FINAL

FISCAL YEAR 2002 PLAN FOR THE ST. LOUIS FUSRAP NORTH COUNTY SITES

ST. LOUIS, MISSOURI

APRIL 2002

U.S. Army Corps of Engineers
St. Louis District Office
Formerly Utilized Sites Remedial Action Program

Science Applications International Corporation
An Employee-Owned Company

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Mr. James A. Mills, P.E.
U.S. Army Corps of Engineers, St. Louis District
Contracting Officer's Representative
CEMVS-ED-C
1222 Spruce Street
St. Louis, MO 63103

SUBJECT: Contract DACW43-00-D-0515, Task Order 0004
Transmittal of Final *Fiscal Year 2002 Plan for the St. Louis FUSRAP North County Site*

Dear Mr. Mills:

Enclosed is the final *Fiscal Year 2002 Plan for the St. Louis FUSRAP North County Site.* Additional copies of this document are being distributed to the individuals identified below.

Comments from members of your staff on the draft version of this document have been resolved and incorporated into this final version. If you have any questions or need additional information, please call Sherry Gibson at (314) 581-7767 or the undersigned at (314) 770-3010.

Sincerely,
SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Sherry E Gibson

for James R. Moos
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prepared by
U.S. Army Corps of Engineers, St. Louis District Office, Formerly Utilized Sites Remedial Action Program

with assistance from
Science Applications International Corporation
under Contract No. DACW43-00-D-0515, Task Order 0004

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

The purpose of this plan is to present the investigation methodology for returning St. Louis North County Site properties to normal use (i.e., free of unacceptable risk from radiological contaminants). The complete list of properties is presented in the *St. Louis FUSRAP North County Property Characterization Plan* (USACE, 2000a). The properties scheduled to be addressed in Fiscal Year 2002 (FY02) are presented in Table 1. These properties will be investigated to determine if they can be released or if additional characterization is necessary. In accordance with this plan, it is anticipated Steps 2.1 through 2.6 will begin for the properties in Table 1 during FY02. As a result, the properties may be released or may be subjected to additional investigation based on findings during these steps. Progress on individual properties within the scope of this plan may be affected by funding changes, discovery of previously unknown areas of significant contamination, lack of access agreements with property owners, or changes in priority based on other factors.

Table 1. Properties Scheduled to be Addressed in FY02

VP-1L	VP-34
VP-2L	VP-35
VP-3L	VP-36
VP-4L	VP-37
VP-5L	VP-38
VP-6L	VP-39
VP-13	VP-40
VP-19	VP-41
VP-20	VP-42
VP-21	VP-43
VP-22	VP-44
VP-23	VP-45
VP-24	VP-46
VP-25	VP-47
VP-26	VP-48
VP-27	VP-53
VP-28	VP-08(C)
VP-29	VP-40A
VP-30	10K53-0087
VP-31	Latty Creek W. of VP-01(L)
VP-31A	Latty Creek E. of VP-02(L)
VP-32	North County Roads
VP-33	Half Undesignated Haul Routes

2.0 GENERAL METHODOLOGY

The steps listed below represent the progression of activities that is anticipated for properties within the scope of this plan. This sequential process is presented graphically in Figure 1. Evaluation and verification activities will be performed in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) and are further described in the *FUSRAP Final Status Survey Plan for the St. Louis North County Vicinity Properties* (USACE, 1999).

2.1 ACCESS AGREEMENT

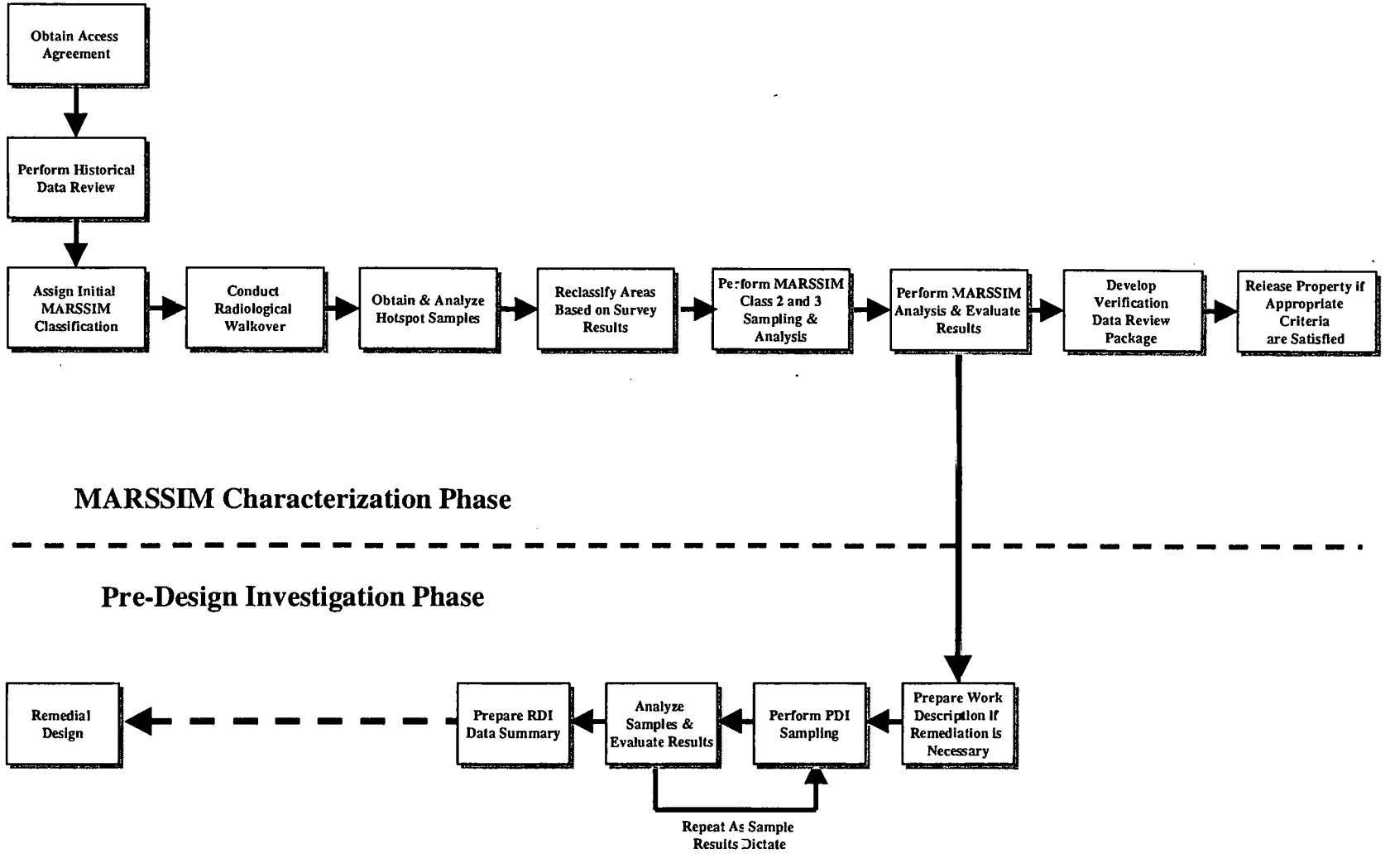
Before activities can begin at a property, an agreement must be reached with the property owner to allow access to the property. United States Army Corps of Engineers (USACE) Real Estate personnel will coordinate access agreements with each property owner. If access agreements for specific properties are not obtained within a reasonable time frame, progress at those properties will likely be delayed until an agreement can be reached.

2.2 HISTORICAL DATA REVIEW

Previous characterization, removal actions and associated reports will be reviewed to perform an initial assessment of each property. All data points from previous sampling campaigns will be reviewed to optimize necessary future fieldwork. Historical data points indicating significantly elevated radiological constituents may be further investigated to verify the presence of such contamination. Such investigation would typically consist of gamma walkover surveys and collecting soil samples at the same location and depth as the historical sample point, as well as taking at additional samples within close proximity of the historical location to assess the magnitude and extent of the elevated area. If the investigation of the historical sample point reveals data that are inconsistent with the historical data, the data from the historical location will be considered suspect and may not be used in future data assessments or remedial design.

Historical photographs will be examined to establish property boundaries and features, construction dates of existing buildings as well as areas covered with asphalt or concrete. Those areas that were beneath such cover during the time frame when contamination most likely occurred will be excluded from the assessment unless evidence exists that suggests contaminant migration into these areas. Chemical contamination is assumed to be incidental and co-located with the radiological soil contamination for the scheduled properties.

Figure 1. General Methodology for Characterization of St. Louis North County Site Properties



2.3 INITIAL MARSSIM CLASSIFICATION

Based upon review of information such as historical soil data, contaminated material haul routes, and exposed areas at the time of hauling, each property will be preliminarily classified in accordance with the MARSSIM guidelines. This initial classification will result in designation of MARSSIM Class 1, Class 2, and/or Class 3 areas within each property.

A survey unit is classified as a Class 1 if it meets the following criteria:

1. The area is or was impacted (potentially influenced by contamination);
2. The area has potential for delivering a dose or risk above criteria;
3. There is potential for small areas of elevated activity; and
4. There is insufficient evidence to classify the area as Class 2 or Class 3.

MARSSIM suggests that a Class 1 unit be limited to a maximum of 2,000 square meters (m^2) for a land area or a maximum of 100 m^2 for a surface structure. There may be more than one Class 1 unit at a site if the total land area, or building surface area meeting the requirements listed above is greater than 2,000 m^2 or 100 m^2, respectively.

A survey unit is classified as a Class 2 if:

1. The area is or was impacted;
2. The area has low potential for delivering a dose or risk above criteria; and
3. There is little or no potential for small areas of elevated activity.

MARSSIM suggests that a Class 2 unit be limited to a maximum of 10,000 m^2 for land areas or a maximum of 1,000 m^2 for a surface structure.

A survey unit is classified as a Class 3 unit if:

1. The area is or was impacted;
2. The area has little or no potential for delivering a dose or risk above criteria; and
3. There is little or no potential for small areas of elevated activity.

There is no limitation to the size of Class 3 units.

Based upon the results of the radiological walkover survey and soil samples (as described in Section 2.4), boundaries of the initial MARSSIM classification areas may be modified. For example, an area initially classified as Class 2 may become Class 1 based on the additional data obtained from the walkover survey and associated soil sampling.

2.4 RADIOLOGICAL WALKOVER SURVEY AND HOTSPOT SAMPLING

Thorium-230 (Th-230), radium-226 (Ra-226) and its progeny, Th-232 and its progeny, and processed natural uranium have associated gamma radiation, which can be used to identify the presence of residual contamination and estimate the concentrations of the various individual radionuclides potentially present at the North County properties. Field survey techniques are

relatively insensitive to Th-230 due to the low abundance of gamma radiation it emits. However, concentrations of mixtures of other primary radioactive contaminants can be detected by field methods. Surface scans for gross gamma radiation will be performed to identify locations of elevated external radiation, suggesting possible residual radiological contamination. Instrument response will be continuously monitored during scanning through use of the instrument audible signal. Scanning results will be recorded in counts per minute (cpm).

Screening gamma scans will be performed in accordance with USACE, 1999. On Class 2 and Class 3 properties where less than 100% of the accessible area is surveyed, scans should focus on areas most likely to have elevated levels of activity as determined by the survey supervisor. The surveyor will advance at a speed of approximately 2 feet per second (ft/s) [approximately 0.5 meters per second (m/s)] while passing the detector over the surface in a serpentine pattern. Audible response of the instrument will be monitored, and locations of elevated audible response will be noted. The ambient background for a survey unit will be determined at the start of the survey and a scanning response that is detectable above the background level (e.g., 2,000 cpm above background) will be set as the investigation level, indicating potential contamination. Locations exceeding the investigation level will be investigated and, if appropriate, sampled. Gamma scan data may also be recorded in real time, using position and data recording methods.

There may be locations where safety considerations or other restrictions prevent access for normal scanning activities. Reasonable efforts to scan such locations will be made. Alternative and innovative approaches (e.g., employing extension poles, mounting detectors on platforms with wheels or skids, placing detectors in protective sleeves, using excavating equipment to position and move detectors, etc.) will be considered. Table 2 lists radiological field survey instruments that will be used (functional and performance equivalents may be used, as determined by a Certified Health Physicist).

Table 2. Typical Gamma Scan Instruments

Description	Application	Approximate Detection Sensitivity (pCi/g)
Ludlum Model 44-10; 2-inch × 2-inch NaI gamma scintillation detector	Gamma scans of all surfaces	Th-230 (1122); Ra-226 (1.2); and U-238 (19.6)
Ludlum Model 2221; Scaler/ratemeter (with earphones)	Readout instrument for gamma scintillation detector	N/A

All 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 individual 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.

Based on the results of the radiological walkover survey, soil investigation samples may be taken. These samples would be biased to represent areas identified by the walkover survey as

exhibiting elevated levels of radioactivity. The number of investigation samples, if any, will be determined by the survey supervisor after review of the walkover survey findings.

2.5 MARSSIM CLASS 1, CLASS 2, AND CLASS 3 SOIL SAMPLING

Designated areas will be sampled and evaluated in accordance with USACE, 1999. Areas where historical data, walkover data, or other data (i.e., hotspot sampling data or MARSSIM Class 2 or Class 3 data) indicate the likely presence of radiological soil contamination at levels greater than the applicable limits will be sampled as MARSSIM Class 1 areas. Sample spacing for these areas will be at least as dense as the Class 1 spacing outlined in USACE, 1999. The intent of the Class 1 sampling is to provide a reasonable data set upon which to base remedial design, or to demonstrate that remediation is not necessary.

2.6 DETERMINATION OF POTENTIAL FOR RADIOLOGICAL IMPACT TO BUILDINGS

Assessments of the potential for radiological impact will be performed for buildings and structures located on the vicinity properties (VPs). The assessments will address the potential for radiological contamination on the building exteriors as well as the soil beneath the building foundations. The assessments will be conducted in accordance with USACE, 1999 and will based on factors such as proximity of the building to known soil contamination, dates of building construction, and other evidence that may suggest additional building evaluation.

2.7 PRE-DESIGN INVESTIGATION

Based on historical data, radiological walkover surveys, and soil sample results, contaminated areas will be further investigated to determine the vertical and horizontal extent of contamination. This pre-design investigation (PDI) will consist of soil sampling to provide a reasonable data set on which to base the remedial design. Data requirements to be satisfied by this additional sampling will be described in a property-specific work description. The work description document will describe data needs for each appropriate area of design. For example, it may be necessary to collect data regarding the nature and extent of contamination, waste profiling and/or soil blending, as well as structural, geophysical, and chemical information. Samples will be collected and analyzed for appropriate radiological constituents in accordance with the *Sampling and Analysis Guide for the St. Louis Site* (USACE, 2000b) and the *SAIC Site Safety and Health Plan for St. Louis-FUSRAP Activities* (USACE, 2000c).

Soil samples will be taken with hand-held augers, a hand-held motorized auger, a mechanized soil probe, a standard drill rig, or other appropriate method. The drill rig will be used for all depths >9.9 feet (ft). Table 3 shows the backfill requirements that apply to boreholes taken pursuant to this plan.

Table 3. Backfill for Exploration Holes

Boring Type	Boring Depth, d in feet	Typical Location	USACE-directed Special Location
Exploration Holes	d < 4.0'	Bentonitic chips*	Native Soil
Exploration Holes	3.9' < d < 10.0'	Bentonitic chips*	Strength Grout for backfill
Exploration Holes	d > 9.9'	High-solids Bentonitic Slurry Grout for backfill*	Strength Grout for backfill

d symbol for Boring Depth.

* Depending upon the type of surrounding surface, either a base course and pavement should be placed to match the site, or alternatively, the two feet nearest the surface requires native soil for backfill as a growing medium.

Initial boreholes will be established at the perimeter of areas suspected to be contaminated, based on the results of an evaluation of existing data. Samples will be taken in each borehole to delineate depth of contamination. Each sample will be a composite of the soil from an appropriate sampling interval (i.e., 6-inch, 1-ft). Data evaluation and additional sampling will continue until the edge of the contamination has been adequately defined on all sides or until property/physical boundaries are encountered.

A design for remediation of contaminated areas will be developed based on the data obtained from the PDI.

2.8 REMEDIAL ACTION

The selected remediation contractor will remediate the property, if necessary, in accordance with the remedial design.

2.9 FINAL VERIFICATION

After characterization or remedial activities are completed, each property will undergo final verification in accordance with the MARSSIM guidance and USACE, 1999. Documentation of successful remediation and final status survey will occur through the issuance of a property Final Status Survey Evaluation Report (FSSER).

3.0 REFERENCES

USACE, 1999. *FUSRAP Final Status Survey Plan for the St. Louis North County Vicinity Properties*, Regulatory Review Draft, August.

USACE, 2000a. *St. Louis FUSRAP North County Property Characterization Plan,* Rev.0, April.

USACE 2000b. *Sampling and Analysis Guide for the St. Louis Site*, Final, September.

USACE 2000c. *SAIC Site Safety and Health Plan for St. Louis – FUSRAP Activities, St. Louis, Missouri*, Final, January.

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