LACROSSE SOLUTIONS

# LACBWR Site Restoration Project

## Radiological Assessments And Remedial Action Support Surveys (RASS)

**Procedure No. LC-FS-PR-003**

**Revision No. 0**

Preparer (Print name/Sign) R J Reheard Robert J. Reheard Date: 3/23/2016

Secondary Reviewer JD Jacobsen J. D. Jacobsen Date: 3/23/2016

| Regulatory Required Reviews (attach completed LC-RA-PR-001 forms) | | |
|---|---|---|
| Part 50 License: 10 CFR 50.59 and 50.90 | ☐ YES | ☒ NO |
| Fire Protection: 10 CFR 50.48(f) | ☐ YES | ☒ NO |
| Conditions of License: PSP: 10 CFR 50.54(p) | ☐ YES | ☒ NO |
| Conditions of License: E-Plan: 10 CFR 50.54(q) | ☐ YES | ☒ NO |
| Termination of License: 10 CFR 50.82(a)(6) and 50.82(a)(7) | ☐ YES | ☒ NO |
| Part 72 License: 10 CFR 72.48 | ☐ YES | ☒ NO |

**Program Required Reviews**

RP: ☒ YES ☐ NO SIGNATURE J. D. Jacobsen DATE: 3/23/2016

QA: ☐ YES ☒ NO SIGNATURE _____ DATE: _____

QTR: ☐ YES ☒ NO SIGNATURE _____ DATE: _____

**Approval Section**

PROJECT MANAGER: SIGNATURE Joseph [illegible] DATE: 4/4/2016

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# 1. PURPOSE AND SCOPE

## 1.1. Purpose

The purpose of this procedure is to provide instructions for the development, implementation and review of Radiological Assessment (RA) and Remedial Action Support Survey (RASS) sample plans which are generated to manage the assessment of radiological conditions in MARSSIM impacted survey units where radiological conditions may have changed since (RA) or in survey units undergoing remediation (RASS) at the La Crosse Site Restoration Project (LCRP).

## 1.2. Scope

This procedure implements the requirements of applicable U.S. Nuclear Regulatory Commission (NRC) regulations and guidance documents; specifically, NUREG-1757, Volume 2, Revision 1 "*Consolidated Decommissioning Guidance - , Survey, and Determination of Radiological Criteria"* (Reference 2.1 , and NUREG-1575, "*Multi-Agency Radiation Survey and Site Investigation Manual"* (MARSSIM, Reference 2.2 .

This procedure applies to all personnel performing RA and RASS survey package development and/or implementation, data review and sample plan closeout.

# 2. REFERENCES

**2.1.** NUREG-1757, "Consolidated NMSS Decommissioning Guidance - , Survey, and Determination of Radiological Criteria" Volume 2, Revision 1 – September 2002

**2.2.** NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM) – August 2000

**2.3.** **LC-QA-PN-001** "Quality Assurance Project Plan (QAPP) for FRS"

**2.4.** **RS-TD-313196-003** "La Crosse Station Historical Site Assessment"

**2.5.** LaCrosse*Solutions* Technical Support Document **RS-TD-313196-006** "Ludlum Model 44-10 Detector Sensitivity" – February 2012

**2.6.** ISO 7503-1, "Evaluation of surface contamination - Part 1: Beta-emitters (maximum beta energy greater than 0.15 MeV) and alpha-emitters"

**2.7.** Decker memo, "Minimum Detectable Activity Calculations" August 27, 2012

# 3. GENERAL

## 3.1. Responsibilities

3.1.1 RP FRS Manager – is responsible for:

1.) Providing overall guidance and support for the development and implementation of RA and RASS sample plans.

2.) Reviewing and approving all RA and RASS sample plans.

3.1.2 FRS Supervisor– is responsible for:

1.) Preparing RA and RASS sample plans.

2.) Ensuring RA and RASS surveys are conducted in accordance with approved survey and sampling plans, procedures, and work instructions.

3.) Providing technical direction and guidance to field survey and sampling activities.

4.) Controlling and implementing sample plan instructions during field activities.

5.) Providing daily supervision and guidance to field survey and sampling crews and performing quality checks of field activities.

6.) Overseeing preparation of samples for transfer to on-site or off-site laboratories.

7.) Ensuring all necessary instrumentation and other equipment is available to support survey activities.

3.1.3 Graphics/GPS Specialist – is responsible for:

1.) Preparing survey maps, layout diagrams, composite view drawings and other graphics as necessary to support survey design and reporting.

2.) Interacting with the FRS Supervisor regarding the preparation of maps, diagrams and other graphics which present survey units and sample or measurement locations.

3.1.4 FRS RPT – is responsible for:

1.) Obtaining and documenting survey measurements in accordance with the sample plan instructions.

## 3.2. Definitions

3.2.1 Biased Measurements – Measurements performed at locations selected using professional judgment based on unusual appearance, location relative to known contamination areas, high potential for residual radioactivity, general supplemental information, etc.

3.2.2 Measurement – 1) the act of using a detector to determine the level or quantity of radioactivity on a surface or in a sample of material removed from a media being evaluated, or 2) the quantity obtained by the act of measuring.

3.2.3 Minimum Detectable Concentration (MDC) – The minimum detectable concentration is the a priori activity level that a specific instrument and technique can be expected to detect 95% of the time. When stating the detection capability of an instrument, this value should be used. The MDC is the Detection Limit, multiplied by an appropriate conversion factor to give units of activity concentration.

3.2.4 Sample Plan – Sampling plans are prepared for each survey unit independently and contain, at a minimum, survey instructions, the number and location of survey measurements and samples, survey maps, instrumentation requirements, and safety requirement as necessary.

3.2.5 Survey Unit - The study area consisting of structures or land areas of specified size and shape for which a separate decision will be made to judge whether the remedial action has achieved the site-specific reference-based cleanup standard for the designated pollution parameter. Survey units are generally formed by grouping contiguous site areas with a similar use history and the same classification of contamination potential.

## 3.3. Acronyms:

**ALARA** - As Low As Reasonably Achievable

**CoC** - Chain-of-Custody

**DCGL** - Derived Concentration Guideline Level

**DQO** - Data Quality Objectives

**FRS** - Final Radiation Survey

**GPS** - Global Positioning System

**HSA** - Historical Site Assessment

**HTD** - Hard-to-Detect

**MARSSIM -** Multi-Agency Radiation Survey and Site Investigation Manual

**MDC**- Minimum Detectable Concentration

**NRC** - U.S. Nuclear Regulatory Commission

**QA** - Quality Assurance

**QAPP -** Quality Assurance Project Plan

**RA** - Radiological Assessment

**RASS** - Remedial Action Support Survey

**LCSRP**- LaCrosse Station Restoration Project

## 3.4. Precautions, Limitations, and Prerequisites

### 3.4.1 Precautions

1.) Documents and databases containing survey data and survey records are Quality Assurance (QA) records when complete. Positive control of these records shall be maintained until such time that they are forwarded to Records Management.

2.) When documenting survey information, all personnel shall ensure that all QA records are of good quality and legible. Legibility is determined to be readable and reproducible.

3.) The FRS Supervisor tasked with the development and implementation of multiple RA or RASS sample plans must be aware that it is possible that duplicate sample/measurement numbers may be generated when using the guidance for designating a unique sample identification number in accordance with the "Sample & Measurement Unique Identification Designation" presented in Attachment 1. Consequently, the FRS Supervisor must be vigilant to ensure that this does not occur.

### 3.4.2 Limitations

1.) Survey instrumentation and analytical laboratory equipment and procedures should be selected based on detection capabilities for the expected contaminants and their quantities. The instruments and detectors selected for direct measurements and scanning should be capable of detecting, at a minimum, the gross gamma, beta-gamma and/or alpha activity to a MDC of 50% of the applicable action level.

2.) All RA or RASS direct measurements and/or samples will be given a unique sample identification number in accordance with the Sample & Measurement Unique Identification Designation presented in Attachment 1.

3.4.3 Prerequisites

1.) All survey or counting instruments used to produce RA or RASS survey data shall be in current calibration and verified to be operational.

### 3.5. Records

3.5.1 Radiological Assessments and Remedial Action Support Surveys (RASS)-Attachment 3

## 4. PROCEDURE

### 4.1. General

4.1.1 Remedial Action Support Surveys (RASS) are conducted to support remediation activities.

4.1.2 Radiological Assessments (RA) are conducted to;

1.) Determine when a survey unit is ready for FRS,

2.) Update data as necessary to use for FRS survey design.

4.1.3 The documented results of RA and RASS surveys shall be placed in the FRS folder for the open land or structural survey units that is pertinent to the area and/or items surveyed and documentation shall be controlled in accordance with the record quality requirements of LaCrosse*Solutions* LC-QA-PN-001 "Quality Assurance Project Plan (QAPP) for FRS" (Reference 2.3).

**NOTE**

**Other formats may be used to document RA or RASS survey design and results provided that the same information is presented as in the Attachments noted below.**

4.1.4 All attachments described in this procedure may be generated electronically. If electronic attachments are used, the physical layout of the attachment may be modified provided the intent described in this procedure is not changed.

### 4.2. Sample Plan Development

4.2.1 Initiate Attachment 3, "RA/RASS Survey Design" for the applicable survey unit.

4.2.2 Complete the Description section, providing the following;

1.) The type of survey (RA or RASS).

**NOTE**

**Sample plans will be numbered in numerical sequence for each type (RA or RASS) of survey in each individual survey unit. For example, if three (3) RASS surveys have been previously worked in a survey unit, then the next sample plan generated for that survey unit would be numbered #04.**

2.) The next sequential sample plan number for the survey unit.

3.) Survey Area Number and Description.

4.2.3 Designate the type of survey unit.

**NOTE**

**The "LaCrosse Station Historical Site Assessment" (HSA) (Reference 2.4 established the initial survey unit classification for each survey unit. Radiological survey data from surveys, operational surveys in support of D&D, routine surveillance, and any other applicable survey data may provide indications that would cause an increase in survey area classifications (for example, from Class 3 to Class 2 and from Class 2 to Class 1) until the time of commencement of the FRS. Final classification is performed and verified as a DQO during FRS design.**

4.2.4 Designate the current classification of the survey unit.

4.2.5 Denote the reason for performing the survey.

1.) RA surveys are performed to:

A. Determine if the radiological conditions in an area or structure are suitable for performing FRS.

B. Update the existing survey results with additional survey data.

2.) RASS surveys are performed to:

A. Support remediation of a structure that will be subjected to FRS.

B. Support guided remediation in an excavation of impacted soils.

C. Support pre-demolition surveys of structures that could impact a previously characterized structure or open land survey unit.

4.2.6 State the Action Levels applicable to the survey.

**NOTE**

**The action levels for gross activity (static or scan) should be set at an observed reading of elevated activity above background where an action, such as reclassification, performing an additional investigation or performing additional remediation would be required. This action level may be based on the sensitivity of the instrument used, an ALARA criterion for the remediation of structural surfaces or an adjusted gross DCGL for soils.**

1.) If static measurements will be taken during the survey, then state the action level for static measurements and the appropriate units.

2.) If scan measurements will be taken during the survey, then state the action level for scan measurements and the appropriate units.

**NOTE**

**The action level for isotopic activity (gamma-emitters or beta/alpha-emitters) is typically the DCGL for the radionuclide(s) of concern.**

3.) If sample(s) of a media will be taken, then denote the type of analysis that will be performed.

A. If gamma spectroscopy analysis will be performed, then denote the desired isotopic MDC for Cs-137 and Co-60.

B. If media will be sent for analysis for Hard-to-Detect (HTD) and/or Transuranic radionuclides, then denote the radionuclides of interest.

**NOTE**

**The type(s) of measurements and/or samples and the necessary sample/measurement population size will be determined by the professional judgment of the responsible FRS Supervisor.**

**NOTE**

**The number of measurement/sample(s) are a minimum population that will be taken. Additional measurement/sample(s) may be taken as necessary based upon the observed conditions or activities as the survey is being performed.**

4.2.7 Denote the minimum number of samples and/or measurements that are required to adequately address the objectives of the survey.

**NOTE**

**Static and Scan MDC for scanning structures and soil will be determined in accordance with the guidance provided in Attachment 2.**

4.2.8 Designate the radiological instrumentation and detectors that will be used to acquire field measurements and document the static and scan MDC.

1.) Denote the backgrounds used to calculate the static and scan MDC(s) in the "Notes" section.

**NOTE**

**The location of measurements and/or samples that will be taken will be determined by the professional judgment of the responsible FRS Supervisor.**

**Measurement/sample locations may be pre-determined or based on real-time observations as decommissioning activities occur (e.g. excavation, remediation, system removal, demolition, backfill and grading).**

**Consideration should be given to locations that exhibit the greatest potential for elevated radioactivity, including depressions, discolored areas, cracks, low point gravity drain points and actual or potential spill locations.**

4.2.9 Describe the location(s) of where measurement(s) and/or sample(s) will be taken.

**NOTE**

**Pre-determined measurement/sample location(s) may be selected at random, using a systematic approach or biased.**

**Chosen location(s) may be physically marked using flags and/or marking paint or denoted by using Global Positioning System (GPS) coordinates.**

1.) If measurement/sample locations are pre-determined, then denote how the locations will be selected and marked.

2.) If measurement/sample locations will be selected based on real-time observations, then describe the criteria that should be employed to determine when and where a measurement/sample should be taken.

### 4.3. Sample Plan Survey Instructions

**NOTE**

**Survey instructions may be provided without using RA/RASS Survey Design (Attachment 3) provided all the applicable items of the Survey Instruction attachment are included.**

4.3.1 Complete the Survey Instructions section of RA/RASS Survey Design (Attachment 3). The types of instructions that may be specified include, but are not limited to the following:

1.) Description of potential safety hazards that may be encountered during performance of the survey including any required Personal Protective Equipment, safety sampling and/or safety surveillances.

2.) A list of all equipment and instrumentation required to perform the survey, as well as applicable procedural references.

3.) Identified areas, conditions or constraints where sampling or surveying may not be possible and alternative solutions to support survey requirements if these obstacles are encountered.

4.) Specific instructions for performing sampling, scans, total surface contamination measurements, loose surface contamination measurements or special measurements including:

A. <u>Area (in square meters) and location for surface scans.</u>

B. Specific scanning instructions including scan speed, pattern (e.g., serpentine), alarm set-points, action levels, background check, etc.

C. Instructions for background correction if applicable.

D. Count times for static measurements.

E. Desired depth and volume requirements for surface and subsurface soil samples.

F. Directions for taking water, sediment or vegetation samples as necessary.

5.) Instructions for quality control (e.g., techniques to prevent cross-contamination, proper sampling, and labeling techniques).

6.) Action(s) to be performed if an action level(s) is exceeded.

7.) Documentation requirements (e.g., survey map, documentation of anomalies).

8.) Chain-of-Custody (CoC) instructions for media samples.

9.) Any areas of interface where the progress of the survey will be contingent on interaction or support from another department or group (e.g., security notification, man-lift support, scaffold erection support, excavation or soil loading support, etc.).

## 4.4. Sample Plan Approval

4.4.1 When the sample plan is complete, the Attachment 3 will be reviewed and signed by the FRS Supervisor and then forwarded to the RP FRS Manager for approval.

4.4.2 The RP FRS Manager will signify approval of the sample plan by signing Attachment 3.

## 4.5. Sample Plan Implementation

4.5.1 FRS Supervisor shall perform a pre-survey briefing with the FRS Technicians assigned to execute the sample plan during which the survey instructions and safety issues will be reviewed.

4.5.2 FRS Technicians shall perform surveys in accordance with the survey instructions contained in the sample plan.

1.) If a situation is encountered in which survey instructions cannot be followed as written, then contact the responsible FRS Supervisor for resolution.

4.5.3 FRS Technicians shall create a RA/RASS Field Log (Attachment 4) for the survey. The type(s) of information that may be documented in the RA/RASS Field Log (Attachment 4) include, but are not limited to the following:

1.) A description of the physical conditions encountered.

2.) Observed background as well as obvious sources contributing to background from adjacent areas.

3.) Instrument(s) and detector(s) used, serial numbers and calibration date(s).

4.) Changes in measurement/sample location(s) due to encountered obstacle(s) and/or physical constraint(s).

5.) A description of location(s) or item(s) surveyed where the applicable action level(s) were exceeded, the results of any investigation(s) and any action(s) taken as a result.

4.5.4 FRS Technicians shall denote on a survey map the location of all measurement/sample location(s) and area(s) scanned.

4.5.5 When the survey and all investigations are complete, FRS Technicians shall forward all completed RA/RASS Field Log (Attachment 4), survey maps, instrument download report(s) and sample analysis report(s) to the FRS Supervisor.

4.5.6 The FRS Supervisor shall review the completed documents for completeness and accuracy. When the review is satisfactory, the completed survey will be forwarded to the responsible FRS Supervisor for sample plan closure.

**4.6. Sample Plan Closure**

4.6.1 The FRS Supervisor shall perform an evaluation of the sample plan to determine if survey results are acceptable and complete. The review should include, but is not limited to the following:

1.) Ensuring that survey measurements are recorded in units appropriate for comparison to the applicable Action Levels.

2.) Reviewing all laboratory analysis reports from the analysis of media samples.

3.) Reviewing the counting parameters of survey measurements and analytical results of sample media to ensure that the count times used resulted in an MDC that is a minimum of 50% of the applicable action level.

4.) Comparing survey results to the applicable action level. If any survey result exceeded the applicable action level, then ensure that appropriate corrective actions were implemented.

4.6.2 When the survey has been reviewed and accepted, then the FRS Supervisor shall sign RA/RASS Survey Design (Attachment 3) and forward the package to the RP FRS Manager or designee for approval.

4.6.3 The RP FRS Manager will signify closure of the sample plan by signing Attachment 3.

## 5. ATTACHMENTS

**5.1.** Attachment, Sample & Measurement Unique Identification Designation

**5.2.** Attachment 2, Calculation of Static and Scan MDC

**5.3.** Attachment 3, RA/RASS Survey Design

**5.4.** Attachment 4, RA/RASS Field Log

# ATTACHMENT 1

## SAMPLE & MEASUREMENT UNIQUE IDENTIFICATION DESIGNATION

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | |

**Classification & Survey Area**

1st digit indicates type of Survey Area

**L** = Open Land Area
**B** = Structural Survey Area
**S** = System

2nd digit indicates Classification

**1** = Class 1
**2** = Class 2
**3** = Class 3
**4** = Non-impacted
**5** = Unassigned

3rd, 4th and 5th digits indicates Survey Area Number

(from Tables 6-1 and 6-2)

**Survey Unit Number & Sequence Indicator**

6th and 7th digits indicates Survey Unit Number

(from Tables 6-1 and 6-2)

The 8th digit indicate alphanumeric sequence

(Sequence A-J) allows the survey unit to be divided into 10 smaller survey units.

(Sequence K-Z) allows for up to 16 different survey instructions for a single survey unit.

**Survey and Measurement Type**

The 9th digit indicate the type of survey.

**A** = Assessment
**B** = Background
**S** = Scoping
**C** =
**R** = Remedial Action
**F** = FSS
**I** = Investigation
**V** = Verification
**Q** = QA/QC

The 10th digit indicates the type of measurement.

**B** = Background
**R** = Random
**S** = Systematic
**J** = Biased
**I** = Investigation
**V** = Verification
**Q** = QA/QC

**Surface Type**

The 11th digit indicates the type of surface where the measurement was taken.

**F** = Floor
**W** = Wall
**C** = Ceiling
**S** = System
**R** = Roof
**P** = Paved Road
**G** = Ground
**L** = Water

The 12th digit indicates the material composition of the surface where the measurement was taken.

**C** = Concrete
**M** = Metal
**W** = Wood
**B** = Cinder Block
**K** = Brick
**A** = Asphalt
**S** = Soil
**T** = Tar
**L** = Liquid

**Sample or Measurement No.**

The 13th, 14th and 15th digits indicate the alphanumeric measurement number

Sequentially, 001 through 999

**Media Type**

The 16th and 17th digits indicate the type of media that was sampled.

**SS** = Surface Soil
**SB** = Subsurface Soil
**SM** = Sediment
**WT** = Water
**LQ** = Other liquids besides water
**OL** = Oil
**CV** = Volumetric Concrete
**AV** = Volumetric Asphalt
**MT** = Metal
**PT** = Paint
**SW** = Smear Sample
**BD** = Beta Direct
**AD** = Alpha Direct
**GD** = Static Gamma measurement
**BS** = Beta Scan
**GS** = Gamma Scan
**JS** = Juncture Scan
**JD** = Juncture Direct
**PS** = Penetration Scan
**PD** = Penetration Direct

**ATTACHMENT 2**

**CALCULATION OF STATIC AND SCAN MDC**

Page 1 of 2

MDC is the minimum activity concentration on a surface or within a material volume, that an instrument is expected to detect (e.g., activity expected to be detected with 95% confidence). The MDC is dependent upon the counting time, geometry, sample size, detector efficiency and background count rate. For a portable instrument, MDC is calculated using two different methods depending on the mode of operation, static ($MDC_{static}$) or scanning ($MDC_{scan}$).

**Total Efficiency**

Instrument efficiencies ($\varepsilon_i$) are derived from the surface emission rate of the radioactive source(s) used during the instrument calibration. Total Efficiency ($\varepsilon_t$) is calculated by multiplying the instrument efficiency ($\varepsilon_i$) by the surface efficiency ($\varepsilon_s$) commensurate with the radionuclide's alpha or beta energy using the guidance provided in ISO 7503-1, *"Evaluation of surface contamination - Part 1: Beta-emitters (maximum beta energy greater than 0.15 MeV) and alpha-emitters"* (Reference 2.6) .

**Beta Scan Measurement MDC**

The formula used to determine the scanning MDC at the 95% confidence level is:

$$MDC_{scan} = \frac{d'(\sqrt{b_i} * \frac{60}{i})}{(\epsilon_t)\sqrt{p}(\frac{A}{100})}$$

| | | | |
|---|---|---|---|
| Where, | $MDC_{scan}$ | = | Minimum Detectable Concentration in dpm/100 $cm^2$ |
| | d' | = | index of sensitivity (1.38) |
| | i | = | observation interval (seconds) |
| | bi | = | background counts per observation interval |
| | εt | = | total efficiency |
| | p | = | surveyor efficiency (0.5) |
| | A | = | detector area in cm2 (not to exceed 126 cm2) |

The observation interval (*i*) is considered to be the amount of time required for the detector field of view to pass over the area of concern. This time depends upon the scan speed, the size of the source, and the fraction of the detector's sensitive area that passes over the source. The scan speed is based on one detector window width per second however; other scan speeds may be used. For the Ludlum Model 43-68 gas flow proportional detector, the window width is 8.8 cm resulting in a scan speed of ~3.5 inches per second. The floor monitor detector is the Ludlum Model 43-37 with a window width of 13.35 cm which results in a scan speed of 5.25 inches per second. For clarification of the MDC scan formula please refer to the Decker August 27, 2012 memo, which explains calculation of the background counts per observation interval.

**ATTACHMENT 2**
**CALCULATION OF STATIC AND SCAN MDC**

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**Direct Beta Measurement MDC**
Direct (static) measurements utilize the following formula:

$$MDC_{static} = \frac{\frac{2.71}{t_s} + 3.29\sqrt{\frac{R_b}{t_s} + \frac{R_b}{t_b}}}{\varepsilon_t \frac{A}{100\ cm^2}}$$

| | | | |
|---|---|---|---|
| Where, | MDCstatic | = | Minimum Detectable Concentration in dpm/100 cm2 |
| | ts | = | sample count time |
| | tb | = | background count time |
| | Rb | = | background count rate (cpm) |
| | εt | = | total efficiency |
| | A | = | detector window area (cm2) |

**Gamma Scan MDC**

The gamma scan MDC is discussed in detail in RS-TD-313196-003 "Ludlum Model 44-10 Detector Sensitivity" (Reference 2). This Technical Support Document (TSD) examines the gamma sensitivity for 5.08 by 5.08 cm NaI detectors to several radionuclide mixtures of Co-60 and Cs-137 using sand ($SiO_2$) as the soil base. The TSD derives the MDC for the radionuclide mixtures at various detector distances and scan speeds. The TSD model uses essentially the same geometry configuration as the model used in MARSSIM (Reference 2.2. RS-TD-313196-006 provides MDC values for the expected LCSRP soil mixture based on detector background condition, scan speed, soil depth (15 cm), soil density (1.6 g/cm$^3$) and detector distance to the suspect surface.

**ATTACHMENT 3**

**RA/RASS SURVEY DESIGN**

Page 1 of 2

**Description:**

**Survey Type** ☐ - RA ☐ - RASS **Sample Plan No.:** _____

**Survey Area No.:** _____ **Description:** _____

**Survey Unit No.:** _____ **Description:** _____

**Survey Unit Type:**

☐ - Open Land ☐ - Structure Interior ☐ - Structure Exterior ☐ - System

**Survey Unit Classification:**

Current Classification: ☐ - Non-Impacted ☐ - Class 3 ☐ - Class 2 ☐ - Class 1

**Reason for Survey:**

RA: ☐ - FSS Readiness ☐ - Update ☐ - Surveillance

RASS: ☐ - Remediation Support ☐ - Excavation Support ☐ - Demolition Support

**Radiological Action Level(s):**

☐ - Gross Activity

☐ - Static Measurement (units)

☐ - Scan Measurement (units)

- Alarm set-points for gross activity will be set at the appropriate action level plus the observed background for the area.

☐ - Isotopic Activity

☐ - Gamma Spectroscopy

☐ - Hard-to-Detect Radionuclide(s)

- Count times should be adjusted to achieve an isotopic MDC equal to or less than _____ pCi/gm for Cs-137 and Co-60.
- Radionuclides of Interest: _____

**Types and Number of Measurements/Sample(s):**

| | Minimum # | Type | | Minimum # | Type |
|---|---|---|---|---|---|
| ☐ | _____ | Surface Soil Sample(s) | ☐ | _____ | Swipe Sample(s) |
| ☐ | _____ | Subsurface Soil Sample(s) | ☐ | _____ | Static beta-gamma measurement(s) |
| ☐ | _____ | Sediment Sample(s) | ☐ | _____ | Static alpha measurement(s) |
| ☐ | _____ | Concrete Core Sample(s) | ☐ | N/A | Surface Scans (structures) |
| ☐ | _____ | Volumetric Concrete Sample(s) | ☐ | N/A | Surface Scans (soils) |
| ☐ | _____ | Volumetric Asphalt Sample(s) | ☐ | _____ | Other _____ |
| ☐ | _____ | Water Sample(s) | ☐ | _____ | Other _____ |

**Instrument(s) and Detector(s):**

| | Instrument Type: | Detector Type: | Static MDC: | Scan MDC: |
|---|---|---|---|---|
| 1 | _____ | _____ | _____ | _____ |
| 2 | _____ | _____ | _____ | _____ |
| 3 | _____ | _____ | _____ | _____ |
| 4 | _____ | _____ | _____ | _____ |

Note(s):

**ATTACHMENT 3**

**RA/RASS SURVEY DESIGN**

Page 2 of 2

**Description of Measurement/Sample Location(s):**

**Survey Instruction(s):**

**Survey Plan Approval:**

Prepared by: _____ Date: _____
FRS Supervisor

Reviewed and Approved by: _____ Date: _____
RP FRS Manager

**Survey Plan Closure:**

Reviewed by: _____ Date: _____
FRS Supervisor

Approved by: _____ Date: _____
RP FRS Manager

**ATTACHMENT 4**

**RA/RASS FIELD LOG**

**Description:**

**Survey Type** ☐ - RA ☐ - RASS **Sample Plan No.:** _____ **Date:** _____

**Survey Area No.:** _____ **Description:** _____

**Survey Unit No.:** _____ **Description:** _____