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Room 2101  
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Subject: Draft Workplan Proposal to Perform Site Investigation Activities at the Federal Center located at 4300 Goodfellow Road in St. Louis, Missouri

Dear Mr. Santee and Mr. Hartshorn:

SCS Engineers (SCS) is pleased to present this Workplan Proposal to provide Site Investigation Activities at the St. Louis Federal Center located at 4300 Goodfellow Road, St. Louis, Missouri. We have based this proposal on information collected during the Preliminary Assessment/Site Investigation performed at the Center.

At the request of the U.S. General Services Administration (GSA), SCS initiated the performance of a Preliminary Assessment (PA)/Site Investigation (SI) of the St. Louis Federal Center located at 4300 Goodfellow, St. Louis, Missouri (Property). To date, SCS has performed the PA of the entire Center and an SI of Building 105 and associated structures. This Workplan Proposal summarizes the proposed activities associated with completing the SI on the balance of the Property.

## **PRELIMINARY ASSESSMENT**

In 2002, SCS Engineers initiated a PA of the Center including a detailed site inspection of Building 105. Specific attention to Recognized Environmental Concerns associated with the future occupancy of Building 105 was emphasized. The PA process performed at the site identified the need for a Center SI. A separate PA Report has been prepared by SCS which documents the findings of the PA. The PA identified the need for a removal action associated with the shooting range in the basement of Building 105. Concerns regarding the presence of lead associated with the firing range and the potential for human exposure or a release to the environment necessitated the removal action. The Shooting Range Remediation project was completed by SCS and has been documented in a Firing Range Remediation Report.

Other suspect environmental concerns were identified during the PA and subsequent data review process. These suspect environmental concerns are associated with the former use of the Federal Center as a munitions manufacturing Center and include potential environmental impacts to the Property by hazardous chemicals. The PA/SI process, as designed by EPA, will address these potential concerns. This would include a detailed assessment of former and current activities at the Property and would include intrusive sampling of all identified concerns. During the

performance of a PA/SI, potential environmental concerns are identified and assessed. The typical PA/SI Scope of Work would include conducting a file review, performance of a thorough site inspection, development of a sampling plan, execution of the data acquisition and analysis, and the interpretation and reporting of the results. The goals of the PA/SI process are to determine if a release of hazardous substances has occurred, if the hazardous substances are of sufficient toxicity and quantity to represent a risk to human health and the environment, and determine if human or environmental targets have, or have the potential to be, exposed to the hazardous substances at the site. The performance of a PA/SI at the Property will provide a thorough understanding of the environmental conditions at the Federal Center.

The SI activities we propose will include a combination of subsurface soil borings; building crawl space soil, wipe, and sump sampling; first and second floor wipe sampling; and intrusive sampling entailing concrete coring to access sample locations in Buildings 104, 105, and 112. Areas of environmental concern to be sampled include:

- .30 Caliber Production Unit - Buildings 102 and 103.
- .50 Caliber Production Unit – Buildings 104 and 105.
- Powder Storage & Handling – Buildings 102 D, 103 D, 104 E, and 105 E.
- Primer Storage and Handling – Buildings 102 E, 103 E, 104 F, and 105 F.
- Powder Bunkers – Buildings 102 F, 102 G, 102 H, 103 F, 103 G, and 103 H.
- Powder Bunkers – Buildings 104 G, 104 H, 104 J, 105 G, 105 H, and 105 J.
- Solvent & Lacquer Storage – Former Buildings 102 J & K, Buildings 103 J & K, Buildings 104 M & N, Buildings 105 M & N, and Building 137 B.
- Vehicle Maintenance/Water Softener – Former Building 104 K.
- Acid Storage – Former Building 104L.
- Electrical Substations – Buildings 108 A and Building 108 B.
- Tool & Gauge Shop – Building 110 & 110 Extension.
- Boiler House – Former Building 111.
- Lead Shop – Building 112.
- Garage Building – Building 115.
- Service Building – Building 122.
- Paint & Lacquer Mixing – Former Building 137 A.
- Pump House – Building 141 C.
- Tunnels.

Laboratory analysis will include targeted analytical schemes based on contaminants of concern and potential receptors. The following describes in detail the proposed SI Phase Scope of Work.

## **SUBSURFACE SOIL DRILLING AND SAMPLING**

Subsurface soil drilling and sampling will be performed by utilizing a truck-mounted Geoprobe unit equipped with a pneumatic hammer and hollow, 2-inch diameter probe rods. At each probe location, soil will be continuously sampled by driving two-foot sample barrels equipped with acetate liners into subsurface soils to a total depth of 20 feet below ground surface (bgs) or until

refusal is encountered. Refer to Figure 2 for the Subsurface Drilling and Sampling probe locations. Soil samples will be extracted from the acetate liners and screened with a photo-ionization detector (PID).

### **Logging of Subsurface Materials**

The materials encountered in the borings will be classified in the field and a log prepared for each boring by the SCS Geologist (Appendix B). The classification procedure will include texture descriptions of soils according to the Unified Soil Classification System (USCS). Included in the descriptions will be principal and minor soil constituents, moisture content, soil color, plasticity of cohesive soils, gradation of non-cohesive soils, consistency, and other visible features. Color is defined using the Munsell Color System. The results of field screening for VOCs will be presented on the drilling logs.

### **Analytical Sample Collection**

Each soil sample will be extracted from the acetate liner with a stainless steel sampling tool. Upon extraction from the acetate liners, soil samples will be immediately stored in clean, laboratory-supplied jars for analysis. Each sample consists of a discrete portion of soil obtained directly from the continuous soil sampler with a decontaminated stainless steel spatula. Once capped and sealed with a Teflon-lined lid, sample jars will be placed on ice in a cooler, and held until the end of the day of field investigation. One soil sample from each boring is to be submitted for laboratory analysis and sent under a chain-of-custody to Severn-Trent Laboratories in University Park, Illinois.

### **Chemical Analyses**

Soil samples may be analyzed by Severn-Trent for Volatile Organic Compounds (VOCs) using USEPA Method 8260B, for Semi-Volatile Organic Compounds (SVOCs) using USEPA Method 8270, for Total Metals using USEPA Method 6010B, Explosives using USEPA Methods 8330, PCBs using USEPA Methods 8082, Total Petroleum Hydrocarbons (TPH) using USEPA Method 8015, and Corrosivity using USEPA Method 9040.

### **Scope of Work**

A total of 45 subsurface soil borings are proposed during this Phase of the SI. Subsurface soil borings will be installed and appropriate laboratory analysis will be performed in the following areas:

#### **.30 Caliber Production Unit – Buildings 102 and 103**

A total of 5 borings will be installed associated with these areas. Soil samples will be analyzed for Explosives, Metals, and PCBs.

**.50 Caliber Production Unit – Building 104**

A total of 1 boring will be installed associated with these areas. Soil samples will be analyzed for Explosives, Metals, and PCBs.

**Powder Storage & Handling – Buildings 102 D, 103 D, and 104 E**

A total of 6 borings will be installed associated with these areas. Soil samples will be analyzed for Explosives, Metals, and PCBs.

**Primer Storage and Handling – Buildings 102 E, 103 E, 104 F**

A total of 3 borings will be installed associated with these areas. Soil samples will be analyzed for Explosives, Metals, and PCBs.

**Powder Bunkers – Buildings 102 F, 102 G, 102 H, 103 F, 103 G, and 103 H**

A total of 4 borings will be installed associated with these areas. Soil samples will be analyzed for Explosives and Metals.

**Powder Bunkers – Buildings 104 G, 104 H, 104 J, 105 G, 105 H, and 105 J**

A total of 2 borings will be installed associated with these areas. Soil samples will be analyzed for Explosives and Metals.

**Solvent & Lacquer Storage – Former Buildings 102 J & K, Buildings 103 J & K, Buildings 104 M & N, Buildings 105 M & N, and Building 137 B**

A total of 5 borings will be installed associated with these areas. Soil samples will be analyzed for VOCs, SVOCs, TPH, and PCBs.

**Vehicle Maintenance/Water Softener – Former Building 104 K**

A total of 1 boring will be installed associated with these areas. Soil samples will be analyzed for VOCs, Metals, and PCBs.

**Acid Storage – Former Building 104L**

A total of 1 boring will be installed associated with these areas. Soil samples will be analyzed for Metals and Corrosivity.

**Electrical Substations – Buildings 108 A and Building 108 B**

A total of 5 borings will be installed associated with these areas. Soil samples will be analyzed for TPH and PCBs.

**Tool & Gauge Shop – Building 110 & 110 Extension**

A total of 2 borings will be installed associated with these areas. Soil samples will be analyzed for TPH, Metals, and PCBs.

**Boiler House – Former Building 111**

A total of 2 borings will be installed associated with these areas. Soil samples will be analyzed for TPH, Metals, and PCBs.

**Lead Shop – Building 112**

A total of 2 borings will be installed associated with these areas. Soil samples will be analyzed for Metals and PCBs.

**Garage Building – Building 115**

A total of 4 borings will be installed associated with these areas. Soil samples will be analyzed for TPH, Metals, and PCBs.

**Service Building – Building 122**

A total of 1 boring will be installed associated with these areas. Soil samples will be analyzed for VOCs, Metals, and PCBs.

**Paint & Lacquer Mixing – Former Building 137 A**

A total of 1 boring will be installed associated with these areas. Soil samples will be analyzed for VOCs and Metals.

**Pump House – Building 141 C**

A total of 1 boring will be installed associated with these areas. Soil samples will be analyzed for Metals and PCBs.

**CRAWL SPACE SOIL SAMPLING**

Crawl space soil samples will be collected from the basement level of Building 102 (Areas A, B, & C), Building 102 D, Building 102 E, Building 103 (Areas A, B, & C), Building 103 D, Building 103 E, Building 104 (Areas A, B, C, & D), Building 104 E, and Building 104 F. Two soil samples will be collected from each Area (A, B, C, Buildings D, E, F) in Building 103 and 104 E (Day Care), while one crawl space soil sample will be collected from each Area in Buildings 102, 102 D, 102 E, 104, and 104 F. In addition, three crawl space soil samples will be collected beneath Building 12. A total of approximately twenty five (25) crawl space soil samples will be collected for laboratory analysis. Crawl space sample locations will be selected at random within each defined area. Each area will be divided and locations will be selected based on proximity to potential hazard exposure, changes in surface color or texture, proximity to process areas, or spatial considerations. Samples will be collected from an average depth of 0 - 6 “ bgs.

**Logging of Sample Parameters**

The color, texture, and moisture content of materials sampled will be classified in the field log for each sample location (Appendix B). The classification procedure includes texture descriptions of soils according to the Unified Soil Classification System (USCS). Included in the descriptions will be principal and minor soil constituents, moisture content, soil color, consistency, and other visible features. Color is defined using the Munsell Color System. Unusual odors or other indicators of potential contamination will be noted in the field logs.

### **Analytical Sample Collection**

Each sample will be collected from a pre-determined depth by removing the cover material to expose the layer to be sampled. Crawl space soil samples will be collected with a stainless steel sampling tool. VOC samples will be collected using USEPA Method 5035. Three discreet 5 gram soil samples will be collected in En Core sample containers using an En Core T-handle sampler. The 5035 Method requires the three sample containers to be placed in sealed bags and shipped overnight to the laboratory for preservation and analysis. Upon collection, crawl space soil samples will be immediately stored in clean, laboratory-supplied jars for analysis. Once capped and sealed with a Teflon-lined lid, sample jars will be placed on ice in a cooler, and held until the end of the day of field investigation. One soil sample from each sample location is submitted for laboratory analysis. Samples will be placed on ice and submitted under a chain-of-custody to Severn-Trent Laboratories in University Park, Illinois.

### **Chemical Analyses**

The crawl space soil samples from Building 103, 103 D, and 103 E will be analyzed for VOCs by USEPA Method 8260B, for SVOCs by USEPA Method 8270C, for Metals by USEPA Method 6010B, for Cyanide by USEPA Method 9014/9010B, for Phosphorous by USEPA Method 4500PE, for PCBs by USEPA Method 8082, and for Explosives by USEPA Method 8330. The samples from Buildings 102, 102 D, 102 E, 104, 104 E, and 104 F will be analyzed for Metals by USEPA Method 6010B, for Cyanide by USEPA Method 9014/9010B, for Phosphorous by USEPA Method 4500PE, for PCBs by USEPA Method 8082, and for Explosives by USEPA Method 8330. The samples from Building 112 will be analyzed for Metals by USEPA Method 6010B, and for PCBs by USEPA Method 8082.

### **WIPE SAMPLING**

Main floor and crawl space wipe samples will be collected from the basement and main floor levels of most Buildings at the Center. Wipe samples will be collected using ASTM, OSHA, and HUD protocols. All wipe samples will be collected from an area 100 cm<sup>2</sup> using cut gauze pads containing appropriate solvent/preservatives (Explosives-acetonitrile, PCBs-hexane, Metals-nitric acid). A total of approximately one hundred (100) wipe samples will be collected for laboratory analysis. Wipe sample locations will be selected at random within each defined area. Each area will be divided and locations will be selected based on proximity to potential hazard exposure, proximity to process areas, or spatial considerations.

### **Logging of Sample Parameters**

All sample locations will be documented in the field log and pictures of the sample locations will be taken.

## **Wipe Sample Collection**

Each wipe sample is collected from a predetermined location on the main floor and basement levels. Basement level wipe samples will be collected from the sides of concrete pillars or walls and will be collected from a height of three (3) feet above ground surface. All wipe samples will be collected by removing the pre-soaked gauze pad from the sample container and wiping an area of approximately 100 cm<sup>2</sup>. Explosives, PCBs, and Metals wipe samples will be collected from the same sample locations at the same elevation. Main floor wipe samples will be collected from exposed walls, concrete floors, and from exposed steel ceiling girders depending on sample location. All wipe samples will be collected by removing the pre-soaked gauze pad from the sample container and wiping an area of approximately 100 cm<sup>2</sup>. Explosives, PCBs, and Metals wipe samples will be collected from the same sample locations, i.e. walls, floors, ceilings. Upon collection, wipe samples will be immediately stored in the same laboratory-supplied jars for analysis. Once capped and sealed with a Teflon-lined lid, sample jars will be placed on ice in a cooler, and held until the end of the day of field investigation. Samples will be placed on ice and submitted under a chain-of-custody to Severn-Trent Laboratories in University Park, Illinois.

## **Chemical Analyses**

Wipe samples will be analyzed for Explosives by USEPA Method 8330, for Total Metals by USEPA Method 6010B, and for PCBs by USEPA Method 8082.

## **Scope of Work**

A total of 100 wipe samples are proposed during this Phase of the SI. Wipe samples will be collected and appropriate laboratory analysis will be performed in the following areas:

### **.30 Caliber Production Unit - Buildings 102 and 103 – Areas A, B, C**

A total of 22 wipe samples will be collected from these areas. Wipe samples will be analyzed for Explosives, Metals, and PCBs.

### **.50 Caliber Production Unit – Building 104 Areas A, B, C, D**

A total of 8 wipe samples will be collected from these areas. Wipe samples will be analyzed for Explosives, Metals, and PCBs.

### **Powder Storage & Handling – Buildings 102 D, 103 D, and 104 E**

A total of 16 wipe samples will be collected from these areas. Wipe samples will be analyzed for Explosives, Metals, and PCBs.

### **Primer Storage and Handling – Buildings 102 E, 103 E, 104 F**

A total of 12 wipe samples will be collected from these areas. Wipe samples will be analyzed for Explosives, Metals, and PCBs.

**Electrical Substations – Buildings 108 A and Building 108 B**

A total of 8 wipe samples will be collected from these areas. Wipe samples will be analyzed for PCBs.

**Tool & Gauge Shop – Building 110 & 110 Extension**

A total of 4 wipe samples will be collected from these areas. Wipe samples will be analyzed for Explosives, Metals, and PCBs.

**Lead Shop – Building 112**

A total of 12 wipe samples will be collected from these areas. Wipe samples will be analyzed for Metals and PCBs.

**Garage Building – Building 115**

A total of 3 wipe samples will be collected from these areas. Wipe samples will be analyzed for Explosives, Metals, and PCBs.

**Service Building – Building 122**

A total of 2 wipe samples will be collected from these areas. Wipe samples will be analyzed for Explosives, Metals, and PCBs.

**Pump House – Building 141 C**

A total of 1 wipe sample will be collected from these areas. Wipe samples will be analyzed for PCBs.

**Tunnel Walls – Entire Center**

A total of 12 wipe samples will be collected from these areas. Wipe samples will be analyzed for Explosives, Metals, and PCBs.

**BASEMENT SUMP SAMPLING**

Water samples will be collected from basement level sumps for laboratory analysis. Sumps to be sampled include the sumps in the basements of Buildings 102, 102 D, 102 E, 103, 103 D, 103 E, 104, 104E, 104 F, 112, and up to five additional tunnel sumps.

**Logging of Sample Parameters**

All sample locations will be documented in the field log and pictures of the sample locations will be taken.

**Analytical Sample Collection**

Each sump water sample will be collected using a stainless dipper. Upon collection from the sump, water samples will be immediately stored in clean, laboratory-supplied containers for analysis. Once capped and sealed with a Teflon-lined lid, sample containers will be placed on ice in a cooler, and held until the end of the day of field investigation. Samples will be placed



on ice and submitted under a chain-of-custody to Severn-Trent Laboratories in University Park, Illinois.

### **Chemical Analyses**

Water samples will be analyzed by Severn-Trent for VOCs, SVOCs, Total Metals, Explosives, and PCBs using USEPA Methods 8260B, 8270C, 6010B, 8330, and 8082, respectively.

### **TUNNEL STANDING WATER SAMPLING**

Water samples will be collected from pools of standing water within the tunnel complex for laboratory analysis. Standing water will be sampled when encountered within the tunnel complex. Particular emphasis will be placed on standing water that is associated with high risk areas.

### **Logging of Sample Parameters**

All sample locations will be documented in the field log and pictures of the sample locations will be taken.

### **Analytical Sample Collection**

Each standing water sample will be collected using a stainless dipper. Upon collection from the sump, water samples will be immediately stored in clean, laboratory-supplied containers for analysis. Once capped and sealed with a Teflon-lined lid, sample containers will be placed on ice in a cooler, and held until the end of the day of field investigation. Samples will be placed on ice and submitted under a chain-of-custody to Severn-Trent Laboratories in University Park, Illinois.

### **Chemical Analyses**

Water samples will be analyzed by Severn-Trent for VOCs, SVOCs, Total Metals, Explosives, and PCBs using USEPA Methods 8260B, 8270C, 6010B, 8330, and 8082, respectively.

### **STORM WATER INLET SEDIMENT SAMPLING**

Storm water sediment samples will be collected from twelve of the storm water inlets located at pre-determined sample locations. The Center has over 100 storm water inlets located throughout the complex. The storm water system combines with the sanitary system to complete a combined waste collection system. A total of twelve (12) storm water inlet samples will be collected for laboratory analysis. Sample locations will be selected at random within each production or process area and will be selected based on proximity to potential hazard exposure.

### **Analytical Sample Collection**

Each sample will be collected from a pre-determined inlet by removing the storm water inlet cover to expose the collection box for sample collection. Sediment samples will be collected with a sampling dipper. Upon collection, samples will be immediately stored in clean, laboratory-supplied jars for analysis. Once capped and sealed with a Teflon-lined lid, sample jars will be placed on ice in a cooler, and held until the end of the day of field investigation. Samples will be placed on ice and submitted under a chain-of-custody to Severn-Trent Laboratories in University Park, Illinois.

### **Chemical Analyses**

The sediment samples will be analyzed for VOCs by USEPA Method 8260B, for SVOCs by USEPA Method 8270C, for Metals by USEPA Method 6010B, for PCBs by USEPA Method 8082, and for Explosives by USEPA Method 8330.

### **WASTE TRENCH/VAULT/PIT SAMPLING**

Waste trench, vault and pit sludge samples will be collected from the anneal trench locations in the crawl spaces below Buildings 104 and 105. Samples will be collected from the anneal trench sump drain pipe by removing a section of the waste drain and collecting a sample of the contents. Building 112 contains five (5) concrete machine vaults and one concrete remelt pit which are completely sealed to the outside environment. The vaults and pits will be accessed and samples of their contents will be collected.

### **Analytical Sample Collection**

A sample will be collected from each vault/pit by coring through the concrete walls and inserting a stainless sampling tool to extract a sample of the contents. Upon collection, samples will be immediately stored in clean, laboratory-supplied jars for analysis. Once capped and sealed with a Teflon-lined lid, sample jars will be placed on ice in a cooler, and held until the end of the day of field investigation. Samples will be placed on ice and submitted under a chain-of-custody to Severn-Trent Laboratories in University Park, Illinois.

### **Chemical Analyses**

The trench samples will be analyzed for VOCs by USEPA Method 8260B, for SVOCs by USEPA Method 8270C, for Metals by USEPA Method 6010B, for PCBs by USEPA Method 8082, and for Explosives by USEPA Method 8330. The vault/pit samples will be analyzed for Metals by USEPA Method 6010B and for PCBs by USEPA Method 8082.

### **REPORT**

An SI Report will be prepared in draft form for your review which will include a description of all activities performed. The Report will identify the following: Site Description, Data Collection

April 2, 2003  
Draft SI Workplan  
Page 11

and Sampling Protocols, Results of Field Screening Analysis, Results of Sample Analysis, Boring Logs, Site Plan and Conclusions. Reports will also include analytical data sheets with QC and chain-of-custody forms. The report will be delivered to GSA in both paper and electronic formats.

SCS will conduct the SI for the subject property under the SCS GSA Schedule Contract No. GS-10F-0371K. The ESI will be conducted in accordance with generally accepted engineering practices. The purpose of the SI is to identify any remaining environmental issues related to the Hardesty Center. The estimated cost to perform the SI described above is \$ 160,885.

We look forward to continuing our working relationship with the GSA. Thank you for the opportunity to provide our services.

Very truly yours,

David G. Hempleman, P.E.  
Project Manager

David E. Brewer, P.G.  
Project Director  
SCS ENGINEERS

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