MTR
MANAGEMENT AND TECHNICAL RESOURCES, INC.

September 27, 2011

Mr. Lucas Berresford
Project Manager
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: Phase IV Delineation – Preliminary Findings
Phase V Delineation – Proposed Activities
Congaree River Sediments
Columbia, South Carolina

Dear Mr. Berresford:

This letter provides a brief summary of the recently completed fieldwork associated with the Phase IV delineation activities for the Congaree River project and also provides a recommendation for additional activities (i.e., Phase V). These preliminary findings were briefly discussed at the August 24, 2011 meeting between representatives of South Carolina Electric & Gas (SCE&G) and the South Carolina Department of Health and Environmental Control (SCDHEC). Also included herein is a summary of the current understanding of the spatial distribution of the tar-like-material (TLM) in the Congaree River.

PHASE IV - DELINEATION SUMMARY

The proposed Phase IV delineation activities were described in a letter submitted to SCDHEC dated August 3, 2011. The proposed activities were, by design, a continuation of the delineation efforts initiated by SCE&G to determine the extent of TLM in the Congaree River. The proposed Phase IV activities generally included:

- Evaluating the occurrence of TLM and/or other weathered material (OWM) within the river from below the Blossom Street bridge using manual techniques referred to as “wade and spade”; and
- Attempting to define the downriver extent of TLM/OWM;

Phase IV - Findings and Visual Observations

On August 10, 2011, a total of 23 locations were investigated between the Blossom Street bridge and the railroad trestles as shown on Figure 1. A total of five investigation locations (CR-24 through CR-28) were previously evaluated in July 2011 and as part of the Phase III activities. All of the investigation locations were located with a handheld GPS and the findings indicated the presence of TLM at seven locations (Figure 1).

On September 1, 2011 a reconnaissance was focused to two areas along a stretch of the Congaree River between the railroad trestles and existing dam/abandoned lock as shown on Figure 2. This evaluation employed the “wade and spade” approach that permitted inspecting numerous locations within the boundaries and was able to be completed because of the low river level. The Phase IV reconnaissance findings indicated TLM was not present in the two areas inspected (Figure 2).

Phase IV – Sediment Collection Activities

A total of four sediment samples (CR-1, CR-4, CR-7, and CR-9) were collected on August 10, 2011 (Figure 1). The sediment samples were collected using a pointed shovel referred to as a sharp shooter. The samples were

collected at randomly selected locations determined by field personnel. Each location was generally field-screened with a metal detector to confirm the absence of a magnetic anomaly before attempting to obtain the sample. Based on the previous "wade and spade" activities, a photo-ionization detector (PID) was not used since moisture from the river caused the instrument to malfunction. The field activities followed procedures described in the approved Delineation Work Plan ([DWP] MTR, September 2010).

The sediment and soil samples were submitted for analyses of benzene, toluene, ethylbenzene, and total xylenes (BTEX) and polynuclear aromatic hydrocarbons (PAH) via EPA Methods 8260B and 8270D, respectively. The samples were transported under standard chain-of-custody procedures to Shealy Environmental Services, Inc. (Shealy) located in West Columbia, South Carolina for laboratory analyses.

The analytical results are provided on Table 1, and Figure 1 summarizes the total BTEX and total PAH results. With the exception of CR-1, the constituents analyzed were non-detect. Three PAH constituents were detected in the sediment sample from CR-1 and included benzo(b)fluoranthene, fluoranthene, and naphthalene.

CURRENT UNDERSTANDING

Since September 2010, SCE&G has performed four separate investigations (Phase I through Phase IV) and several other field reconnaissance efforts to gain a better understanding of the potential extent of TLM in the Congaree River. In summary, the delineation efforts included (please refer to Figure 2):

- Phase I - September 2010: Investigated from the "1" line (established at the Gervais Street Bridge) to the "16" line. The findings were reported to SCDHEC on December 29, 2010;
- Phase II - February 2011: Investigated from the"17" line to the "19" line and unnamed tributary #1. The findings were reported to SCDHEC on June 6, 2011;
- Phase III - July 2011: Investigated from the "20" line to the "36" line and drilled 15 landside soil borings along the eastern shoreline. The "36" line is located approximately 400 feet downriver from the Blossom Street bridge. The preliminary findings from the Phase III investigations were reported to SCDHEC on August 3, 2011;
- Phase IV - August 2011: Investigated the area downriver from the "36" line to the railroad trestles. The findings from the Phase IV investigations are included herein; and
- Numerous additional "reconnaissance activities" have also been completed in conjunction with the various phases of investigations.

The findings and observations from the fieldwork are compiled on Figure 2, which depicts the sampling locations and the approximate known spatial extent of TLM. For discussion purposes, the spatial extent of TLM is characterized as either "continuous" or "discontinuous" and the distinction is determined by the spatial continuum of visual TLM observations. In summary, the current understanding of the spatial extent of TLM in the Congaree River includes the following:

- Continuous TLM: Extending from north to south (downriver direction), from the "4" to "18" lines and approximately 100 to 150 feet from the eastern shoreline. Continuous TLM is characterized by the visual presence of TLM at multiple contiguous or near-contiguous investigative points. Within the continuous TLM area, it is possible that the spatial continuity of TLM may be disrupted;

- Discontinuous TLM: Noted at several locations below the Blossom Street bidge and first observed at the “34” line (below the Blossom Street bridge) with the last observation currently near the “53” line. Discontinuous TLM is sporadic in occurrence and is characterized by limited spatial continuity;
- For both the continuous and discontinuous TLM areas, the TLM exhibits similar physical characteristics that includes a highly viscous to taffy-like appearance, typically has sediment as part of the matrix, and has a distinct tar-like odor; and
- An apparent transition zone is noted at the “19” line and likely represents the end of continuous TLM.

In addition, other observations noted while completing the fieldwork included “TLM fragments” and “OWM”. TLM fragments represent that fraction of TLM that was likely eroded from the continuous area (by fluvial action), transported downstream, and deposited. When encountered, the quantity of TLM fragments was typically limited, did not exhibit spatial continuity, nor did the TLM fragments possess the highly viscous or taffy-like consistency of TLM. Therefore, TLM fragments were noted when observed but are not considered to have spatial continuity or aerial extent. OWM refers to a substance encountered that has the physical appearance of a cinder-like material, notably different than TLM. Similar to TLM fragments, OWM is not interpreted to be widespread.

PHASE V DELINEATION - PROPOSED ACTIVITIES

Based on the Phase IV activities, the southern extent of TLM has not yet been determined or confirmed. As discussed during the August 24, 2011 meeting, both SCE&G and SCDEHC desire to investigate further downriver from below the Blossom Street bridge to:

- Define the southern extent of TLM;
- Better understand the potential occurrence of TLM downriver from the previously evaluated areas; and
- Collect representative samples in the deeper water, previously unable to be sampled via wade and spade techniques.

Therefore, the next phase of sediment investigation (Phase V) will focus on investigating the Congaree River from approximately 400 feet south of the Blossom Street bridge (“36” line) to potentially above the existing dam/former lock (“87.5” line), as shown on Figure 2. As before, the purpose of the Phase V investigation is to collect sediment samples at pre-determined locations to assess the potential presence or absence of TLM in the river sediments, especially below the “53” line, which currently represents the furthest downriver extent of visually discontinuous TLM.

As shown on Figure 2, the transect locations will generally be established at notable Congaree River features. The sediment investigation points are proposed at locations that appear to be conducive for potential TLM accumulation/occurrence. Based on the work completed to date, there appears to be a relationship between the presence of TLM and the bathymetric conditions (i.e., depth of water, river bottom contours, rocks and boulders, and other variations due to the water current or flow velocity).

Investigative Approach

The ability to investigate the Congaree River between the “36” to “87.5” lines is a function of the Congaree River level and the ability to safely navigate a boat from potential launch locations to the investigation points. The Phase I and Phase II investigations were performed from a pontoon boat equipped with a direct push

technology (DPT) drill rig. Given the anticipated river levels and subsequent surface water conditions, a pontoon boat cannot be safely navigated to the proposed investigation areas. Therefore, a specialized approach that includes using two "johnboats" equipped with a vibracore sampling device will be used. The johnboats will be physically attached to each other to form a "floating platform" for the sampling equipment. This approach will provide more flexibility to navigate the Congaree River within the study area.

Vibracore Drilling

Vibracore drilling uses induced oscillations to vibrate a metallic tube (typically 3- to 4-inch diameter aluminum). The vibrating metallic tube causes the unconsolidated sediment to liquefy along the surface of the tube, and along with some down pressure, permits advancement of the aluminum tube. Vibracore drilling works best in saturated unconsolidated media with a grain size range from clay to about coarse sands. Stiff clay, coarser grained sediments (e.g., gravels, cobbles, or boulder), and bedrock are not amenable to vibracore drilling. Based on the previous work in this stretch of the Congaree River, it appears that coarser grained material is present on the Congaree River bed and with depth, grained size decreases. Therefore, once the coarser grained riverbed sediments have been penetrated, it is expected that the deeper and finer grained sediments will be more easily penetrated. The metallic tube will be advanced until refusal is encountered. Upon withdrawal, the tube will be capped, and the coring location will be noted on the sampling tube. The cores will be transported to shore and transferred for processing at the Huger Street site, which is equipped with facilities more amenable to open the metallic tube and log the sample. Logging and screening will follow the procedures described in the approved DWP.

Investigation Locations

The proposed investigation locations are shown on Figure 2 and will be positioned along seven proposed transect lines, which are approximately perpendicular to the main Congaree River channel. As proposed, these transect lines will maximize spatial distribution of the investigation points while focusing on stretches of the river with relatively thick sediment deposition. The transect lines are labeled based on the approximate distance from the "37" line of the existing grid.

TLM has not been observed from the "19" to "33" lines, however, discontinuous TLM has been observed below the "33" line. Therefore, the intent of the proposed sampling locations is to span a long stretch of the river (below the "33" line) so that sediment samples can be collected in different bathymetric environments. Sediment coring locations along each transect line will start approximately 50 feet from the western shoreline and proceed across the river on an approximately 100-foot spacing. Similar to previous investigations, each sampling location will be defined with an alpha-numeric designation.

Sampling Approach

A total of seven transect lines are proposed between the Blossom Street bridge and the railroad trestles, from which coring locations will be established. A hierarchal approach to sediment sampling is proposed with the initial investigations focused to the "57", "64", and "71.5" lines. In the event that visual TLM is noted along these locations, the investigation will proceed further downriver along the "80" and/or "87.5" lines. Two upstream transects ("42" line and "49" line) will be investigated to provide additional data in that area, as time and river conditions permit. Since these transects are located in the main Congaree River channel, the ability to obtain representative core samples may be limited if sediment deposition is minimal or absent.

Sediment Logging and Analytical Samples

Three additional sediment samples for laboratory analyses are proposed and will include one sediment sample in the eastern segment of the "57" line and two sediment samples along the "71.5" line. In the event that TLM is observed at any of the investigation points along the "71.5" line, sediment samples for laboratory analyses will not be collected and sediment samples will instead be collected from the "80" line (assuming no TLM observations). The sediment cores will be logged, screened, and analyzed for the same list of parameters as those described in the DWP.

IDW Management and Decontamination

Investigative derived waste (IDW) will be managed as described in the DWP, with drums temporarily staged at the Huger Street site, pending disposal coordination. Dedicated aluminum tubes will be used for the vibracore sampling and therefore, will not require decontamination. Reusable sampling equipment will be decontaminated, if required, as described in the DWP.

SCHEDULE

Subject to SCDHEC approval, the investigation activities as described herein will be completed October 3-4, 2011. The actual fieldwork planned for these dates includes evaluating the "57", "64" and "71.5" lines, assuming favorable river conditions. The two-day sampling event is based on the limited near-term availability of the sediment sampling subcontractor that will provide the boats and sampling equipment. Follow-up sediment sampling activities are anticipated to complete the delineation efforts and these activities are tentatively scheduled for the week of October 24, 2011. As always, the completion of the sediment sampling activities will be dictated by the actual river conditions, the weather forecast and the extent of TLM observed in the river.

A complete delineation report will be developed and submitted to SCDHEC for review and approval following completion of the delineation work. Should you have any questions or require additional information, please contact Bob Apple at 919-819-2748 or me at 412-829-9650.

Sincerely,

Andrew R. Contrael
Senior Project Manger

Attachments

cc: B. Apple - SCANA
M. Ferlin - MTR

TABLE 1

SUMMARY OF PHASE IV SEDIMENT ANALYTICAL RESULTS
FOR SAMPLES TAKEN BETWEEN THE BLOSSOM ST. BRIDGE AND THE RAILROAD TRESTLES

Congaree River Sediments
Columbia, South Carolina

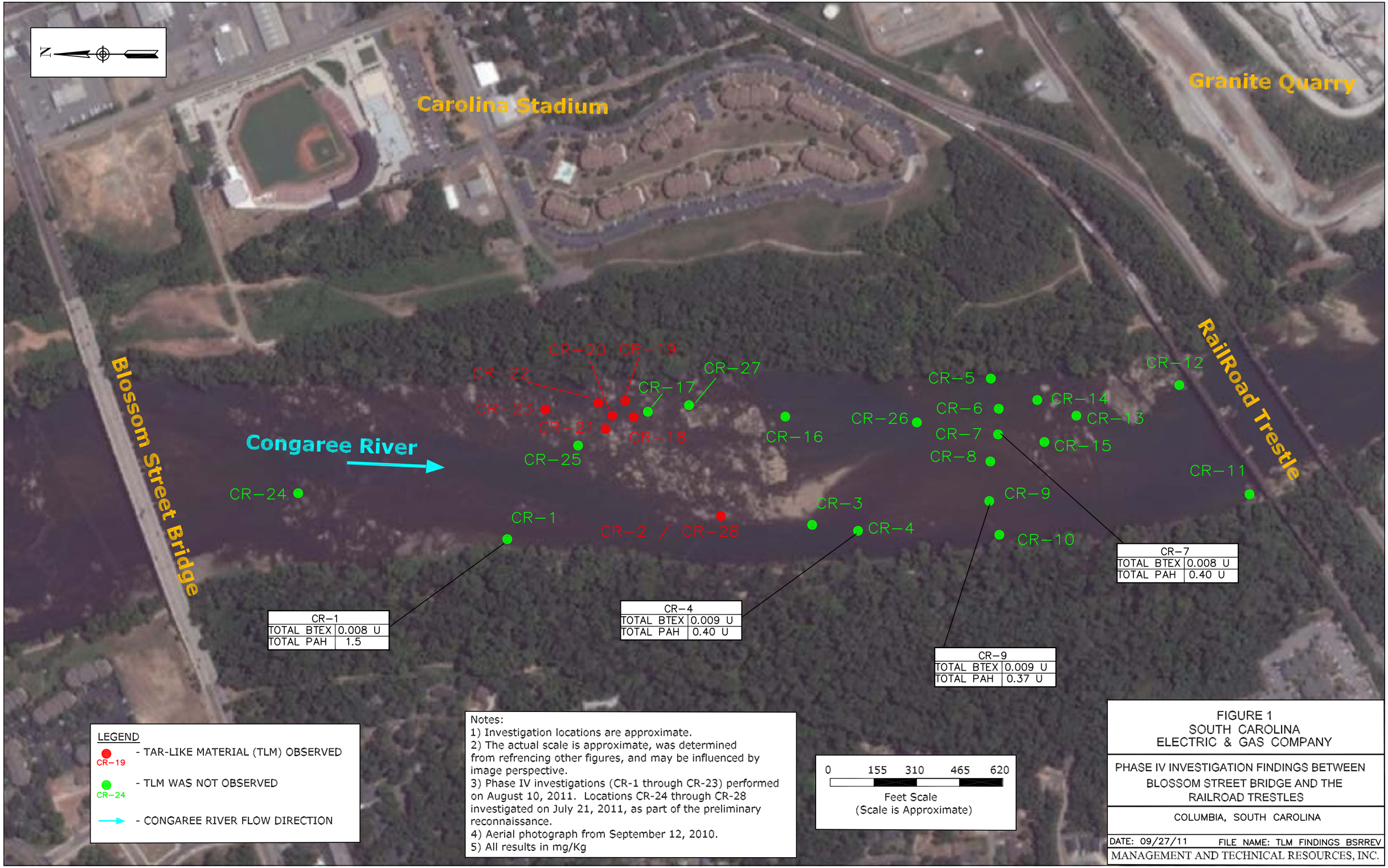
Sample Identification	CR-1	CR-4	CR-7	CR-9
Date Sampled	8/10/2011	8/10/2011	8/10/2011	8/10/2011
Sample Interval (feet brb)[1]	0 - 1.5	0 - 1.0	0 - 0.5	0 - 0.75
Parameters				
Volatiles (mg/Kg)				
Benzene	0.008 U[2]	0.009 U	0.008 U	0.009 U
Ethylbenzene	0.008 U	0.009 U	0.008 U	0.009 U
Toluene	0.008 U	0.009 U	0.008 U	0.009 U
Total Xylenes	0.008 U	0.009 U	0.008 U	0.009 U
Semi-Volatiles (mg/Kg)				
Acenaphthene	0.40 U	0.40 U	0.40 U	0.37 U
Acenaphthylene	0.40 U	0.40 U	0.40 U	0.37 U
Anthracene	0.40 U	0.40 U	0.40 U	0.37 U
Benzo(a)anthracene	0.40 U	0.40 U	0.40 U	0.37 U
Benzo(a)pyrene	0.40 U	0.40 U	0.40 U	0.37 U
Benzo(b)fluoranthene	0.41	0.40 U	0.40 U	0.37 U
Benzo(g,h,i)perylene	0.40 U	0.40 U	0.40 U	0.37 U
Benzo(k)fluoranthene	0.40 U	0.40 U	0.40 U	0.37 U
Chrysene	0.40 U	0.40 U	0.40 U	0.37 U
Dibenz(a,h)anthracene	0.40 U	0.40 U	0.40 U	0.37 U
Fluoranthene	0.64	0.40 U	0.40 U	0.37 U
Fluorene	0.40 U	0.40 U	0.40 U	0.37 U
Indeno(1,2,3-cd)pyrene	0.40 U	0.40 U	0.40 U	0.37 U
Naphthalene	0.40 U	0.40 U	0.40 U	0.37 U
Phenanthrene	0.40 U	0.40 U	0.40 U	0.37 U
Pyrene	0.48	0.40 U	0.40 U	0.37 U
Totals (mg/Kg)[3]				
Total BTEX	0.008 U	0.009 U	0.008 U	0.009 U
Total PAH	1.5	0.40 U	0.40 U	0.37 U

Notes:

(1) brb = below river bed, and interval is from top of sediment.

(2) U - indicates the consitutent was not detected at the reporting limit.

(3) Total BTEX (benzene, toluene, ethylbenzene, and xylenes) and total PAH (polynuclear aromatic hydrocarbons). The total PAH comprise the listed semi-volatiles constituents shown above.


Carolina Stadium
Granite Quarry
Blossom Street Bridge
RailRoad Trestle
Congaree River
CR-20
CR-19
CR-22
CR-27
CR-17
CR-23
CR-21
CR-18
CR-25
CR-16
CR-26
CR-5
CR-12
CR-14
CR-6
CR-13
CR-7
CR-15
CR-8
CR-11
CR-24
CR-9
CR-3
CR-1
CR-2 / CR-28
CR-4
CR-10
CR-1
TOTAL BTEX 0.008 U
TOTAL PAH 1.5
CR-4
TOTAL BTEX 0.009 U
TOTAL PAH 0.40 U
CR-7
TOTAL BTEX 0.008 U
TOTAL PAH 0.40 U
CR-9
TOTAL BTEX 0.009 U
TOTAL PAH 0.37 U
LEGEND
CR-19 - TAR-LIKE MATERIAL (TLM) OBSERVED
CR-24 - TLM WAS NOT OBSERVED
- CONGAREE RIVER FLOW DIRECTION
Notes:
1) Investigation locations are approximate.
2) The actual scale is approximate, was determined from refrencing other figures, and may be influenced by image perspective.
3) Phase IV investigations (CR-1 through CR-23) performed on August 10, 2011. Locations CR-24 through CR-28 investigated on July 21, 2011, as part of the preliminary reconnaissance.
4) Aerial photograph from September 12, 2010.
5) All results in mg/Kg
0 155 310 465 620
Feet Scale
(Scale is Approximate)
FIGURE 1
SOUTH CAROLINA
ELECTRIC & GAS COMPANY
PHASE IV INVESTIGATION FINDINGS BETWEEN
BLOSSOM STREET BRIDGE AND THE
RAILROAD TRESTLES
COLUMBIA, SOUTH CAROLINA
DATE: 09/27/11 FILE NAME: TLM FINDINGS BSRREV
MANAGEMENT AND TECHNICAL RESOURCES, INC.

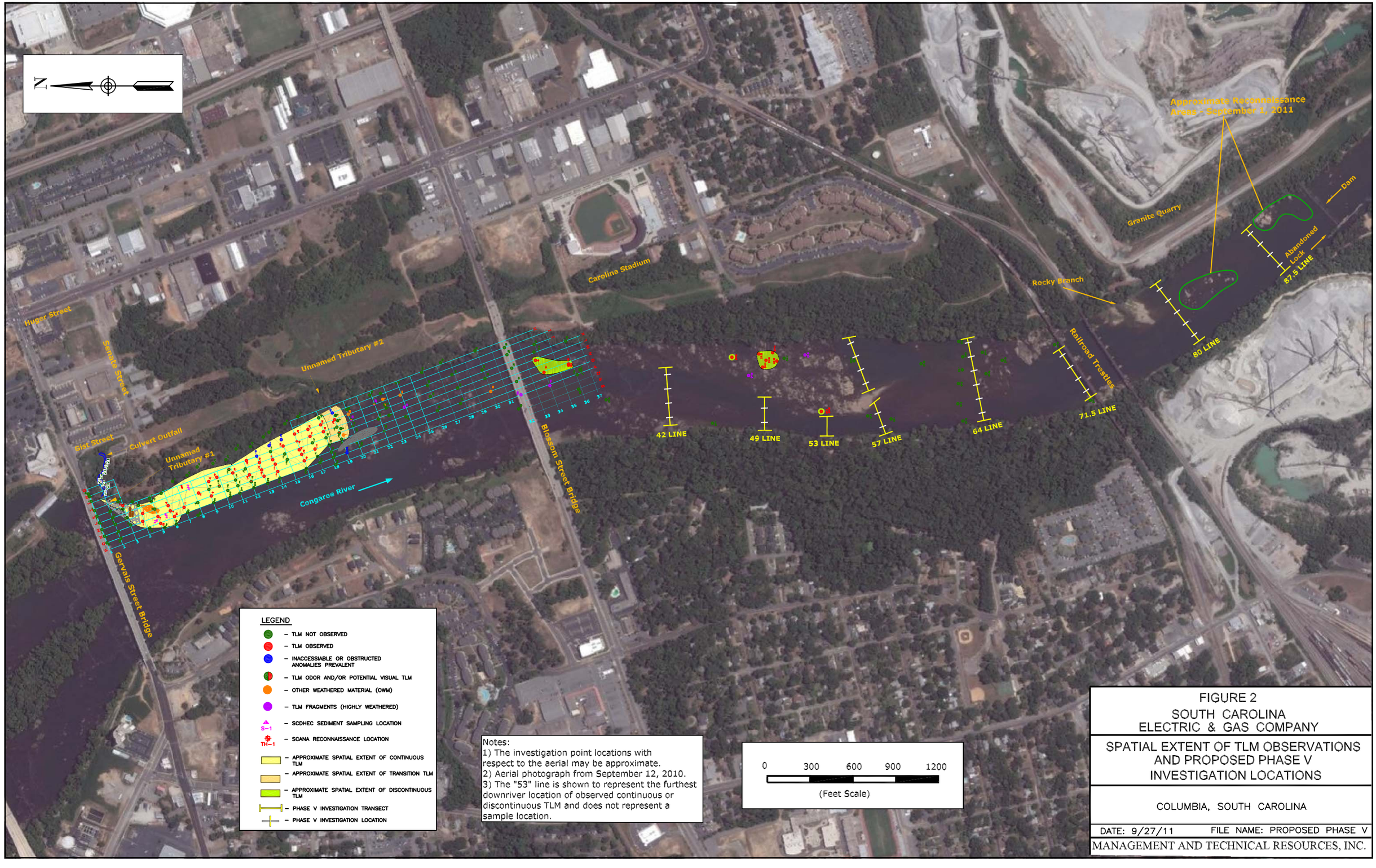


FIGURE 2
SOUTH CAROLINA ELECTRIC & GAS COMPANY

SPATIAL EXTENT OF TLM OBSERVATIONS AND PROPOSED PHASE V INVESTIGATION LOCATIONS

COLUMBIA, SOUTH CAROLINA

DATE: 9/27/11 FILE NAME: PROPOSED PHASE V

MANAGEMENT AND TECHNICAL RESOURCES, INC.