Stantec Consulting Services Inc.
1409 North Forbes Road
Lexington, KY 40511-2050
Tel: (859) 422-3000
Fax: (859) 422-3100

March 23, 2012 let_032_17560005

Mr. Roberto Sanchez, PE, PG, D, GE, PH-GW
Tennessee Valley Authority
1101 Market Street, LP 3P-C
Chattanooga, Tennessee 37402

Re: Letter for Additional & Replacement Instrumentation Installations
Dry Fly Ash Stack
John Sevier Fossil Plant
Rogersville, Tennessee

Dear Mr. Sanchez:

Stantec Consulting Services Inc. (Stantec) has completed installation of additional instrumentation for the Dry Fly Ash Stack (DFAS) at the John Sevier Fossil (JFS) Plant. The additional instrumentation installations were conducted in general accordance with proposal pro_008_17560005, dated October 4, 2011. This letter includes general site information, scope of work performed, summary of new instrumentation, revised instrumentation layout, instrumentation installation schematics, and typed boring logs.

General Information

It is understood at JSF, dry fly ash is collected in silos and transferred to the 90-acre DFAS for disposal. The DFAS was originally developed as a series of ash ponds receiving sluiced ash when the plant was brought online in 1955. Since that time, the DFAS has been re-configured and re-graded and has received dry fly ash and dredged bottom ash. The DFAS covers approximately 118 acres and includes the filled area, a sedimentation basin, access roads, and buffer areas. The filled portion is approximately 92 acres and includes the 27-acre 1997 Partial Closure area, the 40-acre area covered with an interim soil cover (i.e., the Interim Soil Cover Area), and the 25-acre active area that is still in operation.

On December 14, 2010 Stantec submitted a draft MINA letter (let_008_175660005) which contained recommendations for installation and automation of piezometers and slope inclinometers at JSF. Upon receipt of comments, Stantec submitted a Final MINA Letter of recommendations (let_019_175660005) on July 22, 2001. Stantec recommended the installation of nine (9) piezometers and four (4) slope inclinometers along the north side of the DFAS following the construction of the toe drain seepage collection system, which was completed in August 2011. Five (5) of the piezometers and one (1) of the slope inclinometers were replacements of instruments abandoned for the toe drain construction project and installed near the locations of the abandoned instruments. Four (4) piezometers and three (3) slope inclinometers were installed at new locations along the north slope as shown in the attached revised instrumentation layout. The recommendations for the instrument installations were based on results from 2009 geotechnical explorations, proposed corrective measures (as designed by Stantec and URS Corporation), instrumentation data, and planned operational activities. The purpose of the piezometers is to observe the phreatic surface in the areas where the piezometers were placed.

Scope of Work

Fieldwork for the additional instrumentation was performed by Stantec during the months of December 2011, January 2012 and March 2012. The field work consisted of advancing a total of thirteen (13) borings at the project site. Boring locations were chosen by Stantec, then surveyed and staked by TVA. The locations of the borings and their corresponding elevations are given on the updated instrumentation layout drawing enclosed. The additional instrumentation installations was performed using 4¼ inch (ID) hollow stem augers following a carbide tipped tooth bit and NQ-size rock coring equipment.

Standard Penetration Testing (SPT) was performed in all the borings continuously or on 2.5 feet depth intervals. A standard penetration test consists of dropping a 140-pound hammer to drive a split-barrel sampler 18 inches. The consistency or relative density of the soil material is estimated by the number of blows it takes to drive the split spoon sampler the last 12 inches. This method is typically used to obtain soil samples, estimate the consistency or relative density of the soil and also to estimate the vertical limits of the subsurface soil horizons. The results of SPT testing are presented on the typed boring logs enclosed.

Upon completion of the drilling and sampling procedures, the boreholes were either backfilled with well backfill materials (cement, sand and/or bentonite) depending on the type of instrumentation (piezometer versus slope inclinometer) the borehole was planned to receive. A geotechnical engineer was present on-site throughout the drilling and sampling operations. The engineer directed the drill crew, logged the subsurface materials encountered during the exploration and collected soil samples. Particular attention was given to the soil's color, texture, moisture content and consistency or relative density. The bedrock was logged with particular attention to rock type, color, grain size, hardness, and bedding characteristics. Following the field exploration, the SPT samples and rock core were transported to Stantec's Lexington, Kentucky laboratory for analyses. The samples will be available for review up to thirty (30) days following the submittal of this report, at which time the samples will be discarded unless prior arrangements for storage have been made.

Laboratory Testing and Analyses

Laboratory testing was performed on soil samples obtained from the geotechnical exploration. SPT samples from the borings were tested for natural moisture content in accordance with ASTM D 2216. The results of laboratory testing are presented in boring logs enclosed.

Summary of Instruments

This scope of work includes preparation and submittal of an updated instrumentation layout drawing, instrumentation installation schematics, and typed boring logs. Additionally, information relative to instruments installed previously is shown on the layout drawing. A summary of additional instrumentation (installed December 2011, January 2012 and March 2012) and boring information is presented in Table 1, where all measurements are expressed in feet.

Table 1. Summary of Additional Instrumentation

Instrument ID	Cross Section	Instrument Type	Surface Elevation (ft)	PZ Tip Elevation (ft)	Location	
					Northing	Easting
JS-28R	E-E’	Piezometer	1078.9	1062.9	736,041.33	2,891,216.02
JS-35R	D-D’	Piezometer	1081.3	1059.3	735,540.94	2,890,693.02
JS-43R	C-C’	Piezometer	1083.1	1058.3	735,270.41	2,890,358.61
JS-47R	B-B’	Piezometer	1078.5	1064.0	735,007.66	2,890,006.13
JS-53R	A-A’	Piezometer	1082.3	1071.2	734,735.90	2,889,582.52
JS-54R	A-A’	Inclinometer	1100.2	--	734,688.35	2,889,606.40
JS-66	--	Piezometer	1081.3	1067.0	736,237.45	2,891,412.24
JS-67	--	Piezometer	1098.7	1071.1	736,204.38	2,891,447.95
JS-68	--	Piezometer	1081.4	1069.3	735,862.54	2,891,067.05
JS-69	--	Inclinometer	1097.6	--	735,836.69	2,891,100.43
JS-70	--	Piezometer	1111.3	1080.5	735,812.68	2,891,128.74
JS-71	D-D’	Inclinometer	1093.8	--	735,514.47	2,890,719.29
JS-72	--	Inclinometer	1079.5	--	735,165.03	2,890,198.16

Note: R - represents a replacement instrument.

Subsurface Soil Conditions

The subsurface conditions encountered during the geotechnical exploration of the Dry Fly Ash Stack were dependent on the vertical location of the borings. In general, borings advanced above elevation 1110 feet encountered three or more of seven predominant soil types. These included clay fill (cap material), compacted fly ash fill, sluiced fly ash fill, alluvial clay, alluvial gravel and alluvial sand. Borings advanced below elevation 1110 feet (upper perimeter road) but above the lower perimeter road encountered a clay fill layer (cap material) underlain by what is believed to be original starter dike clay, alluvial clay, and alluvial gravel and sand. Borings advanced along the lower perimeter road encountered mostly alluvial materials consisting of clay, sand and gravel. Logs of sample borings are enclosed. The soil numbers described below were developed based on Stantec’s Report of Geotechnical Exploration - Dry Fly Ash Stack, Bottom Ash Disposal Area 2 and Ash Disposal Area J, dated February 8, 2010.

Clay fill (Soil 1) or cap material, typically located above ash deposits, was visually classified in the field as lean clay with sand and gravel, light brown to brown, soft to stiff, moist, with mottling and occasional silty zones.

Alluvial clay (Soil 2) was visually classified in the field as lean clay, brown to tan, soft to very stiff, moist to wet, with occasional manganese concretions, silty zones, with sand and gravel.

Bottom ash (Soil 3) was not encountered during this exploration.

Compacted or dry fly ash (Soil 4) and Sluiced fly ash (Soil 5) was visually classified in the field as fly ash, gray to dark gray and black, dry to wet, very loose to very dense, with occasional clay seams, gravel, coal fragments, and traces of bottom ash.

Alluvial sand (Soil 7) and gravel (Soil 6) were typically encountered in thin zones above the shale bedrock. The sand was visually classified in the field as brown and tan, medium grained, moist, and loose to very dense. The gravel was visually classified in the field as brown to gray, medium grained, wet, loose to very dense, poorly graded with sand.

Dike material (Soil 8) was visually classified in the field as lean clay with sand and silt, light brown to brown and gray, medium stiff to very stiff, moist, with traces of gravel and manganese concretions.

Subsurface Water

Subsurface water was encountered in some of the borings advanced during this project. The water level reading was taken after the boring had been drilled and before the installation of instrumentation. The depths to water noted immediately after drilling are shown on the boring logs enclosed. Additional water level readings were obtained from piezometers installed in the borings. The results of the additional water level readings will be included in Stantec's Monthly Instrumentation Report.

Closure

Subsurface profiles are generally based on straight line interpolation between borings and no warranties can be made regarding the continuity of subsurface conditions between the borings.

Stantec appreciates the opportunity to provide engineering services for this project. If you have any questions, or if we may be of further assistance, please contact our office.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Zachary C. Massey, PE
Geotechnical Engineer

Hugo R. Aparicio, PE
Principal

/rws

Enclosures: 3

1. Updated Instrumentation Layout
2. Instrumentation Schematics
3. Typed Boring Logs