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St. Charles, MO 63303

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▸AUTHOR REITINGER, JULIE M ▸▸TO McCRACKEN, STEPHEN H ▸▸DATE 4-4-95

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ACTION ITEM TRACKING

INITIATE ACTION ITEM

INDIVIDUAL ASSIGNED TO ACTION DEPARTMENT

ACTION REQUIRED

DUE DATE / / ACTION ITEM LOG NUMBER

IF ADDITIONAL ACTION ITEMS ARE ATTACHED, HOW MANY?

CLOSE ACTION ITEM

ACTION ITEM LOG NUMBER INITIATING DOCUMENT DIN

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April 4, 1995

U.S. Department of Energy
Weldon Spring Site
Remedial Action Project
ATTN: Mr. Stephen H. McCracken
Project Manager
7295 Highway 94 South
St. Charles, MO 63304

SUBJECT: Contract No. DE-AC05-86OR21548
SOILS REVIEW SAMPLING PLAN FOR THE SOUTHEAST DRAINAGE AND SAMPLING NOTIFICATION

Dear Mr. McCracken:

Enclosed is the *Soils Review Sampling Plan for the Southeast Drainage* for your evaluation and approval. This plan was prepared to support scoping activities for removal action in the Southeast Drainage. The purpose of the sampling is to determine if specific radiologically elevated locations identified in the Oak Ridge Associated Universities soil survey of 1985 can be located and if these soils remain at elevated concentrations.

As verbally directed by Karen Reed of your staff, it is our intention to begin the location review and soil sampling activities described in the enclosed sampling plan on April 4, 1995. Sampling notification for this event, as required by the FFA, was made on March 31, 1995, by Walter Anderson. If you have any questions, please contact Julie Reitinger at extension 3522.

Sincerely,

James R. Powers

James R. Powers
Project Director

JRP/jmr/kmp

Enclosure: as stated

cc: Walker K. Love

SOILS REVIEW SAMPLING PLAN
SOUTHEAST DRAINAGE

1.0 Introduction

The Southeast Drainage is a natural drainageway with intermittent flow that traverses the Weldon Spring Conservation Area from the Weldon Spring Chemical Plant to the Missouri River (Fig. 1). During past operations at the chemical plant, the Southeast Drainage received discharge from the sanitary and process sewers and overflow from the raffinate pits. As a result, sediments and surface and subsurface soils in the drainage are contaminated with uranium, thorium, and radium.

This sampling plan has been developed to provide the current status on radiological concentrations in the drainage in consideration of a removal response. A location review and limited soil sampling effort is proposed.

2.0 Background

In 1985, the Oak Ridge Associated Universities (ORAU) surveyed the Southeast Drainage. A systematic survey was conducted at 100 meter intervals along the drainage where surface and subsurface soil samples were taken. In addition, a walkover survey with a sodium iodide survey meter was conducted and at locations where elevated readings were found, surface and subsurface samples were taken.

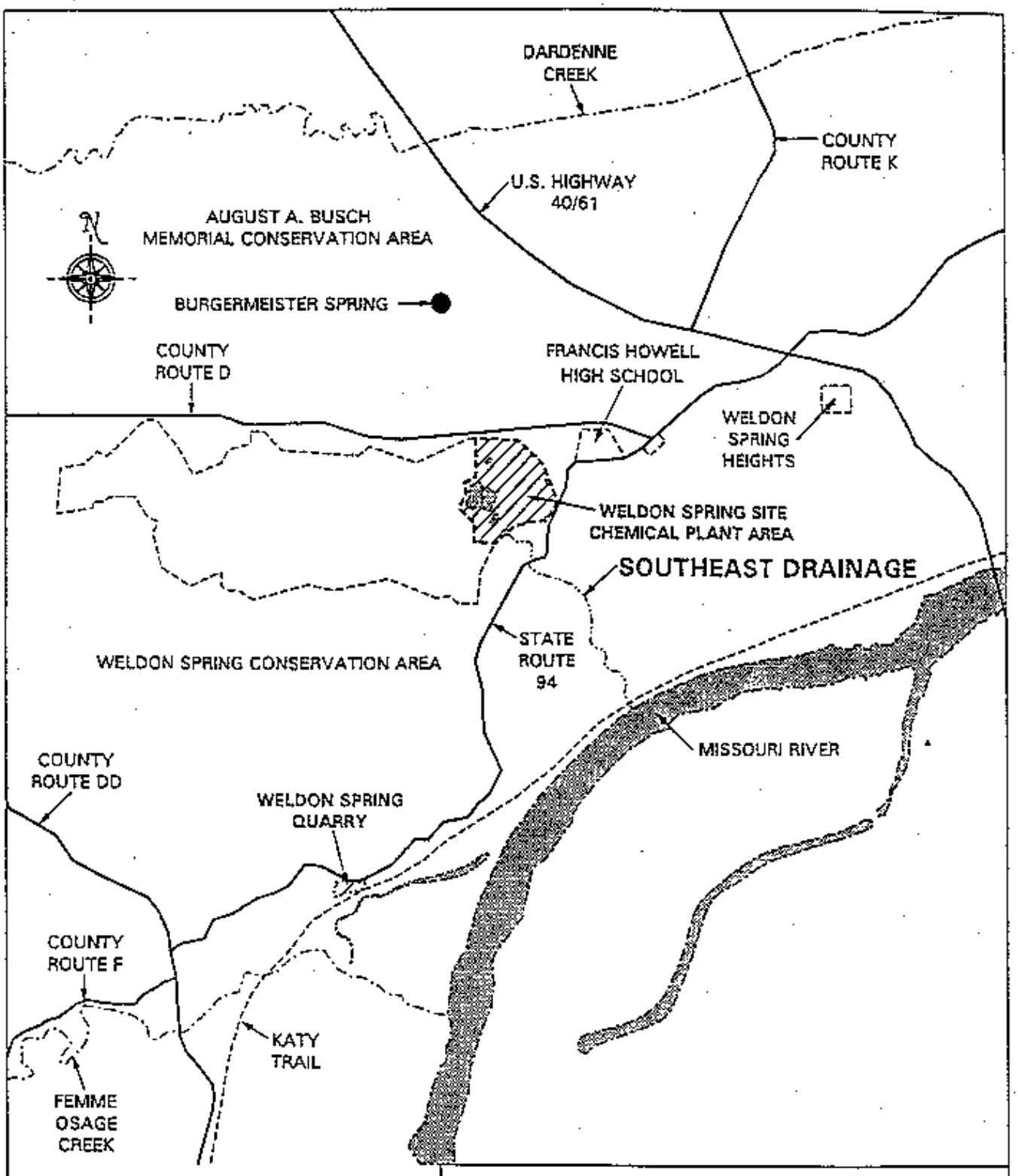
From this survey, several localized areas were found where radiological compounds were elevated above DOE's residual contamination guidelines. The ORAU survey classified the Southeast Drainage as vicinity properties DA4 and DOC7 (Figure 2), additional areas outside the main chemical plant boundary that contain elevated radionuclides.

The ORAU study is documented in two references, *Radiological Survey, U.S. Army Reserve Property, Weldon Spring Site, St. Charles County, Missouri* (E.J. Deming, January, 1986) and the *Radiological Survey of the August A. Busch and Weldon Spring Wildlie Areas, Weldon Spring, St. Charles County, Missouri* (A.J. Boerner, April, 1986).

3.0 Sampling Program

The specific data objective for this sampling is to determine what radiological concentrations currently exist at soil locations previously demarcated by ORAU. This data will be compared to the ORAU data collected in 1985 and will be used to perform a preliminary risk assessment and to determine whether a removal action is still warranted for the Southeast Drainage.

Topographical survey monuments were placed at various locations within the Weldon Spring area and coordinates were obtained



LOCATION OF THE SOUTHEAST DRAINAGE AND THE WELDON SPRING CHEMICAL PLANT AREA

0 1 MI
0 1.6 KM
SCALE

FIGURE 1

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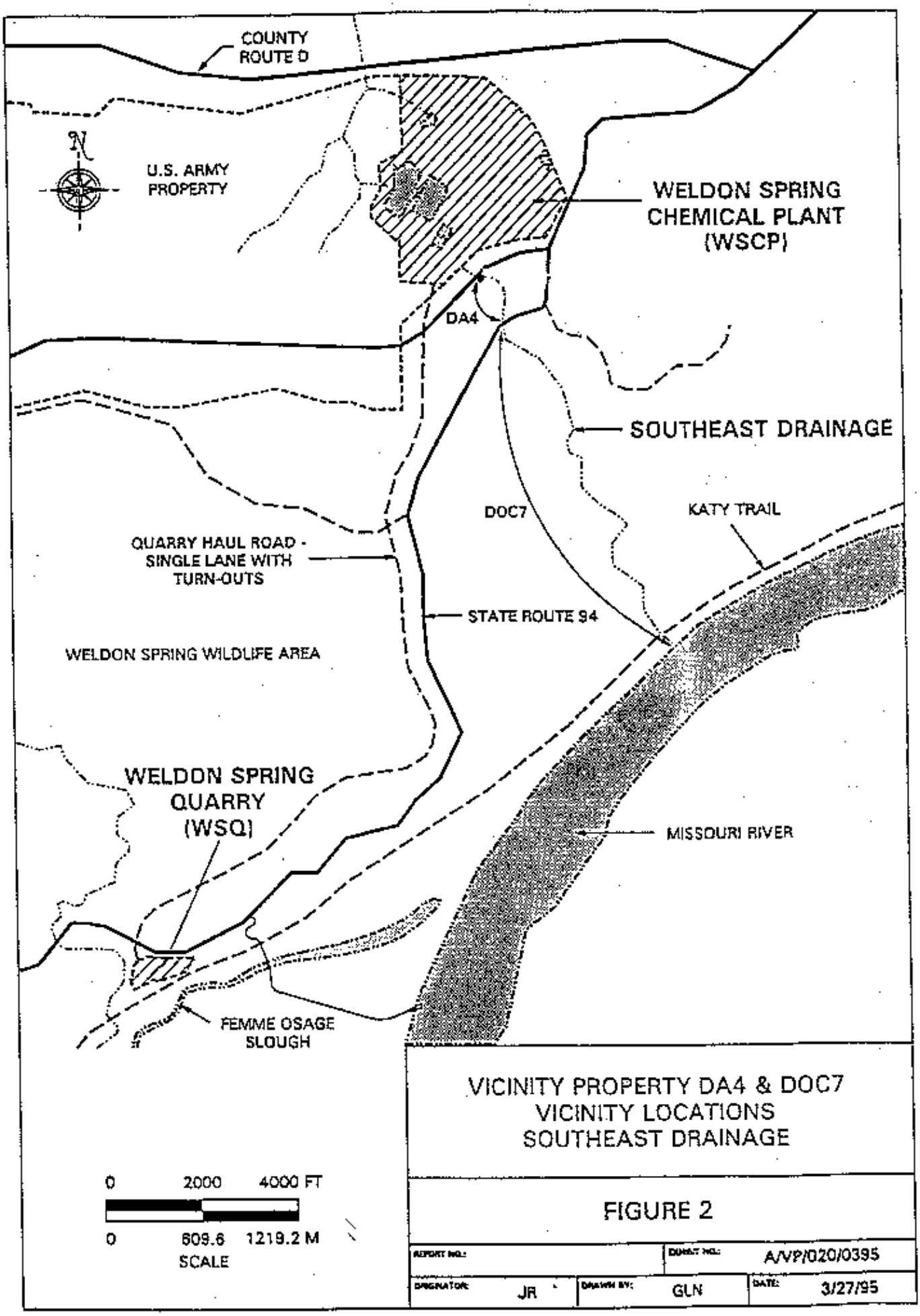

VICINITY PROPERTY DA4 & DOC7
VICINITY LOCATIONS
SOUTHEAST DRAINAGE

FIGURE 2

REPORT NO.:		DWG NO.:	A/VP/020/0395
DESIGNATOR: JR	DRAWN BY: GLN	DATE:	3/27/95

during the ORAU surveys. Recently, several of these survey monuments were found and therefore will be used in an attempt to locate areas were elevated soil concentrations were found by ORAU.

In addition, soil samples will be analyzed for chemical compounds. It is assumed that locations where elevated radiological concentrations are found are most likely to be locations where chemical constituents from the chemical plant discharges are also located. Several chemical samples have been previously collected in the drainage but not at the locations were ORAU found elevated radiological concentrations. This additional data will be used to assess risk levels for chemical compounds in the drainage.

The sampling activities proposed are:

- Identify ORAU locations within the drainage utilizing the ORAU monuments and survey interval identification system.
- Conduct sodium iodide spot surveys to find and delineate specific boundaries of ORAU areas.
- Collect soil/sediment samples from elevated locations and analyze for U-238, Ra-226, Ra-228, Th-230, and Th-232.
- Collect soil/sediment samples from elevated radiological locations and analyze for specific chemical compounds.

3.1 Survey Interval Identification

As part of the radiological studies conducted by ORAU, permanent topographical survey markers (monuments) were placed at the upper and lower portions of the Southeast Drainage. These survey markers were used as a starting point for an ORAU survey interval system that was used to identify soil sampling locations. Locations where elevated soil concentrations were found are identified according to this survey interval system. The permanent survey markers placed by ORAU were recently found by WSSRAP and will be used to reestablish the ORAU survey interval system.

The ORAU drainage interval system defined the boundaries of the two vicinity properties DA4 and DOC7 (Figure 2). The upper survey marker that will be used to reestablish this system is actually located at the upper boundary of vicinity property DOC7. DA4 is 305 meters in length and ends at the old Weldon Spring Training Area (WSTA) perimeter fence. DOC7 begins on the southern side of the fence where the upper survey marker is located, and continues to the Missouri River for 2140 meters. In addition, the start and end intervals where the drainage passes under Highway 94 have been identified as 100 and 113 meters respectively (Figure 3).

WSP60

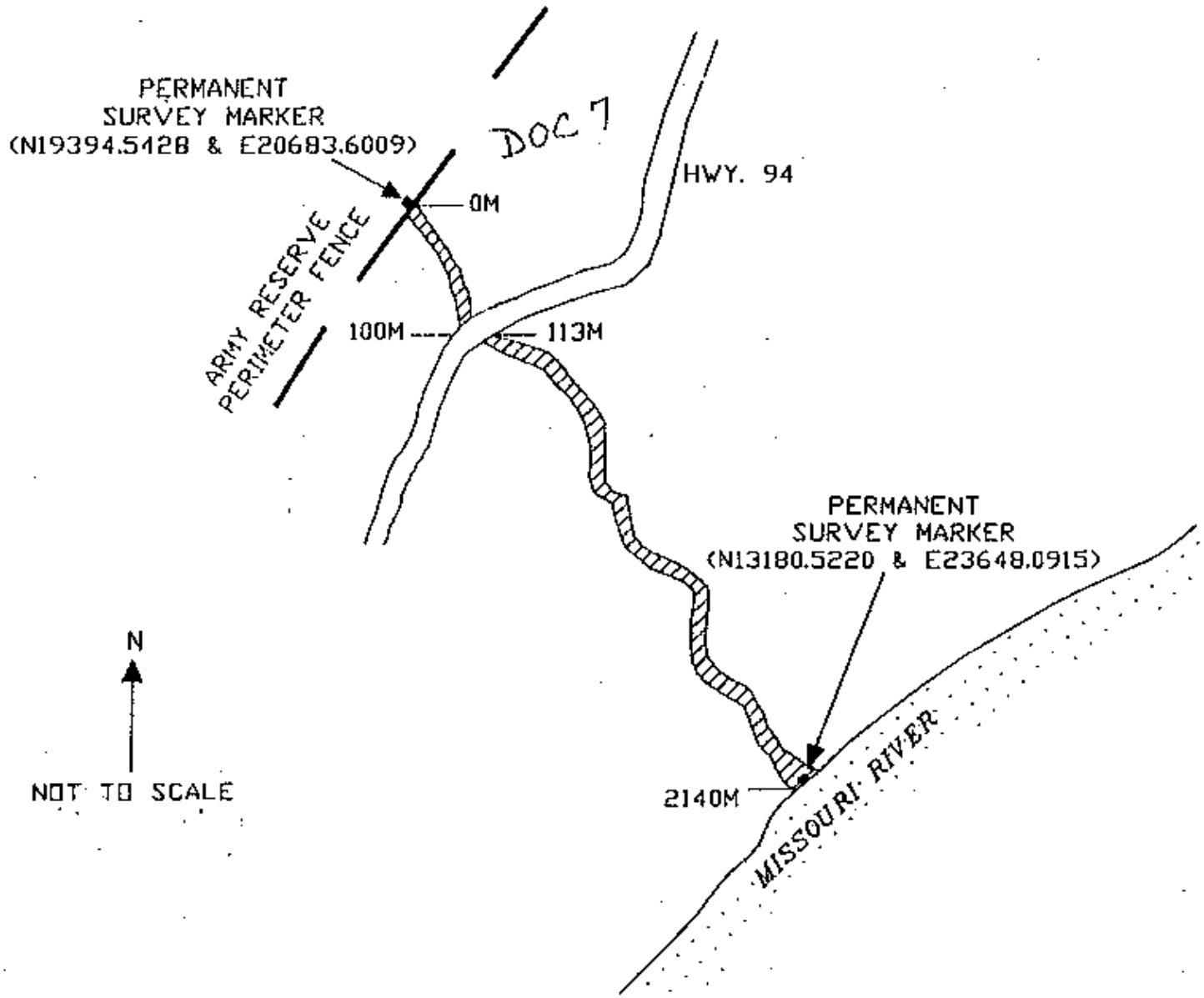

FIGURE 3:

Several locations have been selected to be relocated and are listed in Table 3-1. Starting at the location of the upper survey marker, a measuring tape with meter units shall be positioned in the center of the drainage. A wood stake will be placed within the drainage at the starting point. Progressing down the drainage, 100 meter intervals will be staked and marked. In addition, all locations listed in Table 3-1 will also be staked and marked.

In the case of identifying intervals within DA4, measuring will progress up the drainage from the survey marker with the 1st marker placed 5 meters from the survey marker and identified as 300 meters since the ending point of DA4 is 305 meters. Location DOC7 will only be staked and surveyed to the 1000 meter location for this survey.

Table 3-1 Soil Review Sampling Locations and Identification Numbers

Vicinity Property	Interval, Traverse	Radiological Sample Id [a]	Chemical Composite Sample ID
DA4	10,C	SO-495001	SO-495013
DA4	130,L	SO-495002	
DA4	190,4R	SO-495003	
DA4	305,R	SO-495004	
DOC7	65, C	SO-495005	SO-495014
DOC7	230,2R	SO-495006	
DOC7	320,1R	SO-495007	
DOC7	450,C	SO-495008	
DOC7	485,1L	SO-495009	SO-495015
DOC7	510,2R	SO-495010	
DOC7	730,4L	SO-495011	
DOC7	810,11L	SO-495012	

[a] The suffix -01 or -02 is also added to represent the sample depth as 0 to 6 inches or 6 to 12 inches, respectively.

From the centerline interval location, the traverse location (perpendicular to the drainage) listed in Table 3-1 will also be located. This traverse location was measured from the centerline (C) to the left (L) or Right (R) at approximately 1-2 meter lengths. Therefore, the interval and traverse location listed as 510, 2R is 510 meters down the drainage and 2 meters to the right

a subsurface soil sample taken. All rationale for no surface sample collection shall be recorded on the soil sampling form. All soil sampling and field information shall be recorded on the Soil/Sediment Sample Form in accordance with Procedure ES&H 4.4.5s, *Soil/Sediment Sampling*. Field logbooks will be maintained and completed in accordance with Procedure ES&H 1.1.4, *Logbook Procedure*.

Surface and subsurface soil samples will be collected using a stainless steel split spoon auger or trowel. Surface samples will be collected from ground surface to 6 in. in depth. Subsurface samples will be collected from 6 in. to bedrock or 12 in. in depth, if soil is relatively homogeneous. Each surface and subsurface sample will be prepared separately by mixing the sample in a decontaminated stainless steel pan. During sample compositing, any detritus (e.g., leaves and twigs) will be removed. A description of each sample (e.g., soil type, color, organic matter) will be recorded in field notes.

Soil samples will be identified according to ES&H Procedure 4.1.1 *Numbering System for Environmental Samples and Sampling Locations*. The assignment of sample identification numbers according to this procedure is listed in Table 3-1 and Table 3-2.

In addition to soil samples collected from elevated locations, six random sample locations will be selected from interval locations as listed in Table 3-2 and sampled as designated for surface and subsurface samples. These samples will be used as a control to provide readings and concentrations for non elevated locations.

Table 3-2 Random Sample Locations

Vicinity Property	Interval, Traverse [a]	Radiological Sample Id [b]	Chemical Composite Sample ID
DA4	100,C	SO-495016	SO-495022
DA4	225,L	SO-495017	
DOC7	100,R	SO-495018	
DOC7	300,L	SO-495019	SO-495023
DOC7	600,R	SO-495020	
DOC7	900,L	SO-495021	

[a] Final traverse location will be selected in the field based upon location of depositional areas.

[b] The suffix -01 or -02 is also added to represent the sample depth as 0 to 6 inches or 6 to 12 inches, respectively.

Approximately 1000 grams of soil will be collected for radiological analyses. Large rocks, gravel and other debris (wood) will be removed from the sample prior to placing in sample container. The sample will be placed in one plastic bag and sealed, and then placed in other plastic bag (double-bagged) with a sample label and be transported to WSSRAP for on-site analyses.

Soil from each location and traverse will be sampled and composited with other location and traverse samples according to Table 3-1 and 3-2. Only the 0 to 6 inches surface samples will be collected for chemical analysis. For each composite soil sample, the following containers will be used: one 250-cc amber glass wide-mouth jar for inorganics analysis, one 500-cc amber glass wide-mouth jar for PCBs, one 250-cc amber glass wide-mouth jar for nitroaromatics, one 500-cc wide-mouth bottles for metals. All samples for chemical analyses will be preserved by storing sample bottles in coolers and maintained at 4° Celsius. Sample chain-of-custody will be maintained in accordance with Procedure ES&H 4.1.2.

Soil samples will be analyzed for uranium-238, radium-226, radium-228, thorium-230 and thorium-232 at the WSSRAP using gamma spectrometry. Procedures developed for soil sampling, preparation, and analysis are documented in Procedure ES&H 2.6.9s/4, *Instructions for Calibration and Operation of the High Purity Germanium Detector* and ES&H 2.5.5, *Radiological Preparation Procedure for Soil Samples*.

Several soil samples that will be collected for chemical analyses will be analyzed at an off-site laboratory for the preliminary list of chemical parameter as shown in Appendix A. Appendix A also lists the required methods and detection limits for these samples. All soil samples will be shipped within one day of sample collection.

3.4 Quality Control Samples

As part of the WSSRAP quality assurance program, several quality control samples will be collected and analyzed as part of this sampling program. A minimum of 5% (1 in 20) of all soil samples will include collection of a field replicate, a blind duplicate, a matrix spike, a matrix duplicate, and a matrix spike duplicate. All quality assurance samples will be identified according to Procedure ES&H 4.1.1.

3.5 Equipment Decontamination

All sampling equipment from radiological sampling will be decontaminated between sampling locations. All equipment shall be wiped clean of visible soil or sediment and will be stored in a manner that maintains the cleanliness of the equipment.

Decontamination of equipment used for chemical soil sampling will be conducted in accordance with ES&H Procedure 4.1.3 *Sampling*

Equipment Decontamination. This requires that equipment be pressure washed between sampling or requires decontaminated equipment for each chemical composite sample. Final arrangements for equipment decontamination will be made prior to field sampling and according to ESH 4.1.3.

Water and other wastes generated during decontamination activities will be collected and disposed of in accordance with Procedure RC-30.

4.0 Sample Management

Samples will be collected, preserved, identified and managed in accordance with the *Sample Management Guide* (MKF and JEG, March 1995). Samples will undergo routine data verification and validation as required by this WSSRAP guide. Sample data will also be administered in accordance with the WSSRAP guide.

5.0 Proposed Schedule

This soils sampling plan for the Southeast Drainage will undergo technical review from March 30, 1995 through April 4, 1995. EPA/State Notification will be given on March 31, 1995. Field team training will commence on April 3, 1995 and conclude on April 4, 1995. Survey and sampling activities will begin on April 4, 1995 and end on April 12, 1995 when all survey and sampling activities described in this plan are anticipated to be complete. All sample analyses will require 2-week turnaround, which will result in data analysis and delivery by May 8, 1995. All data will be delivered to Argonne National Laboratory for analysis and interpretation by May 11, 1995.

6.0 Manpower Requirements

Jamie White is the team leader and is responsible for field oversight and training for this activity. Three field technicians will be requested by off-site authorization (OEA) to conduct all sampling activities for the drainage along with Jamie White. These personnel will report for work on April 3, 1995 to complete required GET and GERT training. On April 4 team members will gather to begin field mobilization and field work. Management of daily field activities will be made by the field team leader.

ES&H support will be required to prepare and analyze soil samples on the gamma spectrometry. In addition, several samples will be required for off-site analysis and will require shipping and laboratory coordination support.

Appendix A: Data Quality Requirements for Soil Review Sampling

CATEGORY	PARAMETER	ANALYTICAL	MDC* SOIL	PRECISION	ACCURACY
Inorganics	Nitrate	300.3/353.1	50	50	50
	Fluoride	300.3/340.1,2,3	50		
	Sulfate	300.3/375.1,.2	200		
PCBs	PCBs - TCL	CLP	CRQL	As Required by CLP	
Nitroaromatics	TNT	HPLC or GC	0.006	50	50
	2,4-DNT		0.006		
	2,6-DNT		0.002		
	1,3,5-TNB		0.006		
	1,3-DNB		0.018		
	Nitrobenzene		0.006		
Metals	Antimony	CLP-ICP	6	As required by CLP	
	Arsenic	CLP-AA	1		
	Barium	CLP-ICP	20		
	Beryllium	CLP-ICP	0.5		
	Cadmium	CLP-ICP	0.5		
	Lead	CLP-AA	0.3		
	Lithium	EPA 200.7	5	50	50
	Molybdenum	EPA 200.7	0.4	50	50
	Nickel	CLP-ICP	4	As required by CLP	
	Selenium	CP-AA	0.5		
	Thallium	CLP-AA	1		
	Vanadium	CLP-ICP	5		

* MDC; minimum detected concentration