATE _____

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Manual Name: Quality Assurance Program and Quality Assurance Administrative Procedures

Document Number: QAAP 2.1

Revision Number: 6

Date Printed: _____

Person Checking the Revision Number: _____

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION QUALITY ASSURANCE ADMINISTRATIVE PROCEDURE			
Title: Indoctrination and Training			
Procedure No: QAAP 2.1	Revision: 6	Date: 6/16/2008	Page: 1 of 8
Business Unit General Manager:	Date:	QA/QC Officer:	Date:
<i>Mary Wash</i>	<i>6/19/08</i>	<i>C.B. Cowart</i>	<i>6/12/2008</i>

R

1.0 PURPOSE

The purpose of this procedure is to establish specific responsibilities and activities for indoctrination, training and qualification of personnel performing services for Science Applications International Corporation (SAIC).

2.0 SCOPE

This procedure applies to SAIC personnel, subcontractors, other (such as temporary employees) performing work for SAIC directly.

3.0 REFERENCES AND DEFINITIONS

3.1 REFERENCES

See the common references at the front of the QAAP manual.

3.2 DEFINITIONS

- 3.2.1 Certification - The act of determining, verifying, and attesting in writing to the qualifications of personnel in accordance with specified requirements for positions requiring such certification.
- 3.2.2 Nonpermanent Personnel - Persons whose job assignment is expected to be less than 3 months.
- 3.2.3 Reading Assignment - Procedures or instructional material assigned by the Task Leader for indoctrination purposes to be read and understood by personnel.
- 3.2.4 Instructor - a person with sufficient experience and expertise in a subject matter to provide training to other personnel. Instructor qualifications are documented and certified by SAIC Division management or above.
- 3.2.5 On-The-Job-Training - training provided in an actual job setting whereby an individual performs an activity in either a real or simulated application of the activity, and is observed and corrected as necessary by a qualified instructor. This training is typically planned and could also include pre- and post-job briefings.

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.1	Revision: 6	Page: 2 of 8
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3.2.6 iTrack - An automated web-enabled system used to identify individual training requirements and track completion of required training. Other non-required training documentation may be included in the database by individuals at their discretion.

4.0 RESPONSIBILITIES

4.1 See the common responsibilities at the front of the QAAP manual.

4.2 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) OFFICER

In addition to the common responsibilities, the QA/QC Officer or designee is responsible for developing and implementing specific Quality indoctrination and training programs.

4.3 BUSINESS UNIT TRAINING COORDINATOR

The Training Coordinator is responsible for:

- 4.3.1 coordinating training across Operations and reporting status periodically;
- 4.3.2 monitoring training assignments across the Operations to help assure consistency;
- 4.3.3 assuring that iTrack is being maintained;
- 4.3.4 coordinating SAIC-mandated (corporate-level) training with appropriate corporate representatives; and
- 4.3.5 coordinating improvements to the training process whenever possible.

4.4 ORGANIZATION TRAINING COORDINATORS

The Organization Training Coordinators are responsible for:

- 4.4.1 determining appropriate training requirements for functions/ individuals within their respective areas of responsibility;
- 4.4.2 facilitating training for a group of people in an office, program, region or other logical grouping;
- 4.4.3 assuring that training is up to date within their respective areas of responsibility;

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION QUALITY ASSURANCE ADMINISTRATIVE PROCEDURE			
Title: Indoctrination and Training			
Procedure No: QAAP 2.1	Revision: 6	Date: 6/16/2008	Page: 1 of 8
Business Unit General Manager: <i>Mary Wash</i>		QA/QC Officer: <i>C.B. Cowart</i>	Date: <i>6/12/2008</i>
Date: <i>6/19/08</i>			

R

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2.0 SCOPE

This procedure applies to SAIC personnel, subcontractors, other (such as temporary employees) performing work for SAIC directly.

3.0 REFERENCES AND DEFINITIONS

3.1 REFERENCES

See the common references at the front of the QAAP manual.

3.2 DEFINITIONS

3.2.1 Certification - The act of determining, verifying, and attesting in writing to the qualifications of personnel in accordance with specified requirements for positions requiring such certification.

3.2.2 Nonpermanent Personnel - Persons whose job assignment is expected to be less than 3 months.

3.2.3 Reading Assignment - Procedures or instructional material assigned by the Task Leader for indoctrination purposes to be read and understood by personnel.

3.2.4 Instructor - a person with sufficient experience and expertise in a subject matter to provide training to other personnel. Instructor qualifications are documented and certified by SAIC Division management or above.

3.2.5 On-The-Job-Training - training provided in an actual job setting whereby an individual performs an activity in either a real or simulated application of the activity, and is observed and corrected as necessary by a qualified instructor. This training is typically planned and could also include pre- and post-job briefings.

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.1	Revision: 6	Page: 3 of 8
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R

4.4.4 coordinating training activities with the Business Unit Training Coordinator; and

4.4.5 submitting training records to the identified records system in accordance with section 7.0.

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4.5 DIVISION MANAGER(S)

Division Managers are responsible for:

4.5.1 determining training requirements for each individual in their division based on the individual's anticipated work assignment;

4.5.2 ensuring that training assignments are made and completed in a timely manner; and

4.5.3 coordinating training with the Organization Training Coordinator assigned to the division.

Note: For individuals transferring into a division, the Division Manager may use existing training to fulfill part of the training requirements where that training is applicable.

4.6 TASK LEADER(S)

The Task Leader(s) is responsible for:

4.6.1 assessing qualifications and determining the skill needs of (whether SAIC, subcontractors, or others) personnel working on their projects;

4.6.2 verifying existing training for applicability to assignments;

Note: Where existing training records are acceptable, new training on the same topics is not required.

4.6.3 forwarding training records for personnel in their area of responsibility to the appropriate Training Coordinator;

4.6.4 assuring that appropriate training is provided to staff within the Task Leader's area of responsibility and that the training is completed, for example:

- a) providing classroom or on-the-job training instructors, or
- b) issuing reading assignments;

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.1	Revision: 6	Page: 4 of 8
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4.6.5 assuring that personnel including subcontractors have indoctrination and training in the following subjects as they relate to the individual's assigned responsibilities, as appropriate:

- a) general criteria, including any applicable codes, standards, and regulations, and the purpose, scope, and implementation of quality-related manuals, instructions, and procedures;
- b) applicable QA program elements;
- c) job responsibilities and authority; and
- d) applicable Health and Safety training.

4.7 EMPLOYEES

Employees are responsible for:

4.7.1 documenting their understanding of the knowledge, skills, and abilities required to perform assigned tasks by:

- a) completing and signing the Training Assignment Record (a full size form is provided immediately following this procedure), or
- b) accessing their training profiles electronically and self-certifying;

4.7.2 assuring that their training records are up to date.

4.8 INSTRUCTOR(S)

Instructors are responsible for:

4.8.1 developing training materials in coordination with the responsible Task Leader;

4.8.2 conducting classroom instruction and on-the-job training;

4.8.3 recording the completion of classroom or on-the-job training on the Training Attendance Record or other appropriate format; and

4.8.4 submitting attendance records and training materials to the appropriate training coordinator.

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.1	Revision: 6	Page: 5 of 8
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5.0 GENERAL

5.1 INDOCTRINATION AND TRAINING

- 5.1.1 Individuals will receive indoctrination and training as appropriate to ensure a thorough understanding of applicable SAIC, contract, and regulatory requirements.
- 5.1.2 Indoctrination and training are required whenever personnel are initially assigned to a task. Where personnel have already completed a training assignment on the same material and the material has not been revised, another training assignment is not required.

Note: No arbitrary time limit is set for how long a completed training assignment is effective; however, the Task Leader must evaluate the risks and complexity of the task as well as the proficiency of the assigned personnel to determine if retraining is required.

- 5.1.3 Indoctrination and training is required whenever changes in the job assignment warrant it.
- 5.1.4 Indoctrination and training is provided to:
 - a) achieve initial proficiency;
 - b) maintain proficiency; and
 - c) accommodate changes in technology, methods, or job responsibility.
- 5.1.5 The extent of indoctrination and training will be commensurate with:
 - a) the scope, complexity, and nature of the work to be performed; and
 - b) the education, experience, and proficiency of the person.
- 5.1.6 All assigned training will be completed within thirty (30) days of the assignment date. The assignment date will be designated by the Task Leader.
- 5.1.7 Capability of field personnel to perform procedures applicable to their assignments will be verified by a qualified instructor.

5.2 MINIMUM REQUIREMENTS

- 5.2.1 Individuals must, at a minimum, have training on those documents which directly affect their work performance.
Examples include:

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.1	Revision: 6	Page: 6 of 8
--	---------------------------	----------------	-----------------

R

- a) laws, regulations, orders or other specifications required by a contract scope of work; and
- b) policies, plans, procedures, instructions or other work-controlling documents applicable to the scope of work.

Note: Each individual's training needs are assessed by the manager responsible for the individual's performance. The line manager assures that the person has the required Corporate-level training (e.g., ethics, time charging, etc.) and Business Unit-level training applicable to the person's position (e.g., QAP and QAAPs, field SOPs, Data Management, Engineering and Construction). The Task Leader assures that the person has the basic level of training noted above, and any task-specific training.

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5.2.2 Non-permanent personnel and subcontractors will receive indoctrination and training appropriate to their specific tasks and commensurate with assigned responsibilities or will be required to possess appropriate training when working for SAIC.

5.2.3 SAIC instructors must be certified by Division management or higher as possessing the qualifications (education, experience, expertise) necessary to competently instruct others in the proper performance of the subject matter.

5.3 METHODS

Indoctrination and training will be accomplished by one or more of the following, as appropriate:

- a) classroom instruction;
- b) on-the-job training; and
- c) reading assignments associated with individual job responsibility.

6.0 PROCEDURE

6.1 SAIC CLASSROOM INSTRUCTION

6.1.1 Employees complete courses identified by the responsible Task Leader.

6.1.2 Prior to each course, the responsible Task Leader QA/QC Officer or Instructor distributes written notification of the course, class location, class schedule, and who must attend.

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.1	Revision: 6	Page: 7 of 8
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R

- 6.1.3 All classroom training is knowledge/information based unless performance based training is specifically required.
- 6.1.4 For formal classroom training, the following materials are to be maintained as a records as a minimum:
 - a) material presented; and
 - b) examination, when applicable.
- 6.1.5 Employees sign a Training Attendance Record upon completion of each class they attend. A full size form is provided immediately following this procedure.
- 6.1.6 When the Training Attendance Record is used, unused rows are lined out by the instructor with a diagonal line.
- 6.1.7 The Instructor forwards the Training Attendance Record to the appropriate Training Coordinator, who processes it as a record in accordance with Section 7.0.

6.2 ON-THE-JOB TRAINING

- 6.2.1 Employees complete on-the-job training identified by the responsible Task Leader.
- 6.2.2 Employees sign an inter-office memorandum, field logbook, or other appropriate forms documenting completion of the on-the-job training to be copied to the Training Coordinator, Task Leader, and records system.

6.3 READING ASSIGNMENTS

- 6.3.1 Employees may be assigned documents (plans, procedures, standards, etc.) by line management or responsible Task Leaders to read for indoctrination and training purposes.
- 6.3.2 The employee is required to sign and date the Training Assignment Record attesting to the fact that the assignment has been read and is fully understood or electronically certify through iTrack. This record is forwarded to the appropriate Training Coordinator who processes it as a record in accordance with Section 7.0.

6.4 STORAGE OF TRAINING RECORDS

- 6.4.1 Training Records are maintained as permanent records and are also indexed in iTrack.

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.1	Revision: 6	Page: 8 of 8
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R

6.4.2 Training Records are referenced in iTrack by appropriate identifiers such as the applicable procedure number and revision, the course title, the date of training, and the record number, if applicable.

6.5 ADDITIONAL INDOCTRINATION AND TRAINING

The need for additional indoctrination and/or training is evaluated whenever an employee is assigned to a new position or the employee's responsibilities change.

7.0 RECORDS

Documentation generated as a result of this procedure is to be submitted to the identified records system, in accordance with Section 17 of the Business Unit QAP.

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8.0 ATTACHMENTS

None

TRAINING ASSIGNMENT RECORD

DATE: _____

PROGRAM DESIGNATOR: _____ PROJECT DESIGNATOR: _____

TO: _____
(Employee Name) (employee #) (division #)

FROM: _____
(Task Leader)

1. Based on an assessment of your job assignment you should attend the SAIC QA Orientation and classroom instruction.

2. Based on an assessment of your job assignment, you are responsible for reading and becoming familiar with the following documents:

- | | | | |
|-------------------------------------|---|------------------------|--------------------|
| <input type="checkbox"/> | SAIC QAP/QAAPs _____ | (Procedure(s) #) _____ | (revision #) _____ |
| <input type="checkbox"/> | SAIC Technical Procedures Manual Volume 1 _____ | (Procedure(s) #) _____ | (revision #) _____ |
| <input checked="" type="checkbox"/> | SAIC Technical Procedures Manual Volume 2 _____ | (Procedure(s) #) _____ | (revision #) _____ |
| <input checked="" type="checkbox"/> | SAIC Technical Procedures Manual Volume 3 _____ | (Procedure(s) #) _____ | (revision #) _____ |
| <input type="checkbox"/> | _____ | | |

3. Based on an assessment of your job assignment, you are responsible for the following on-the-job training:

I, _____, certify that I have completed the above training assignments.

Employee Signature

Date

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

CONTROLLED DOCUMENTS

The following document is controlled by the Science Applications International Corporation (SAIC), Quality Assurance/Quality Control Officer. If you print this document, this page must be attached to the front of the document and you must fill in the information required below. The hard copy should be signed and dated the day it is printed by the user.

CAUTION: The attached controlled document was printed from the SAIC Quality Assurance Web Site, which resides on the SAIC ISSAIC home page, and is valid until the revision number changes. The user is responsible for checking that the revision number of the printed document matches the revision number of the controlled document on the SAIC Quality Assurance Web Site for as long as this printed copy is in use.

Manual Name: Quality Assurance Program and Quality Assurance Administrative Procedures

Document Number: QAAP 2.2

Revision Number: 3

Date Printed: _____

Person Checking the Revision Number: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
QUALITY ASSURANCE ADMINISTRATIVE PROCEDURE**

Title: Readiness Review

Procedure No: QAAP 2.2

Revision: 3

Date: 6/16/2008

Page: 1 of 5

Business Unit General Manager:

Date:

QA/QC Officer:

Date:

Marcus Aldred

6/19/08

C.D. Cowart

6/12/2008

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1.0 PURPOSE

The purpose of this procedure is to establish specific responsibilities and activities for performing a Readiness Review for field services conducted by Science Applications International Corporation (SAIC).

2.0 SCOPE

This procedure applies to field activities performed by SAIC and its subcontractors. (See definition 3.2.2).

3.0 REFERENCES AND DEFINITIONS

3.1 REFERENCES AND RELATED READING

See common references at the front of the QAAP Manual.

3.2 DEFINITIONS

3.2.1 Environmental Sampling Activities-Includes, at a minimum, groundwater, storm water, surface water, waste water, air, geotechnical, soil, sediment, and wipe sampling; and industrial hygiene and/or radiological surveys.

3.2.2 Field Activities - Primarily focused on environmental sampling activities performed on client sites, but also includes activities where SAIC installs and/or operates systems or equipment on site, performs remediation or construction activities, or other work which poses physical hazards or regulatory risks. Also included are other activities, which affect the physical characteristics of a client site, such as construction or remediation, whether self-performed or where SAIC is in a position of responsibility for the project. Typically not included (for the purpose of this procedure) are activities such as visual assessments, audits, inspections, appraisals, literature surveys, or site walkovers (unless there are known or suspected hazards to the health and safety of field personnel).

3.2.3 Performance-Based Training – applies scientific principles on how people, learn, think, and remember. Performance-based training is identified by the following characteristics:

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SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.2	Revision: 3	Page: 2 of 5
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- a) Provides clearly stated performance objectives of what the learner should be able to do and how well he/she should be able to do it. The objective directly matches a job performance requirement.
- b) Derived directly from the job. Determine (for each job task) precisely what it is the learner should be able to do. Performance-based training is designed from the job out.
- c) Meets the specific needs and characteristics of the learners. Training should consider the background, education, preferences, and other general characteristics of the learners. The training should use vocabulary and examples that learners will relate well to.
- d) Provides practice and immediate feedback on every skill. Performance-based training is focused on providing learners with practice and immediate feedback on all the skills required to perform a job to meet management expectations. Every learner must be provided practice on every skill and the majority of training time should be spent in practice.
- e) Practice mirrors actual job conditions. Learners should practice all the major situations they are likely to confront, under all the conditions they are likely to face.
- f) Every learner must demonstrate competence in every skill before training ends. Every learner must be able to show that he/she can meet all the performance requirements to the pre-set criteria stated in the performance objective while still in training.
- g) Includes only what is needed to perform to expectations—no more and no less. Any information or knowledge that doesn't relate to a job performance requirement isn't needed.

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3.2.4 Project Manager- the person responsible for the scope of work under review. This is a general term which may be substituted by other terms such as Task Manager, Delivery Order Manager, etc.

3.2.5 Readiness Review - Meeting prior to commencement of field activities at which affected key personnel verify these activities are ready to begin.

3.2.6 Readiness Review Notice - A memorandum that provides the Readiness Review scope and purpose (identifying areas and items to be reviewed) and the date, time, location, and other logistical information for the review meeting.

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.2	Revision: 3	Page: 3 of 5
--	-------------------------------	--------------------	---------------------

R

3.2.7 Readiness Review Checklist - A list of prerequisites, requirements, and other information that forms the basis for the Readiness Review and provides evidence for determining readiness.

4.0 RESPONSIBILITIES

4.1 See the common responsibilities at the front of the QAAP Manual.

4.2 PROGRAM MANAGER

In addition to the common responsibilities, the Program Manager or designee is responsible for:

4.2.1 ensuring the Readiness Review meeting occurs; and

4.2.2 providing approval, in conjunction with the QA/QC Officer, for the start of field work.

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NOTE: In instances where there is no Program Manager, a designated authority (typically a Division or Operations Manager) will provide the approval to start.

4.3 PROJECT MANAGER

In addition to the common responsibilities, the Project Manager or designee is responsible for:

4.3.1 preparing and issuing a Readiness Review Notice and setting up a readiness review meeting;

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4.3.2 preparing any additional Readiness Review Checklist(s);

4.3.3 completing the Readiness Review Checklist(s);

4.3.4 communicating additional information generated during the Readiness Review to the field team, as appropriate; and

4.3.5 ensuring that all items on the Readiness Review Checklist(s) are complete, providing documentation of closure to the QA/QC Officer, and assuring that open action items are completed.

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SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.2	Revision: 3	Page: 4 of 5
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4.4 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) OFFICER

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In addition to the common responsibilities, the QA/QC Officer or designee is responsible for:

- 4.4.1 leading the Readiness Review meeting;
- 4.4.2 documenting open action items; and
- 4.4.3 providing approval, in conjunction with the Program Manager, for the start of field work.

5.0 GENERAL

5.1 Prior to commencement of field activities, a Readiness Review will be conducted. This will be at the beginning of a field effort, but may also occur at the beginning of a new phase of a project, or when deemed appropriate due to a change in scope.

5.2 It is recommended that the Project Manager give a brief summary of the project scope before the Readiness Review begins.

5.3 As noted in Section 4.4 above, the QA/QC Officer may designate alternates to perform the steps in Section 6.0 below, as necessary and appropriate.

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6.0 PROCEDURE

6.1 READINESS REVIEW NOTICE AND MEETING

6.1.1 The Project Manager prepares a Readiness Review Notice (or comparable notification, such as e-mail) and submits it to all affected personnel, including, but not limited to: the QA/QC Officer; Program Manager; Contracts Manager; Subcontracts Manager; Project Health and Safety Officer; Health and Safety Manager; Regulatory Compliance Officer; and appropriate key field team members. An example Readiness Review Notice is provided as a full size form immediately following this procedure.

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NOTE: It is recommended that notification be given 5 working days in advance of the Readiness Review.

6.1.2 The Project Manager sets up the readiness review meeting, including telecommunications (phone number and pass code) as necessary, and notifies participants.

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SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.2	Revision: 3	Page: 5 of 5
--	-------------------------------	--------------------	---------------------

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6.2 READINESS REVIEW CHECKLIST

- 6.2.1 The QA/QC Officer uses the Readiness Review Checklist to guide the readiness review meeting. A full size form is provided immediately following this procedure.
- 6.2.2 The Project Manager prepares any additional required checklists pertaining to the Task. Any specialized checklists, prepared to supplement the standard checklist, will be attached to the Readiness Review Checklist.
- 6.2.3 Prior to the Readiness Review meeting the Project Manager will collect all information required for the meeting.

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6.3 COMPLETION OF THE READINESS REVIEW CHECKLIST

- 6.3.1 The QA/QC Officer verifies the Readiness Review Checklist(s) during the readiness review meeting based on confirmation by the Project team and objective evidence (where possible) supporting readiness.
- 6.3.2 If open items remain, the QA/QC Officer documents the open items and the Project Manager assigns responsibility and makes commitments to close the open items.
- 6.3.3 The Project Manager tracks open items and provides a documented closure for each open item to the QA/QC Officer and the Health and Safety Manager. Open items may be closed individually or in a group(s).
- 6.3.4 The QA/QC Officer submits the approved Readiness Review Checklist(s) and documentation of action items to the Central Records Facility (CRF).
- 6.3.5 The Project Manager submits the Readiness Review Notice, and closure evidence to the CRF, or other records system when the organization is not a participant in CRF.

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7.0 RECORDS

All documents generated as a result of this procedure will be collected and maintained in accordance with the requirements specified in QAAP 17.1, Records Management.

8.0 ATTACHMENTS

None

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
READINESS REVIEW PLAN/NOTICE**

DATE: _____

TO: Distribution

FROM: _____, Project Manager

SUBJECT: Readiness Review Meeting

Program Designator: _____ Project Designator: _____

A Readiness Review meeting is scheduled for: _____ / _____
Date / Time (and zone)

to complete the Readiness Review Checklist(s) for Task _____, Contract _____.

Location: room number _____
Phone number _____
Pass code _____ (if applicable)

Distribution:

- Program Manager: _____
- Division Manager _____
- Project QA/QC Officer: _____
- Business Unit QA/QC Officer: _____
- Contracts Manager: _____
- Subcontracts Manager: _____
- Regulatory Compliance Officer: _____
- Project Health & Safety Officer: _____
- Business Unit Health & Safety Manager: _____
- Field Operations Manager: _____
- Key Field Team Members: _____
- _____
- _____

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SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
READINESS REVIEW CHECKLIST PAGE 1 OF 12

Records System Descriptors:

Program Designator: _____

Project Designator: _____

Project Title: _____

Project Manager: _____

Field Manager: _____

Other SAIC Field Personnel: _____

Date of Readiness Review: _____

Project Description: _____

Site Description: _____

Projected field start date: _____

Projected duration of field activities: _____

GENERAL

A. Is this project different from work typically performed by this organization, and if so how?
Yes No

If Yes, explain: _____

B. Do the Project Manager and Field Manager have direct experience in this type of work?
Yes No

If No, explain how this situation will be mitigated. _____

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C. Was a risk review completed that covers this project(s)? Yes No N/A

If so, what level of review:

SAIC Environmental Risk Subcommittee(ERSC) Date of review: _____

Business Unit risk review Date of review: _____

Were action items or conditions established by this review? Yes No

If so, have they been addressed and closed? Yes No

D. What are the names of the individuals presented to the risk reviewers as Project Manager and Field Manager for this work? _____

Has this changed? Yes No N/A

If Yes, explain _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
 READINESS REVIEW CHECKLIST PAGE 2 OF 12**

E. Is this project highly sensitive or otherwise susceptible to heightened public scrutiny?
 Yes No If so, what measures are planned to mitigate our exposure and reduce the
 potential for embarrassing publicity and adverse client or public perception of SAIC?

I. DOCUMENTATION

A. Are the appropriate documents for the project in their final approved form and have they been
 distributed, as appropriate, to the subcontractors, assigned field personnel, and the analytical
 laboratory?

Work Plan	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Field Sampling and Analysis Plan	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input checked="" type="checkbox"/>
QA Project Plan	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Health and Safety Plan	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Data Management Plan	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Waste Management Plan	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Field Procedures	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Others (specify): _____			

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B. What type(s) of documentation will be used to record field information?

Bound field logbook Yes No
 Field forms Yes No

C. If used, how are the forms managed to prevent loss (e.g. bound in a field logbook, 3-ring binder,
 job box or folder)? _____

D. What system or method has been selected for maintaining project records in accordance with
 Section 17.0 "Records" in the BU QAP?

SAIC Central Records (QAAP 17.1) Yes No
 Division or office records system Yes No If Yes, describe _____

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Who is responsible for assuring that records are submitted to the records system?

E. Have the required logbook and field forms entries for this project been determined and
 communicated to field personnel? Yes No N/A

F. Will logbooks and/or field forms be copied at least every 30 days and submitted to the records
 system identified in "D" above? Yes No

If No, what frequency will be used for records?

G. Who is responsible for controlling field logbooks and field forms? _____

H. Please attach any additional project-specific criteria pertinent to this category, as appropriate.

II. PERSONNEL AND TRAINING

A. Are there employees who have been with the company less than 6 months or who have not done
 this type of work before on the project field team? Yes No

If so, who are they and what QA and safety measures will be taken to compensate for the lack of
 experience? _____

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**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
READINESS REVIEW CHECKLIST PAGE 3 OF 12**

- B. Does a performance based (i.e., employee demonstrates ability to perform a task) training program exist for critical field activities, and what are the specific instruction techniques for this project? (Note: Project management determines which activities are critical and require performance-based training see definition in QAAP 2.2.)
Yes No N/A Comments: _____
- C. Is there documented evidence that the assigned project personnel (including subcontractors) have been adequately trained? For example, project/site specific H&S, QA and technical procedures; site/client specific procedures and regulations, (e.g., security); and applicable federal laws and regulations (e.g., OSHA or DOT). Yes No
Comments: _____
- D. What Health and Safety requirements, e.g., Hazwoper 40 hour, 8 hour refresher, Hazwoper Supervisor, SAIC procedures, medical surveillance, respirator fit testing, hearing conservation, confined space, excavation, current drivers licenses, client specific training, etc. are needed for this work?
List required certifications and/or training: _____

- E. Are project field personnel (including subcontractors and temporaries) up-to-date on above H&S requirements? Yes No N/A
If Yes, who personally verified this information? _____
If No, explain: _____
- F. Has all training been entered in a training matrix or database? Yes No
Which one and who is responsible for it? _____
- G. Are there properly trained back-up personnel available? Yes No N/A
Who: _____
- H. Have field personnel been trained in incident/occurrence reporting (SAIC EH&S procedure # 24 in general and/or client-specific reporting system)? Yes No
Comments: _____
- I. Have staff been advised of stop work authority and responsibility? Yes No
Comments: _____
- J. Have field personnel been briefed on their responsibility to control an established work zone (e.g., OSHA work zone, exclusion zone, radiation control zone) and their authority to restrict admittance to a work zone? Yes No N/A
Describe the work zone control measures: _____

- K. Where state or federal licenses [e.g., licensed land surveyor, Professional Engineer (PE), Professional Geologist (PG), Licensed Site Professional (LSP) or certified environmental contractor] are required, have sufficient personnel been assigned who have such licenses?
Yes No N/A
List licenses and associated personnel: _____

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**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
READINESS REVIEW CHECKLIST PAGE 4 OF 12**

- L. Will the project involve transporting (by driving) or shipping (by Federal Express or similar carrier) isopropyl alcohol, calibration gas, acids (hydrochloric, nitric, etc.), hazardous waste, radiation sources, or other DOT-regulated hazardous materials, or operating vehicles (including trailers) with a gross vehicle weight rating greater than 10,000 pounds? Yes No
If yes, who will perform the transport or shipping and how have they been trained?

- M. Have data management personnel been assigned to interface with field data personnel? Who? Yes No N/A Comments: _____
- N. Has the chain of command from field operations to management been defined, documented, and communicated to all project personnel? Yes No
Comments: _____
- O. Please attach any additional project-specific criteria pertinent to this category, as appropriate.

III. MATERIALS AND EQUIPMENT

- A. What field equipment will be needed for this project (SAIC and SAIC subcontractor)?

How will field equipment be transported to the site? _____
- B. Will SAIC and on-site subcontractor personnel be ready to begin work with the appropriate equipment and personnel for the project? Yes No N/A
Supply the name of each company subcontracted to SAIC (e.g., driller, land surveyor, utility locator, traffic control, on-site laboratory, UXO) and for each field subcontractor the EH&S 140 qualification expiration date: _____
- C. Is back up available for key equipment? Yes No N/A
List key equipment: _____
- D. Have arrangements been made for the necessary power supply (including backup) for field equipment? Yes No N/A Comments: _____
- E. Is an approved purchase order in place for each subcontractor and/or vendor?
Yes No N/A
If No, the project manager is responsible for insuring that a purchase order is in place prior to mobilization of any subcontractor or shipment of any items.
- F. Have subcontractor qualifications, including procedure EH&S 140 requirements, been verified by the SAIC subcontractor administrator? Yes No N/A
If No, what steps are being taken to remedy the situation? _____

Are there action items or restrictions in the database for a subcontractor? Yes No
If Yes, which contractor and how are they being addressed? _____

- G. Have subcontractor/vendor provided materials (e.g., well materials, backfill) been verified as meeting the specifications of the Statement of Work (SOW) and/or the Field Sampling and Analysis Plan? Yes No N/A Comments: _____

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**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
READINESS REVIEW CHECKLIST PAGE 5 OF 12**

H. Have containers for storage and/or shipment of hazardous waste, other regulated material, or any other waste requiring disposal by a waste hauler been correctly specified (size, type, material, etc.) for procurement? Yes No N/A Who verified? _____

I. Have provisions for QA/QC analysis of subcontractor-provided materials (e.g., bentonite, gel and sand packs, pumps, piping, drums) and attendant documentation been made?
Yes No N/A
If materials/equipment must be certified pre-cleaned, when will a copy of the manufacturer's certification documentation be obtained for SAIC records?

J. Have provisions been made for construction of an equipment decontamination pad or other means of managing decontamination fluids in secondary containment? (e.g., size, location, materials)
Yes No N/A Explain: _____

K. Have provisions been made for control and calibration of measuring and test equipment, including a list of all equipment proposed for use on the project, measurement and calibration documentation for each piece, and factory instrument calibration certificates?
Yes No N/A List equipment that requires calibration: _____

L. Have all necessary materials and equipment been assembled to correctly collect, identify, preserve, and transport the types and number of samples to be taken for this job?
Yes No N/A Comments: _____

M. Please attach any additional project specific criteria pertinent to this category, as appropriate.

IV. SITE LOGISTICS

A. Have site-specific clearances (e.g., badges, tags, listings) been obtained for all job-site personnel?
Yes No N/A Comments: _____

B. Have all drilling, excavating, or similar permits/clearances been granted or a schedule established for obtaining them? Yes No N/A
Have drilling locations been cleared through the facility or local "one call" system?
Yes No Describe: _____

C. Have measures been determined to meet the requirements for subsurface hazard avoidance in procedure EH&S 130 for drilling or excavation? Yes No N/A
Describe: _____

Will drilling locations be cleared with low impact techniques (e.g., hand auger or air knife) to a depth of 5 feet and a diameter at least three inches greater than the drill and/or will excavations be cleared by exposing known utilities within 5 feet of an excavation using similar techniques?
Yes No N/A If No, explain: _____

D. Have permits/clearances been obtained for any radioactive materials (including radioactive sources) to be sampled or handled on-site? Yes No N/A
Comments: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
READINESS REVIEW CHECKLIST PAGE 6 OF 12**

E. Have the appropriate site personnel (e.g., base commands/facilities/functions, site security, business or property owners, and other contractors) been informed of the activities, the estimated duration of the project, and potential interfaces in their work areas?
Yes No N/A Comments: _____

F. What communication equipment (two way radio, cell phone, etc.) is needed on site?

Has the equipment been verified to work at this location? Yes No
If No, what steps are planned to assure communication access?

G. Have arrangements been made for storage of bottles, samples, solvents, and sampling equipment? Yes No N/A
If the project involves a field laboratory, has it been properly located and arrangements made for phone, electricity, etc. Yes No N/A Comments: _____

H. Has an interface been established with the appropriate upper-tier organizations to allow two-way communication of changes in policy, procedure, practice, and lessons learned?
Yes No N/A Comments: _____

I. Have work (drilling, sampling, excavating, constructing etc.) locations been established and checked for equipment accessibility? Yes No N/A
Comments: _____

J. Are field activities subject to compliance with the National Environmental Policy Act (NEPA)?
Yes No If yes, describe the NEPA documentation that covers the activities being conducted and who is responsible for permits (i.e., Categorical Exclusion, etc.).

R

K. Please attach any additional project-specific criteria pertinent to this category, as appropriate.

V. LABORATORY LOGISTICS

A. Will the project use an analytical laboratory? Yes No
If no, the remainder of Section V is not applicable. Comments: _____

B. To what corporate entity is the laboratory subcontracted?
 SAIC Customer

C. Does the contract analytical laboratory SOW adequately reflect currently anticipated project needs? Yes No Comments: _____

D. Has a contract-approved laboratory been selected, made aware of the Data Quality Objectives (DQOs) and the anticipated schedule of project activities? Yes No
Provide the laboratory name(s): _____
Have laboratory personnel been advised of any unusual requirements or circumstances?
Yes No N/A Comments: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
READINESS REVIEW CHECKLIST PAGE 7 OF 12**

- E. How has the analytical laboratory been qualified to assure that it can meet project DQO's, including method detection limits (e.g., quality audit by SAIC, certified by client, certified by national or state recognized certification authority)? _____

- F. Does the selected laboratory have a current radiological license or exemption?
Yes No N/A Comments: _____
- G. Has the selected laboratory been notified of when sampling will begin, the projected volume of samples, the types of samples, the on-site point of contact, and when samples should start arriving for analysis? Yes No Comments: _____
- H. Are there any short (less than 72 hours) holding time issues? Yes No
If so, have the field sample manager and laboratory been made aware, and made arrangements to assure that such issues are addressed? Yes No
Comments: _____
- I. Has a secondary, back-up laboratory been selected and approved in case of emergency situations? Yes No N/A
Provide the laboratory name: _____
- J. How will samples be delivered to the laboratory?
 Commercial carrier (e.g., Federal Express, UPS)
 Laboratory courier
 SAIC (includes subcontractor or other entity such as temporary employee) will transport
Has notification been made to the selected sample transportation company and shipping information confirmed? Yes No N/A Comments: _____
- K. Have arrangements been made to ensure that appropriate chain of custody and quality control requirements can be achieved? Yes No Comments: _____
- L. Do procedures identify the proper preservation for the samples to be collected and that preservation is documented prior to shipment? Yes No N/A
List preservatives: _____
- M. Will the cooler be checked for sample container breakage and incorrect sampling containers prior to leaving the field? Yes No N/A
- N. Does a mechanism exist to ensure laboratory receipt of samples and immediate notification of any problems (e.g., holding time, temperature, breakage, preservative)? Yes No
Comments: _____
- O. Does the laboratory contract include provisions for waste disposal? Yes No
(Note: If NO, and waste samples are to be returned for disposal by SAIC, ensure this waste is covered in the Project Waste Management Plan.)
- P. Please attach any additional project-specific criteria pertinent to this category, as appropriate.

R

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
 READINESS REVIEW CHECKLIST PAGE 8 OF 12**

VI. HEALTH AND SAFETY

A. Who will be the field manager responsible and accountable to ensure/enforce safe operations?

What qualifies this person for this role? (For example, SAIC hazardous waste supervisor training and at least a year of experience doing similar work)

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B. Who is assigned as the site health and safety officer (responsible to verify safe operation)?

Has that person had SAIC's hazardous waste supervisor training and at least a year of experience doing similar work? Yes No

If No, explain why this person has been selected: _____

C. Has the field manager (and the SHSO, if applicable) read the hazard assessment or HASP and verified that the hazard controls can be implemented and that the hazard controls are sufficient to ensure safe completion of the work or identified additional necessary controls?

Yes No Comments: _____

D. Will this work involve higher hazard activities such as?

Yes No potential chemical or radiological exposures greater than action levels

Yes No explosive ordnance

Yes No heavy equipment (e.g., drill rig, air knife, track hoe), nearby traffic

Yes No excavations > 6 inches deep

Yes No confined space entry

Yes No >5 gallons total of hazardous chemicals

Yes No chainsaws or similarly dangerous power tools with exposed blades/cutters

Yes No elevated work surfaces

Yes No on-site laboratory

Yes No boat use or work around water > 3 feet deep (drowning hazard)

Yes No compressed gasses (greater than calibration gas bottle)

Yes No hot work

Yes No dangerous wildlife or plants (e.g. poisonous snakes, alligators, ticks, bees, wasps, poison ivy or sumac)

Yes No lifting more than 50 pounds

Yes No slippery work surfaces, steep inclines, unstable terrain, open holes, etc.

Yes No hazardous energy (e.g., electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy)

Yes No other potentially high hazard situations Describe: _____

Yes No If high hazard work, have the work procedures been verified to be in compliance with all regulatory requirements?

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E. Who reviewed the HASP to verify that the hazard controls are appropriate for the work and in compliance with all applicable regulatory requirements? _____

If this work is subject to EH&S Procedure 20, has the HASP been reviewed and approved by a CIH, CSP or designee? Yes No N/A

Who performed the review? _____

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**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
READINESS REVIEW CHECKLIST PAGE 9 OF 12**

F. What are the most probable or most significant injuries, incidents, or emergencies associated with this work? _____

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G. What will be done to prevent this injury, incident, or emergency? _____

H. Is this control(s) specified in a written subcontractor H&S program or plan, or in SAIC's hazard analysis or Health and Safety Plan (HASP)?
Yes No N/A Comments: _____

I. What specific actions will be taken immediately if one of these potential emergencies occurs? Are there post-emergency actions or situations that should be avoided or prevented, and if so, what are they? For example, if a gas line is cut by a drill rig, it is critical that all nearby ignition sources be turned off, the gas company notified, and the immediate area evacuated until the gas is shut off. Comments: _____

J. Which SAIC EH&S Procedures (Corporate and Business Unit) are applicable to this work? List by number and/or title: _____

K. What actions will be taken (e.g., H&S monitoring with detection instruments, visual surveys, daily inspections, spot checking PPE, close supervision of new employees, etc.) to verify that the hazards assessments are correct and that hazards are adequately controlled?

Will verification include at least a daily safety inspection using the checklist on the EH&S web site on ISSAIC, or equivalent? Yes No

If No, explain: _____

L. What is the action level(s), behavior(s) or condition(s) that will require action, and what actions will be taken if an action level is exceeded or failure condition observed?

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M. What calibration checks will be necessary for H&S monitoring instruments?

Where will calibration information be logged? _____

N. Have the required H&S instruments and calibration equipment been assembled?
Yes No N/A Comments: _____

O. What MSDS are needed on site and have they been assembled?

P. Will project-specific training address at least, the major hazards and appropriate controls, location of HASP and MSDS, most probable emergencies, weather hazards, location and use of any emergency gear, post-emergency assembly points, emergency contacts and phone numbers and where this information is kept, and hospital location and route? Yes No

Are there other critical topics to be addressed in project-specific training? Yes No
If YES, describe: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
 READINESS REVIEW CHECKLIST PAGE 10 OF 12**

Q. How will project-specific training be documented? _____
 Will the documentation include at least a description of the topics covered and signatures of participants? Yes No
 If No, explain: _____

R. What PPE and H&S supplies will be needed (e.g., fire extinguisher, spill kit, eye wash, first aid kit, safety glasses, hard hat, hearing protection, snake chaps, steel toe boots)? _____
 Have these supplies been assembled on site or arrangements made to assure that they are on site at the start of field work? Yes No N/A

R

VII. WASTE MANAGEMENT

A. Will SAIC or its subcontractors generate and/or manage wastes (of any kind) through the course of project implementation? Yes No
 If **No**, the remainder of Section VII is not applicable. Provide a brief explanation: _____

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B. Are wastes generated on the project only municipal solid wastes (common garbage)?
 Yes No
 • If **Yes**, describe the wastes, and the remainder of Section VII is not applicable.

 • If **No**, complete Section VII.

C. Briefly describe the wastes that will be generated and the plan for managing the wastes as well as the plan for disposal or recycling of the wastes. _____

D. Summarize the waste characterization or describe the process that will be used to characterize the waste. _____

 Method of sampling IDW? _____
 Who is responsible for characterization? _____
 Who will ensure that proper analytical procedures are specified in the Sampling Plan to characterize the wastes per the regulatory and/or facility requirements, and ensure that the client makes (and documents) the final decision on characterization and disposal?

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E. What document (Work Plan, Waste Management Plan, Statement of Work, Proposal, etc.) describes SAIC's responsibilities for wastes, the applicable regulations, the types and quantities of wastes (hazardous or non-hazardous) to be generated, the process for managing the wastes, any facility-specific requirements, and the process for documenting the client's participation or approval (see procedure EH&S 25)? _____
 Has this document been approved by the client? Yes No N/A
 Has this document been approved by a regulator? Yes No N/A
 If applicable, EPA ID# _____
 Comments: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
READINESS REVIEW CHECKLIST PAGE 11 OF 12**

F. Does this document include provisions for unique marking and traceability of waste containers? [Note: Provisions include 1) marking the containers, 2) container inventory and tracking log, and 3) designation of personnel responsible for tracking and inventory.]
Yes No If NO, explain: _____
Describe how wastes will be marked and tracked and how the inventory will be verified at the close of field activities (e.g., procedure FTP-1225). _____

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G. Will SAIC sign waste shipping papers? Yes No
Will SAIC subcontract for disposal of the client's waste? Yes No
If YES to either question, provide the following information:
1) the date that approval was obtained from the ERSC _____
2) the controls/conditions the ERSC required _____
3) the date(s) that the ERSC conditions were met _____

H. Have all materials required in order to construct and/or operate a waste management area been obtained? Yes No N/A
Briefly describe how wastes will be stored and managed: _____

I. Does the waste management plan address prompt waste disposition or formal (documented) transfer to the facility for disposal? Yes No N/A
Identify the client/facility contact who will be responsible for taking custody of the waste or who will sign any manifest or shipping paper required for waste disposition: _____

J. Does the Work Plan include timeframes that wastes must be removed from the site and the manner in which removal will occur? Yes No N/A
If No or N/A, explain: _____
Waste should be removed and disposed as soon as possible. How long will SAIC be responsible for the waste? _____

K. How will releases due to freezing or container failure be prevented?

How will the waste be secured to prevent unauthorized access or addition of other wastes?
Will secondary containment be used for liquids? Yes No N/A
Describe the controls: _____

R

VIII. QUALITY ASSURANCE

A. Have the plans, procedures, instructions, standards, or other work-controlling documents been identified for the project? Yes No
Has the Business Unit QA web site been checked to assure the current version of each Business Unit procedure is being used? Yes No

B. Where are the above documents identified (e.g. Quality Assurance Project Plan, Quality Control Plan, Engineering Work Plan, other Work Plan, Sampling and Analysis Plan, QA Grading Checklist)? _____

C. Has this document been approved? Yes No

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
 READINESS REVIEW CHECKLIST PAGE 12 OF 12**

- D. Who will provide independent QA/QC oversight for field and for laboratory activities?

- E. Are QA audits or surveillances required for this project? Yes No
 If Yes, when and by whom? _____
- F. How will project documents and procedures be controlled? (Supply the name of the Document Control Coordinator.) _____
- G. What process or procedure (e.g., procedure QAAP 15.1) will be used to identify, report, and evaluate conditions adverse to quality? _____
- H. Have field and laboratory personnel received nonconformance report instruction?
 Yes No Comments: _____
- I. Are roles, responsibilities, and authorities for QA of data collection activities defined and recorded?
 Yes No N/A Comments: _____
- J. Is the status of project data quality routinely assessed and reported to upper-tier organizations?
 Yes No N/A Comments: _____
- K. If required, has a Project Kickoff Checklist been completed per procedure QAAP 2.3?
 Yes No N/A Comments: _____
- L. Please attach any additional project-specific criteria pertinent to this category, as appropriate.

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Approval to proceed with fieldwork. (Approval includes agreement by the Project Manager to complete any action items remaining from this Readiness Review.)

 Program Manager (or designee) signature

 Date

 Print Name (Program Manager)

 Business Unit QA/QC Officer (or designee)

 Date

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SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

CONTROLLED DOCUMENTS

The following document is controlled by the Science Applications International Corporation (SAIC), Quality Assurance/Quality Control Officer. If you print this document, this page must be attached to the front of the document and you must fill in the information required below. The hard copy should be signed and dated the day it is printed by the user.

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Manual Name: Quality Assurance Program and Quality Assurance Administrative Procedures

Document Number: QAAP 2.3

Revision Number: 6

Date Printed: _____

Person Checking the Revision Number: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
QUALITY ASSURANCE ADMINISTRATIVE PROCEDURE**

Title: Project Kickoff Checklist

Procedure No: QAAP 2.3

Revision: 6

Date: 6/16/2008

Page: 1 of 5

Business Unit General Manager:

Date:

QA/QC Officer:

Date:

Manny Walsh 6/19/08

C.D. Cowart 6/12/2008

1.0 PURPOSE

The purpose of this procedure is to establish specific responsibilities and activities for completing a Project Kickoff Checklist. The purpose of the checklist is to provide Project Managers with a tool which helps them plan a project and assure that required processes are not overlooked.

2.0 SCOPE

This procedure applies to projects performed by Science Applications International Corporation (SAIC) with a contracted value of \$50,000 or more.

3.0 REFERENCES AND DEFINITIONS

3.1 REFERENCES

3.1.1 See Common References at the front of the QAAP Manual.

3.1.2 SAIC Corporate Financial Instructions (CFI) B-8, Accounting for Revenues and Estimates at Completion (EACs)

3.2 DEFINITIONS

3.2.1 Program - An organized set of activities directed toward a common purpose, or goal undertaken or proposed in support of an assigned mission area. Programs typically consist of multiple projects.

3.2.2 Project - A unique effort within a program or stand-alone which has firmly scheduled beginning, intermediate, and ending milestones; prescribed performance requirements; prescribed costs; and close management, planning and control. May also be known by other names such as Delivery Order, Task Order, Service Order, Work Release, etc.

3.2.3 Project Kickoff Checklist - A compilation of activities and requirements in checklist form to be used by a Project Manager to evaluate the state of readiness to begin a project.

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.3	Revision: 5	Page: 2 of 5
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3.2.4 SOX (Sarbanes Oxley) Tiers [see SAIC CFI B-8]

- 3.2.4.1 Tier 1: a) Fixed price contracts with a value of \geq \$15 million, or b) cost reimbursable and government T&M/FP-LOE and target cost risk reward contracts with a value \geq \$100 million.
- 3.2.4.2 Tier 2: a) fixed price contracts with a value of \geq \$1 million and less than \$15 million, b) cost reimbursable and government T&M/FP-LOE and target cost risk reward contracts with a value \geq \$5 million and $<$ \$100 million, or c) Tier 3 and 4 contracts with a projected contract loss greater than \$250,000.
- 3.2.4.3 Tier 3: all contracts not in Tiers 1, 2 or 4.
- 3.2.4.4 Tier 4: contracts accounted for using the T&M right-to-bill, hardware product, software product, or services revenue recognition methods (this does not include the units-of-delivery percentage-of-completion revenue recognition method), and target cost risk reward contracts.

4.0 RESPONSIBILITIES

4.1 See the Common Responsibilities at the front of the QAAP Manual.

4.2 PROGRAM MANAGER

The Program Manager or designee is responsible for:

- 4.2.1 ensuring that a Project Kickoff Checklist is completed for each project within the program scope; and
- 4.2.2 signing the "Approved By" block on each completed checklist within the program scope.

4.3 PROJECT MANAGER

The Project Manager is responsible for:

- 4.3.1 completing the Project Kickoff Checklist;
- 4.3.2 coordinating with the Contracts and Finance Representatives to assure that contracts and finance elements of the checklist are correctly characterized;
- 4.3.3 signing the "Completed By" block on the Project Kickoff Checklist; and

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.3	Revision: 5	Page: 3 of 5
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4.3.4 ensuring that all records generated as a result of implementing this procedure for a project are submitted to the designated records system in accordance with section 7.0 of this procedure.

4.4 DIVISION MANAGER

The Division Manager assumes the Program Manager responsibilities specified in section 4.2 above for projects which are not part of a program.

4.5 CONTRACTS REPRESENTATIVE

The Contracts Representative is responsible for assisting the Project Manager with contracts issues associated with completion of the Project Kickoff Checklist.

4.6 PROCUREMENT REPRESENTATIVE

The Procurement Representative is responsible for assisting the Project Manager with procurement related issues associated with completion of the Project Kickoff Checklist.

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4.7 DIVISION FINANCE REPRESENTATIVE

The Division Finance Representative is responsible for assisting the Project Manager with revenue recognition determinations and other finance issues associated with completion of the Project Kickoff Checklist.

5.0 GENERAL

5.1 The Project Kickoff Checklist is provided as a full size form immediately following this procedure.

5.2 The Project Kickoff Checklist is to be completed prior to beginning any technical tasks on the project. Any open items will be assigned for completion to appropriate project team members.

5.3 As a general rule, projects with a contract value of less than \$50,000 will not require a Project Kickoff Checklist unless the Program Manager, Operation Manager, Division Manager, or BU General Manager determines it is necessary. Project Managers should also give consideration to factors such as the type of work, type of contract, duration and risk when determining whether to prepare a Project Kickoff Checklist for projects under a \$50,000 contract value. Best management practices are expected for projects below the \$50,000 limit which are not implementing a Project Kickoff Checklist.

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SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.3	Revision: 5	Page: 4 of 5
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5.4 Most projects in the E&I Business Unit are expected to fall into Tier 3 (as defined in section 3.2.4) meaning that these projects can use the Project Kickoff Checklist associated with this procedure. Projects falling into Tiers 1, 2 or 4 are outside the scope of this procedure and should be reviewed in accordance with direction from the Division Finance Representative.

5.5 It is recommended that the Project Manager conduct a kickoff meeting with the project team.

6.0 PROCEDURE

6.1 The Project Manager completes the header information (page 1, top of the form) on the Project Kickoff Checklist including the project title, task number, contract number, contract type, prime project number and contract level.

6.2 Checklist Section A

6.2.1 The Project Manager completes each item in Section A (page 1) of the checklist and indicates the status of each item by checking the box under the Y(yes), N (No), or N/A (not applicable) columns. Checks under No or N/A are followed by a justification in the Comments column. Any item checked No will be assigned a completion date and action item to complete.

6.2.2 The Project Manager prepares the documentation specified by each of the checklist items, as applicable to the nature of the project.

6.3 Checklist Section B

6.3.1 If the Contract Level is determined to be Tier 3, the Project Manager completes Section B (page 2) of the checklist.

6.3.2 If the Contract Level is determined to be Tier 1, 2 or 4, the Project Manager skips Section B and coordinates with the Division Finance Representative for the appropriate documentation needed for revenue recognition.

6.3.3 When Section B is completed, the Project Manager also completes all associated documentation.

6.4 Checklist Section C

The Project Manager completes each item in Section C (page 3) of the checklist, in the Team Identification portion of the checklist by filling in the name, telephone number and address of each person. Where a Position/Role is not applicable to the

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 2.3	Revision: 5	Page: 5 of 5
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project, the Project Manager writes N/A in the Name column. Other Position /Roles not shown on the checklist are added as applicable to the project.

6.5 Approvals

6.5.1 Upon completion of all checklist items the Project Manager signs and dates the checklist in the "Completed By" block on page 2, and forwards to the Program Manager or to the Division Manager when the project is not part of a program.

6.5.2 The Program Manager or Division Manager reviews the Project Kickoff Checklist, resolves any open issues with the Project Manager; signs and dates the checklist in the "Approved By" block on page 2, and returns the checklist to the Project Manager.

6.5.3 The Project Manager distributes the Project Kickoff Checklist to the project team.

7.0 RECORDS

Documentation generated as a result of this procedure is maintained in accordance with Section 17.0 of the E&I BU QAP (Reference 3.1.2).

7.1 Project Kickoff Checklist

8.0 ATTACHMENTS

None

Project Kickoff Checklist

Project Title: _____ Task #: _____

Contract #: _____ Prime Project #: _____

Contract Type CPFF CPAF CPIF T&M FP LOE FFP FPI

Contract Level (per CFI B-8) Tier 1 Tier 2 Tier 3 Tier 4

Note: if Tier 3, complete SECTION B below; if Tier 1, 2 or 4 complete the SOX checklist (See your Division Finance Representative)

SECTION A	Done?			Comments
	Y	N	N/A	
1. Have the Contract, SOW, and Proposal or other contractual documents been read and reviewed by the Project Manager and appropriate team members?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Have potential OCI issues been reviewed and resolved?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Has a kickoff meeting with project staff and/or technical leads been conducted or planned? When?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3a. Is an SG-20 Contract Kickoff Review required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3b. If so, has the SG-20 review been completed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Has a Project Description (PD) been prepared?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Have project controls been established according to program requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5a. Task Outline (WBS)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5b. Deliverables List and Due Dates?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5c. Project Schedule?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5d. Cost Breakdown by WBS?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5e. Charge Numbers and PANs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5f. Basis of % Complete Reporting?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Does the project involve engineering studies, investigations, analyses, design, or construction inspection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6a. If so, what state registration is required?				
6b. What SAIC corporate entity is the work to be performed under? (e.g. SAIC Engineering Inc.)				
6c. Has the State-Designated Engineer been notified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6d. Is the SAIC branch office performing the engineering work registered in the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6e. Are the Principal Engineer and/or Lead Engineer(s) registered in the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Has the Project team been identified and individuals notified? (including QA plans and procedures)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Have project procedures and training requirements been identified and documented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Does this project require a risk review? If so, what level Risk Committee (SG-20, ERSC, VA, BU)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9a. Have all approvals been obtained?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9b. Have Risk Committee requirements for the project been completed and closed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10. Has a records system for project records been identified by the Project Manager? Which one?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Project Kickoff Checklist			
Project Title: _____		Task #: _____	
Contract #:	Prime Project #:		
11. Have subcontractor technical, financial and H&S purchasing and small business classification evaluations been completed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Have the small business goals been reviewed and approved for the project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Have written, binding quotes/ proposals been received from subcontractors by Procurement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Have subcontractor proposals been reviewed, negotiated and approved by Procurement?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Does Project Manager have Fixed Price Project Management training if the project is FFP?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Are acceptance criteria and customer expectations clearly understood, agreed to, and documented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Project Kickoff Checklist				
SECTION B				
Contract Funding	Price	Cost Target	Fee/Margin (\$\$)	Fee/Margin (%)
Negotiated Contract				
Current Funded				
SPA Required? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Type 1 <input type="checkbox"/> Type 2				
MOUs Required? (List BUs): _____				
Contract Options?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Nonbillable cost/hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Labor Quals?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Contractual Ceiling/cap?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Service Contract Act?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Non-fee bearing items?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Wage Determination?	<input type="checkbox"/> Yes <input type="checkbox"/> No	LOE Requirement?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Invoice Frequency	<input type="checkbox"/> Biweekly <input type="checkbox"/> Fiscal Period <input type="checkbox"/> Calendar Month			
Invoice Type	<input type="checkbox"/> % complete <input checked="" type="checkbox"/> Progress Payments <input type="checkbox"/> Milestones <input type="checkbox"/> T&M Rates			
Invoice By	<input type="checkbox"/> Person <input type="checkbox"/> Labor Category <input type="checkbox"/> Task <input checked="" type="checkbox"/> Other			
ODC Markup	<input type="checkbox"/> G&A <input type="checkbox"/> Actual <input type="checkbox"/> Unbillable			
Uncomp Hours	Billable? <input type="checkbox"/> Yes <input type="checkbox"/> No			
SAIC Invoice Distribution	Name	Telephone #	Address/Office	
Special Invoicing Requirements? (e.g., WBS matches invoicing requirements and level of detail, backup, labor quals/certs, etc.)				
Revenue Recognition Method				
	<input type="checkbox"/> Percentage of Completion (Cost to Cost)		<input type="checkbox"/> Right to Bill	
	<input type="checkbox"/> Percentage of Completion (Efforts Expended)		<input type="checkbox"/> Services Model	
	<input type="checkbox"/> Percentage of Completion (Units of Delivery)		<input type="checkbox"/> Software/Hardware Products	
Special Revenue Calculation Requirements? (e.g., GLA 5705 or 6010 hrs, premium time, HOLA/COLA, etc.)				
Attachments:	Yes	No		
ACB (automated contracts brief) printout	<input type="checkbox"/>	<input type="checkbox"/>		
Initial EAC (estimate at completion)	<input type="checkbox"/>	<input type="checkbox"/>		
QRAM (quantitative risk analysis matrix)	<input type="checkbox"/>	<input type="checkbox"/>		
RRDC (revenue recognition decision checklist)	<input type="checkbox"/>	<input type="checkbox"/>		

Completed By:	Approved By:
_____	_____
Printed Name	Printed Name
_____	_____
Signature _____ Date _____	Signature _____ Date _____

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

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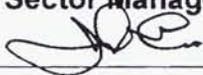
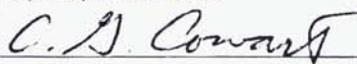
Manual Name: Quality Assurance Program and Quality Assurance Administrative Procedures

Document Number: QAAP 12.1

Revision Number: 3

Date Printed: _____

Person Checking the Revision Number: _____

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION QUALITY ASSURANCE ADMINISTRATIVE PROCEDURE			
Title: Control of Measuring and Test Equipment			
Procedure No: QAAP 12.1	Revision: 3	Date: 7/03/2002	Page: 1 of 7
Sector Manager: 	Date: 7/6/02	QA/QC Officer: 	Date: 7/1/2002

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1.0 PURPOSE

The purpose of this procedure is to define the requirements and responsibilities for the Control of Measuring and Test Equipment (M&TE)

2.0 SCOPE

This procedure applies to M&TE used by Science Applications International Corporation (SAIC) (including subcontractors) for collection of quantitative data. This includes M&TE used for health and safety monitoring as well as collection of technical data to support project analytical objectives.

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3.0 REFERENCES AND DEFINITIONS

3.1 REFERENCES

- 3.1.1 See Common References at the front of the QAAP Manual.
- 3.1.2 SAIC QAAP 15.1, Control of Nonconforming Items and Services.

3.2 DEFINITIONS

- 3.2.1 Adjustment to Calibration - The amount of adjustment performed on an instrument in the process of bringing the instrument to a known or acceptable tolerance.
- 3.2.2 Background Check - A measurement normally taken at a work site prior to work being performed to ensure the health and safety of personnel in the area.
- 3.2.3 Measurement Prior to Calibration - Initial readings from an instrument or gauge prior to any adjustments.
- 3.2.4 Measuring and Test Equipment M&TE - Devices or systems used to calibrate, measure, gauge, test, or inspect in order to control or acquire data to verify conformance to specified requirements. For example:
 - a) instruments for collection of environmental monitoring and sampling, calibration, and data generation/collection.
 - b) health and safety monitoring equipment
 - c) process systems monitoring gauges
- 3.2.5 Post-calibration measurement - A measurement taken against a known standard after the instrument has been used to verify the instrument is still within the acceptable range.

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SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 2 of 7
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3.2.6 Pre-calibration measurement - An instrument reading from a known source prior to any adjustments to determine if adjustments are required.

3.2.7 Response Check - A measurement taken for which the instrument or gauge is expected to read at a specific level, verifying the instrument is properly calibrated.

4.0 RESPONSIBILITIES

See the Common Responsibilities at the front of the QAAP Manual.

4.1 PROGRAM OR PROJECT MANAGER

In addition to the common responsibilities, the Program or Project Manager is responsible for designating a qualified M&TE Coordinator for his or her project.

4.2 TASK LEADER

The Task Leader is responsible for:

4.2.1 implementing the actions delineated in this procedure;

4.2.2 ensuring that personnel have training in the use of applicable M&TE;

4.2.3 initiating a Nonconformance Report (NCR) for data that was generated/collected using M&TE that was known to be out of calibration or broken; and

4.2.4 stopping work in situations when personnel health or safety may be compromised due to inoperable or out of calibration monitoring devices, until the equipment is replaced or repaired.

4.4 PROJECT M&TE COORDINATOR

The Project M&TE Coordinator is responsible for:

4.4.1 acting as a liaison for the procurement and calibration of M&TE; and

4.4.2 ensuring that M&TE is properly controlled and calibrated in accordance with the requirements of this procedure.

4.5 SAIC PERSONNEL

SAIC personnel are responsible for:

4.5.1 ensuring that he/she does not use M&TE for which the calibration recall date has expired or which cannot be calibrated;

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SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 3 of 7
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- 4.5.2 ensuring that he/she does not use M&TE that is tagged, segregated, or taken out of service;
- 4.5.3 initiating an NCR for M&TE which is broken or which cannot be calibrated; and
- 4.5.4 notifying the Task Leader when inoperable or out of calibration monitoring equipment could affect personnel health or safety.

5.0 GENERAL

- 5.1 Equipment owned by SAIC will be housed in a controlled area to protect it from damage or deterioration, and to control its use, i.e., equipment will be checked out to individual Project M&TE Coordinators when requested. Such equipment will either be calibrated per a defined schedule while in storage, or calibration will not be maintained in storage and the Project M&TE Coordinator will be responsible for calibration of such equipment to be used on his/ her specific project.
- 5.2 M&TE is obtained by the Project M&TE Coordinator with the concurrence of the Task Leader.
- 5.3 M&TE is selected for utilization, in accordance with the documented requirements for instrument type, range, accuracy, and tolerance.
- 5.4 In this procedure, the word "calibration" refers to in-house calibration unless specified as factory calibration.
- 5.5 The forms provided immediately following this procedure are examples and may be modified to fit client-specific requirements, as necessary.

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5.6 CALIBRATION/EQUIPMENT CATEGORIES

5.6.1 Category 1 M&TE:

- a) is subject to periodic calibration recall (e.g., annual calibration, calibration prior to use, etc.);
- b) includes reference standards that are used to calibrate other standards and that are traceable to the National Institute of Standards and Technology (NIST) through:
 - the use of physical constants which are recognized and approved by NIST; or
 - the use of standard reference materials that are also traceable to NIST and validated by NIST-accepted procedures;
- c) includes transfer standards that are used to transfer known value to a lower level M&TE directly from a reference standard, thereby providing traceability to higher level standards; and
- d) includes working standards that are used in the laboratory or field for user-calibration of items, thereby providing traceability to higher standards.

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 4 of 7
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5.6.2 Category 2 M&TE:

- a) is used for reference only;
- b) does not require scheduled calibration recall;
- c) only requires recalibration when M&TE is suspected to be out of calibration, or after it has been repaired, modified, or reworked; and
- d) typically does not have its data recorded.

5.6.3 Category 3 M&TE:

- a) is off-the-shelf merchandise (i.e., rulers, laboratory glassware, etc.) where accuracy and quality provided by the manufacturer are considered adequate for its intended purpose; and
- b) does not have calibration requirements, although new items are inspected upon receipt.

6.0 PROCEDURE

6.1 IDENTIFICATION

6.1.1 Identification of Category 1 M&TE is documented through the use of the Category 1 M&TE Inventory (full size form provided immediately following this procedure) or equivalent form. The inventory form is signed and dated by the Project M&TE Coordinator and includes:

- a) a unique identifier labeled or inscribed on the item
- b) a brief description of the item
- c) the date of the last calibration recall
- d) the next calibration recall date
- e) the date of each inventory/log entry

6.1.2 Category 2 and 3 M&TE are identified in logbooks as appropriate to project-specific requirements.

6.1.3 The association of collected/generated data to a particular M&TE item is established by recording the unique identifier in the site or field logbook.

6.2 CALIBRATION

6.2.1 Calibration of Category 1 M&TE is performed using equipment and standards that provide an uncertainty rating appropriate to the type of instrument and its intended use.

6.2.2 The results of calibration are documented on the Category 1 M&TE Calibration Log (full size form provided immediately following this procedure) or equivalent form which includes the following information:

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 5 of 7
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- a) unique identifier
- b) description of the item
- c) measurement prior to calibration
- d) adjustment to calibration
- e) post-calibration measurement
- f) calibration background check
- g) response check
- h) name of the person making the entry
- i) date of entry

6.2.3 Calibration standards and their use are documented on a Calibration Standards Log (full size form provided immediately following this procedure) or equivalent form.

6.2.4 Site or Field logbooks contain measurements performed in the field during the day.

6.2.5 The Project M&TE Coordinator coordinates the maintenance/factory calibration of the following:

- a) items known to be out of calibration
- b) items due for calibration
- c) items suspected to be out of calibration
- d) items repaired or modified
- f) newly procured items

6.2.6 The Project M&TE Coordinator obtains documentation of latest calibration prior to use on the project, whether from a vendor or an SAIC equipment center.

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6.3 USE OF M&TE

6.3.1 Before an item is put into service, the Project M&TE Coordinator ensures that:

- a) the item is uniquely identified and categorized
- b) the calibration recall frequency of the item is established and noted on a calibration label attached to that item
- c) expired items are tagged, and if possible, segregated
- d) calibration specifications and uncertainty ratings are established which include as a minimum, specifications of range, accuracy, and tolerance
- e) calibration specifications are approved by the Task Leader
- f) calibration specifications are provided by the calibrating organization
- g) M&TE users are properly trained and qualified in calibration and use of the instrument

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 6 of 7
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- 6.3.2 When using M&TE, personnel will refer to the manufacturer's operating instructions and/ or relevant procedures for information pertinent to the operation of specific equipment.
- 6.3.3 When using M&TE, personnel will document use on the M&TE Usage Log (full size form provided immediately following this procedure) or equivalent form which includes the following information:
- a) unique identifier of the item
 - b) name of responsible person(s)
 - c) date when item was checked out and in
 - d) project name
 - e) condition of the equipment upon return
- 6.3.4 A working copy of the Usage Log is maintained by the Project M&TE Coordinator. Originals are transmitted to the Central Records Facility at a minimum of semiannually, or at project end if less than six months duration.
- 6.3.5 NCRs are initiated on M&TE utilized in the field when necessary. NCRs are prepared according to QAAP 15.1, Control of Nonconforming Items and Services, under the following circumstances:
- a) expired equipment
 - b) out-of-tolerance calibration results
Note: MT&E must be within calibration tolerance before (Pre-calibration) and after (Post-calibration) M&TE use.
 - c) damaged equipment that cannot be calibrated
 - d) receipt of newly procured equipment that does not conform to the requirements stated in the procurement documents
 - e) nonconformance to procedures
 - f) improper handling, storage, or shipping of equipment
- 6.3.6 NCRs initiated on M&TE suspected or known to be out-of-calibration will include all data generated/collected since the last calibration. The usability of that data must be dispositioned per QAAP 15.1, (Reference 3.1.2).
- 6.3.7 M&TE that is unusable for any reason is tagged (per QAAP 15.1 Reference 3.1.2) or segregated, and taken out of service by SAIC personnel who notify the Project M&TE Coordinator.
- 6.3.8 If M&TE need for health or safety monitoring is unusable for any reason, work dependent on that equipment is stopped until monitoring equipment which meets requirements is available and operable.

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 7 of 7
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6.4 HANDLING AND STORAGE

- 6.4.1 The Project M&TE Coordinator ensures that the proper protection, storage, handling, and environmental conditions are maintained to ensure minimal M&TE uncertainties.
- 6.4.2 Limitations on the handling, use, and storage of items are defined in the applicable calibration procedures, in the applicable test procedures, and in the item-specific technical procedures.
- 6.4.3 Copies of the CDDL for each controlled document or group of controlled documents are transmitted at least annually by the DCC to the Task Leaders, the Program or Project Manager, and the QA/QC Officer for review.

7.0 RECORDS

Documentation generated as a result of this procedure are maintained in accordance with the requirements contained in QAAP 17.1, Records Management.

8.0 ATTACHMENTS

None

Instructions for Completion of the Category 1 M&TE Inventory

Identifier:	Enter the unique number labeled or inscribed on the item.
Item Description:	Enter a brief description of the M&TE item.
Last Recall:	Enter the date of the last calibration.
Next Recall:	Enter the date of the next calibration recall date.
Date:	Enter the date of each inventory/log entry.
Date and Project M&TE Coordinator Signature:	The Project M&TE Coordinator will verify the inventory and sign and date the form.

Instructions for Completion of the Category 1 Calibration Log

- Identifier: Enter the unique number labeled or inscribed on the item.
- Item Description: Enter a brief description of the M&TE item.
- Calibration Measurement:
- Pre: Enter the measurement prior to calibration.
 - Adjustment: Enter the adjustment made to calibration.
 - Post: Enter the measurement after calibration has been completed.
- Background Check: Indicate with check mark the performance of calibration background check (if applicable).
- Response Check: Indicate with check mark the performance of meter response check (if applicable).
- Name: Enter the name of the person making the entry.
- Date: Enter the date of the entry

Instructions for Completion of the M&TE Usage Log

- Identifier: Enter the unique number labeled or inscribed on the item.
- Name: Enter the name of the person checking out the equipment.
- Date Out: Enter the date the equipment is checked out.
- Date In: Enter the date the equipment is returned.
- Project: Enter the project name (e.g., East Fork Poplar Creek).
- Condition Returned: The user shall enter the condition of the equipment upon return, noting any needed repairs.

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Manual Name: Quality Assurance Program and Quality Assurance Administrative Procedures

Document Number: QAAP 12.1

Revision Number: 3

Date Printed: _____

Person Checking the Revision Number: _____

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
QUALITY ASSURANCE ADMINISTRATIVE PROCEDURE**

Title: Control of Measuring and Test Equipment

Procedure No: QAAP 12.1

Revision: 3

Date: 7/03/2002

Page: 1 of 7

Sector Manager:

Date:

QA/QC Officer:

Date:

[Signature]

7/6/02

C. J. Cowart

7/1/2002

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1.0 PURPOSE

The purpose of this procedure is to define the requirements and responsibilities for the Control of Measuring and Test Equipment (M&TE)

2.0 SCOPE

This procedure applies to M&TE used by Science Applications International Corporation (SAIC) (including subcontractors) for collection of quantitative data. This includes M&TE used for health and safety monitoring as well as collection of technical data to support project analytical objectives.

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3.0 REFERENCES AND DEFINITIONS

3.1 REFERENCES

- 3.1.1 See Common References at the front of the QAAP Manual.
- 3.1.2 SAIC QAAP 15.1, Control of Nonconforming Items and Services.

3.2 DEFINITIONS

- 3.2.1 Adjustment to Calibration - The amount of adjustment performed on an instrument in the process of bringing the instrument to a known or acceptable tolerance.
- 3.2.2 Background Check - A measurement normally taken at a work site prior to work being performed to ensure the health and safety of personnel in the area.
- 3.2.3 Measurement Prior to Calibration - Initial readings from an instrument or gauge prior to any adjustments.
- 3.2.4 Measuring and Test Equipment M&TE - Devices or systems used to calibrate, measure, gauge, test, or inspect in order to control or acquire data to verify conformance to specified requirements. For example:
 - a) instruments for collection of environmental monitoring and sampling, calibration, and data generation/collection.
 - b) health and safety monitoring equipment
 - c) process systems monitoring gauges
- 3.2.5 Post-calibration measurement - A measurement taken against a known standard after the instrument has been used to verify the instrument is still within the acceptable range.

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SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 2 of 7
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3.2.6 Pre-calibration measurement - An instrument reading from a known source prior to any adjustments to determine if adjustments are required.

3.2.7 Response Check - A measurement taken for which the instrument or gauge is expected to read at a specific level, verifying the instrument is properly calibrated.

4.0 RESPONSIBILITIES

See the Common Responsibilities at the front of the QAAP Manual.

4.1 PROGRAM OR PROJECT MANAGER

In addition to the common responsibilities, the Program or Project Manager is responsible for designating a qualified M&TE Coordinator for his or her project.

4.2 TASK LEADER

The Task Leader is responsible for:

- 4.2.1 implementing the actions delineated in this procedure;
- 4.2.2 ensuring that personnel have training in the use of applicable M&TE;
- 4.2.3 initiating a Nonconformance Report (NCR) for data that was generated/collected using M&TE that was known to be out of calibration or broken; and
- 4.2.4 stopping work in situations when personnel health or safety may be compromised due to inoperable or out of calibration monitoring devices, until the equipment is replaced or repaired.

4.4 PROJECT M&TE COORDINATOR

The Project M&TE Coordinator is responsible for:

- 4.4.1 acting as a liaison for the procurement and calibration of M&TE; and
- 4.4.2 ensuring that M&TE is properly controlled and calibrated in accordance with the requirements of this procedure.

4.5 SAIC PERSONNEL

SAIC personnel are responsible for:

- 4.5.1 ensuring that he/she does not use M&TE for which the calibration recall date has expired or which cannot be calibrated;

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SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 3 of 7
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- 4.5.2 ensuring that he/she does not use M&TE that is tagged, segregated, or taken out of service;
- 4.5.3 initiating an NCR for M&TE which is broken or which cannot be calibrated; and
- 4.5.4 notifying the Task Leader when inoperable or out of calibration monitoring equipment could affect personnel health or safety.

5.0 GENERAL

- 5.1 Equipment owned by SAIC will be housed in a controlled area to protect it from damage or deterioration, and to control its use, i.e., equipment will be checked out to individual Project M&TE Coordinators when requested. Such equipment will either be calibrated per a defined schedule while in storage, or calibration will not be maintained in storage and the Project M&TE Coordinator will be responsible for calibration of such equipment to be used on his/ her specific project.
- 5.2 M&TE is obtained by the Project M&TE Coordinator with the concurrence of the Task Leader.
- 5.3 M&TE is selected for utilization, in accordance with the documented requirements for instrument type, range, accuracy, and tolerance.
- 5.4 In this procedure, the word "calibration" refers to in-house calibration unless specified as factory calibration.
- 5.5 The forms provided immediately following this procedure are examples and may be modified to fit client-specific requirements, as necessary.

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5.6 CALIBRATION/EQUIPMENT CATEGORIES

5.6.1 Category 1 M&TE:

- a) is subject to periodic calibration recall (e.g., annual calibration, calibration prior to use, etc.);
- b) includes reference standards that are used to calibrate other standards and that are traceable to the National Institute of Standards and Technology (NIST) through:
 - the use of physical constants which are recognized and approved by NIST; or
 - the use of standard reference materials that are also traceable to NIST and validated by NIST-accepted procedures;
- c) includes transfer standards that are used to transfer known value to a lower level M&TE directly from a reference standard, thereby providing traceability to higher level standards; and
- d) includes working standards that are used in the laboratory or field for user-calibration of items, thereby providing traceability to higher standards.

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 4 of 7
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5.6.2 Category 2 M&TE:

- a) is used for reference only;
- b) does not require scheduled calibration recall;
- c) only requires recalibration when M&TE is suspected to be out of calibration, or after it has been repaired, modified, or reworked; and
- d) typically does not have its data recorded.

5.6.3 Category 3 M&TE:

- a) is off-the-shelf merchandise (i.e., rulers, laboratory glassware, etc.) where accuracy and quality provided by the manufacturer are considered adequate for its intended purpose; and
- b) does not have calibration requirements, although new items are inspected upon receipt.

6.0 PROCEDURE

6.1 IDENTIFICATION

6.1.1 Identification of Category 1 M&TE is documented through the use of the Category 1 M&TE Inventory (full size form provided immediately following this procedure) or equivalent form. The inventory form is signed and dated by the Project M&TE Coordinator and includes:

- a) a unique identifier labeled or inscribed on the item
- b) a brief description of the item
- c) the date of the last calibration recall
- d) the next calibration recall date
- e) the date of each inventory/log entry

6.1.2 Category 2 and 3 M&TE are identified in logbooks as appropriate to project-specific requirements.

6.1.3 The association of collected/generated data to a particular M&TE item is established by recording the unique identifier in the site or field logbook.

6.2 CALIBRATION

6.2.1 Calibration of Category 1 M&TE is performed using equipment and standards that provide an uncertainty rating appropriate to the type of instrument and its intended use.

6.2.2 The results of calibration are documented on the Category 1 M&TE Calibration Log (full size form provided immediately following this procedure) or equivalent form which includes the following information:

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 5 of 7
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- a) unique identifier
- b) description of the item
- c) measurement prior to calibration
- d) adjustment to calibration
- e) post-calibration measurement
- f) calibration background check
- g) response check
- h) name of the person making the entry
- i) date of entry

6.2.3 Calibration standards and their use are documented on a Calibration Standards Log (full size form provided immediately following this procedure) or equivalent form.

6.2.4 Site or Field logbooks contain measurements performed in the field during the day.

6.2.5 The Project M&TE Coordinator coordinates the maintenance/factory calibration of the following:

- a) items known to be out of calibration
- b) items due for calibration
- c) items suspected to be out of calibration
- d) items repaired or modified
- f) newly procured items

6.2.6 The Project M&TE Coordinator obtains documentation of latest calibration prior to use on the project, whether from a vendor or an SAIC equipment center.

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6.3 USE OF M&TE

6.3.1 Before an item is put into service, the Project M&TE Coordinator ensures that:

- a) the item is uniquely identified and categorized
- b) the calibration recall frequency of the item is established and noted on a calibration label attached to that item
- c) expired items are tagged, and if possible, segregated
- d) calibration specifications and uncertainty ratings are established which include as a minimum, specifications of range, accuracy, and tolerance
- e) calibration specifications are approved by the Task Leader
- f) calibration specifications are provided by the calibrating organization
- g) M&TE users are properly trained and qualified in calibration and use of the instrument

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 6 of 7
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- 6.3.2 When using M&TE, personnel will refer to the manufacturer's operating instructions and/ or relevant procedures for information pertinent to the operation of specific equipment.
- 6.3.3 When using M&TE, personnel will document use on the M&TE Usage Log (full size form provided immediately following this procedure) or equivalent form which includes the following information:
- a) unique identifier of the item
 - b) name of responsible person(s)
 - c) date when item was checked out and in
 - d) project name
 - e) condition of the equipment upon return
- 6.3.4 A working copy of the Usage Log is maintained by the Project M&TE Coordinator. Originals are transmitted to the Central Records Facility at a minimum of semiannually, or at project end if less than six months duration.
- 6.3.5 NCRs are initiated on M&TE utilized in the field when necessary. NCRs are prepared according to QAAP 15.1, Control of Nonconforming Items and Services, under the following circumstances:
- a) expired equipment
 - b) out-of-tolerance calibration results
Note: MT&E must be within calibration tolerance before (Pre-calibration) and after (Post-calibration) M&TE use.
 - c) damaged equipment that cannot be calibrated
 - d) receipt of newly procured equipment that does not conform to the requirements stated in the procurement documents
 - e) nonconformance to procedures
 - f) improper handling, storage, or shipping of equipment
- 6.3.6 NCRs initiated on M&TE suspected or known to be out-of-calibration will include all data generated/collected since the last calibration. The usability of that data must be dispositioned per QAAP 15.1, (Reference 3.1.2).
- 6.3.7 M&TE that is unusable for any reason is tagged (per QAAP 15.1 Reference 3.1.2) or segregated, and taken out of service by SAIC personnel who notify the Project M&TE Coordinator.
- 6.3.8 If M&TE need for health or safety monitoring is unusable for any reason, work dependent on that equipment is stopped until monitoring equipment which meets requirements is available and operable.

SAIC QA ADMINISTRATIVE PROCEDURE	Procedure No: QAAP 12.1	Revision: 3	Page: 7 of 7
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6.4 HANDLING AND STORAGE

- 6.4.1 The Project M&TE Coordinator ensures that the proper protection, storage, handling, and environmental conditions are maintained to ensure minimal M&TE uncertainties.
- 6.4.2 Limitations on the handling, use, and storage of items are defined in the applicable calibration procedures, in the applicable test procedures, and in the item-specific technical procedures.
- 6.4.3 Copies of the CDDL for each controlled document or group of controlled documents are transmitted at least annually by the DCC to the Task Leaders, the Program or Project Manager, and the QA/QC Officer for review.

7.0 RECORDS

Documentation generated as a result of this procedure are maintained in accordance with the requirements contained in QAAP 17.1, Records Management.

8.0 ATTACHMENTS

None

Instructions for Completion of the Category 1 M&TE Inventory

Identifier:	Enter the unique number labeled or inscribed on the item.
Item Description:	Enter a brief description of the M&TE item.
Last Recall:	Enter the date of the last calibration.
Next Recall:	Enter the date of the next calibration recall date.
Date:	Enter the date of each inventory/log entry.
Date and Project M&TE Coordinator Signature:	The Project M&TE Coordinator will verify the inventory and sign and date the form.

Instructions for Completion of the Category 1 Calibration Log

Identifier:	Enter the unique number labeled or inscribed on the item.
Item Description:	Enter a brief description of the M&TE item.
Calibration Measurement:	
Pre:	Enter the measurement prior to calibration.
Adjustment:	Enter the adjustment made to calibration.
Post:	Enter the measurement after calibration has been completed.
Background Check:	Indicate with check mark the performance of calibration background check (if applicable).
Response Check:	Indicate with check mark the performance of meter response check (if applicable).
Name:	Enter the name of the person making the entry.
Date:	Enter the date of the entry

Instructions for Completion of the M&TE Usage Log

- Identifier: Enter the unique number labeled or inscribed on the item.
- Name: Enter the name of the person checking out the equipment.
- Date Out: Enter the date the equipment is checked out.
- Date In: Enter the date the equipment is returned.
- Project: Enter the project name (e.g., East Fork Poplar Creek).
- Condition Returned: The user shall enter the condition of the equipment upon return, noting any needed repairs.

