

# **GEOTECHNICAL INVESTIGATION**

## **Terminal Apron Reconstruction**

### **MSCAA Project 08-1259-02**

Note: The Geotechnical Investigation consists of seven (7) documents, as follows:

Document 1: Section C - Geotechnical Investigation from Planning Study for Terminal Apron Reconstruction MSCAA Project 08-1259-00, August 25, 2010, by Tri-State Testing, Inc.

#### **Appendix C – Geotechnical Investigation**

Document 2: Section D - Subsurface Environmental Investigation from Planning Study for Terminal Apron Reconstruction MSCAA Project 08-1259-00, August 25, 2010, by Tri-State Testing, Inc.

#### **Appendix D – Subsurface Environmental Investigation**

Document 3: ASR Investigation, February 28, 2011, by American Petrographic Services, Inc.

Document 4: Letter, August 13, 2011, by Arun Wagh, Inc.

Document 5: Letter, August 18, 2011, by Arun Wagh, Inc.

Document 6: Letter, August 19, 2011, by Arun Wagh, Inc.

Document 7: Concrete Core Strength Tests, September 12, 2011, by B&W Engineering Laboratories, Inc.

**DOCUMENT 1: SECTION C – GEOCTECHNICAL  
INVESTIGATION**

## **SECTION C. GEOTECHNICAL INVESTIGATION**

### **C.1 Introduction**

The purpose of this section is to determine the general subsurface conditions by obtaining subsurface samples of the existing subgrade soils and evaluating these with respect to the apron pavement reconstruction criteria for the proposed project. Refer to **Appendix C** for the exhibits referred to in this section.

### **C.2 Site Investigation**

In the following discussion we have referred to the fifteen soil borings, which were drilled in conjunction with the Standard Penetration Test (SPT), as the **geotechnical borings**, and the eighty-five soil borings conducted with macro core sampling as the **direct push technology borings**. The direct push borings are further discussed in **Section D. Subsurface Environmental Investigation**.

Fifteen (15) soil test borings – B-1 through B-15 - were drilled on the existing apron during March 17 through 19, 2010. All borings were drilled to a depth of 15 feet. The borings were spread over the apron area. These borings were drilled with a truck-mounted drill rig. The boring locations are shown on the boring location plan labeled **Exhibit C.1** in **Appendix C**. Split-spoon samples were obtained by the Standard Penetration Test (SPT) method in all of the borings. Samples were obtained at an interval of one foot in the top ten feet and then between the depth range of 13.5 to 15.0.

Logs of borings with groundwater level observations have been included in **Appendix C** of this report. The logs show visual description of the soil strata encountered.

Definitions of the terms and symbols used on the logs and explanations of the SPT procedure are included in **Appendix C**.

The split-spoon samples were inspected and reclassified by the project geotechnical engineer and the boring logs were edited as necessary. To aid in classifying the soils and to determine general soil characteristics, natural moisture contents were determined for all the split-spoon samples and Atterberg Limits tests were performed on selected split-spoon samples. Some of the intact split-spoon samples were also tested for unconfined compressive strength. We recognize that the split-spoon samples are disturbed and the results would not be accurate; however, the results are anticipated to be conservative and sufficient to give some indication of the shear strengths of the soils. The results of moisture content determination tests on split-spoon samples are included on the boring logs and the results of the Atterberg Limits tests along with the results of the Fractional Organic Carbon tests are presented on a summary sheet in **Appendix C**.

### **C.3 Site Conditions**

The site is located in a belt of loess (a finely ground rock flour resulting from glacial erosion) that extends back of the east bank of the Mississippi River across the states of Tennessee and Kentucky. Loess rests on river terrace deposits of Pleistocene age. Under these are hard marine clays and dense sands of Eocene age. Some of the borings at the site, however, showed a few feet of manmade fill.

The earthquake hazard map from the United States Geologic Survey (USGS) indicates that the area of the site has an effective peak velocity-related acceleration coefficient ( $A_v$ ) of about 0.20 and effective peak acceleration ( $A_a$ ) of also 0.20. The soil profile type, as defined by the Unified Building Code, is typically S2, for which the corresponding site coefficient is 1.2. Only locally, though, the soil profile type is inferred to be S3, for which

the corresponding site coefficient is 1.5. However, after implementing site preparation and earthwork construction as recommended later in this report, the entire soil profile is expected to be S2. A review of the groundwater level data, soil type, and consistencies/relative densities that are reflected by the SPT tests indicate that there is no potential for liquefaction in the soils investigated at this site in the event of a major earthquake.

Existing pavement, which consists of a concrete pavement, underlain by a cement treated base (CTB) course and soil-cement sub base course, was cored through in all borings. While the CTB base course could be drilled through in the larger diameter geotechnical borings, it was difficult to separate the CTB base course from the soil-cement sub base course in the smaller diameter direct push technology borings. We have presented the pavement thicknesses as measured in the geotechnical borings in a tabular form in **Appendix C**, as well as noted on the boring logs.

In the cores obtained from the geotechnical borings the concrete thickness varied from a minimum of 10.5 inches to a maximum of 18 inches. Typically, though, the average concrete thickness was 13 inches. The CTB course was found to be consistently 12 inches thick in these borings. Soil-cement course thickness could be obtained in some of the borings and they are noted on the appropriate boring logs.

In the cores obtained from the direct push technology borings the concrete thickness varied from a minimum of 10.5 inches to a maximum of 21 inches. Typically, though, the average concrete thickness was 13.5 inches. The CTB plus soil-cement courses were found to vary considerably in these borings – from 1 to 18 inches. We attribute these erratic results to the fact that the direct push technology diameter is smaller and, therefore, it is very difficult to obtain good cores in CTB and soil-cement. While in some cases no cores could be obtained in CTB and soil-cement, in other cases it was difficult to delineate the CTB and soil-cement interface. It is our opinion that while the CTB core results from geotechnical borings are essentially dependable, only the concrete thicknesses are meaningful in direct push technology borings. Compressive strength tests

were performed on selected samples from the cement treated base. The results of these tests are in **Appendix C**.

Since the direct push technology borings were not performed with SPT sampling, and they were primarily to detect the presence of jet fuel, we present the following discussion based only on the geotechnical borings. Refer to **Section D. Subsurface Environmental Investigation** for a further discussion of the direct push technology borings.

Based on visual observations, some of the borings were entirely in natural soils, some of the borings were entirely in fill, and the other borings were partially in fill and partially in natural soils. The following **TABLE C.1** presents extents of fill soils in the geotechnical borings as inferred from our sample inspection:

**TABLE C.1**

| <b>Boring Number</b> | <b>Inferred Depth Of Fill Soils</b> | <b>Boring Number</b> | <b>Inferred Depth of Fill Soils</b> |
|----------------------|-------------------------------------|----------------------|-------------------------------------|
| 1                    | None                                | 9                    | None                                |
| 2                    | None                                | 10                   | 15'                                 |
| 3                    | 15'                                 | 11                   | 8'                                  |
| 4                    | None                                | 12                   | 8'                                  |
| 5                    | 5'                                  | 13                   | 5'                                  |
| 6                    | None                                | 14                   | 15'                                 |
| 7                    | 15'                                 | 15                   | None                                |
| 8                    | 5'                                  |                      |                                     |

**TABLE C.1 NOTES:**

1. *All borings were terminated at a depth of 15'. Thus, when the inferred depth of fill is given as 15', it implies to the depth extent of the boring.*
2. *The depths given in the above table are with reference to the existing surface. Thus, the pavement is included in the depths given.*

3. *Although no fill is mentioned in B-2, a small amount of sand and gravel was noted at the top of the first sample at 3.5' – 5.0'.*

The natural as well as the fill soils consist of silty clays (CL) or clayey silts (ML). The natural soils frequently consisted of higher plasticity silty clays. Rarely the fill soils contained gravel pieces. The symbols within the above parenthesis are as per the Unified Soil Classification System. The classification is either based on actual tests or inferred from sample inspection.

The SPT blow counts in the fill as well as natural soils were generally indicative of stiff to very stiff consistencies, indicating natural soils with relatively high shear strengths and well-compacted and also of relatively high shear strength fill soils. The only exception to this statement is the natural soils in boring B-9. Soil samples in this boring were consistently very moist and appeared to be of mediocre strength. As far as the SPT blow counts are concerned, they depicted a stiff consistency in sample 1 at 3.5' – 5.0' and sample 4 at 13.5' – 15.0'. The two in between samples reflected a medium stiff consistency.

#### **C.4 Groundwater**

Groundwater levels were noted at time of drilling and at completion of drilling. No water was encountered in any of the fifteen geotechnical borings, either during drilling or at completion of drilling. In the direct push technology borings, water was encountered in nine of the boring locations.

The depth of water is shown on the boring logs. All of the borings where water was encountered are in the area of Concourse "A". Specifically, borings P10, P71, P72, P73, P74, P75, P76, P77, and P83. We believe this water is not naturally occurring ground water, and may be from a leak in an underground water supply pipe in the area.

## **C.5 Discussion And Recommendations**

In general, this investigation shows that the soils in the project area are competent enough to support the apron pavement after some site work as per the recommendations given later in this section. Even so, the following two geotechnical issues revealed by this investigation should be addressed during the design phase of the project:

1. Fill is indicated to be present in several borings, and the fill thickness varies from minor to 15+ feet. We note that the borings were terminated at 15 feet.
2. As discussed above, boring B-9 exhibited questionable conditions in what appear to be natural soils.

As far as the first issue is concerned, we note that it would not be feasible to completely characterize these soils based on the data from our investigation consisting of small diameter soil test borings that were spaced several feet apart. However, borings consistently indicated well-compacted fill. We still recommend that these soils should be carefully reviewed after the existing pavement is removed.

Regarding the second issue we recommend one or more test pits in the area represented by boring B-9. The purpose of these test pits would be to observe the field conditions with a better perspective and decide upon the vertical and lateral extents of undercutting needed to remove the questionable soils depicted by B-9.

## **C.6 Site Preparation and Earthwork**

We recommend that after all lifts of the existing pavement are removed, the subgrade should be excavated to proposed subgrade and then inspected by a qualified soils engineer. At the same time, the subgrade should be proof rolled with a loaded dump truck weighing at least 25 tons. Additionally, test pits should be excavated randomly in the fill areas (soil borings should be used as guide for this) and specifically in the boring

B-9 area. Based on the soil borings, we anticipate well-compacted fill, but field conditions may dictate some undercutting. Based on the inspection, proof rolling, and observation of the test pits all soft, wet, loose, organics, and miscellaneous materials should be completely removed from the site and replaced with well-compacted material as recommended below.

Since the proposed pavement section is slightly thicker than the existing pavement section, it should be noted that apron reconstruction will require minimal, if any, fill. Nevertheless, if any areas require fill, then said fill should be brought to grade using a clean, select, non-expansive fill, free of wet material, organics, debris or other deleterious matter and having a plasticity index between 10 and 20 and a liquid limit less than 45. Fill should be placed at moisture contents within two percentage points of optimum in no more than 8-inch thick loose-depth lifts. Each lift should be compacted to **a minimum dry density of 95 percent of the maximum dry density with the exception of the top twelve inches, which should be compacted to 98 percent of the maximum dry density as obtained by the Modified Moisture-Density relationship (Modified Proctor) (ASTM D-1557)**. The compaction obtained and soil materials provided for each lift should be inspected and approved by a geotechnical engineer before another lift is added. Backfill of utility trenches should also comply with these recommendations. These requirements are in conformance with AC 150/5320-6C Chapter 3, Section 3 of the Federal Aviation Administration's *Standards for Airport Construction*.

Some of the soils at this site are very silty and low to moderate plasticity materials that are prone to losing appreciable amount of shear strength due to disturbances. Every attempt should be made to minimize disturbances to the very silty soils when they are exposed at subgrade or exist near surface.

### **C.7 Apron Pavement Design Recommendations**

We evaluated the subgrade conditions based on the soil borings and laboratory tests consisting of moisture content determinations, Atterberg limits, and unconfined

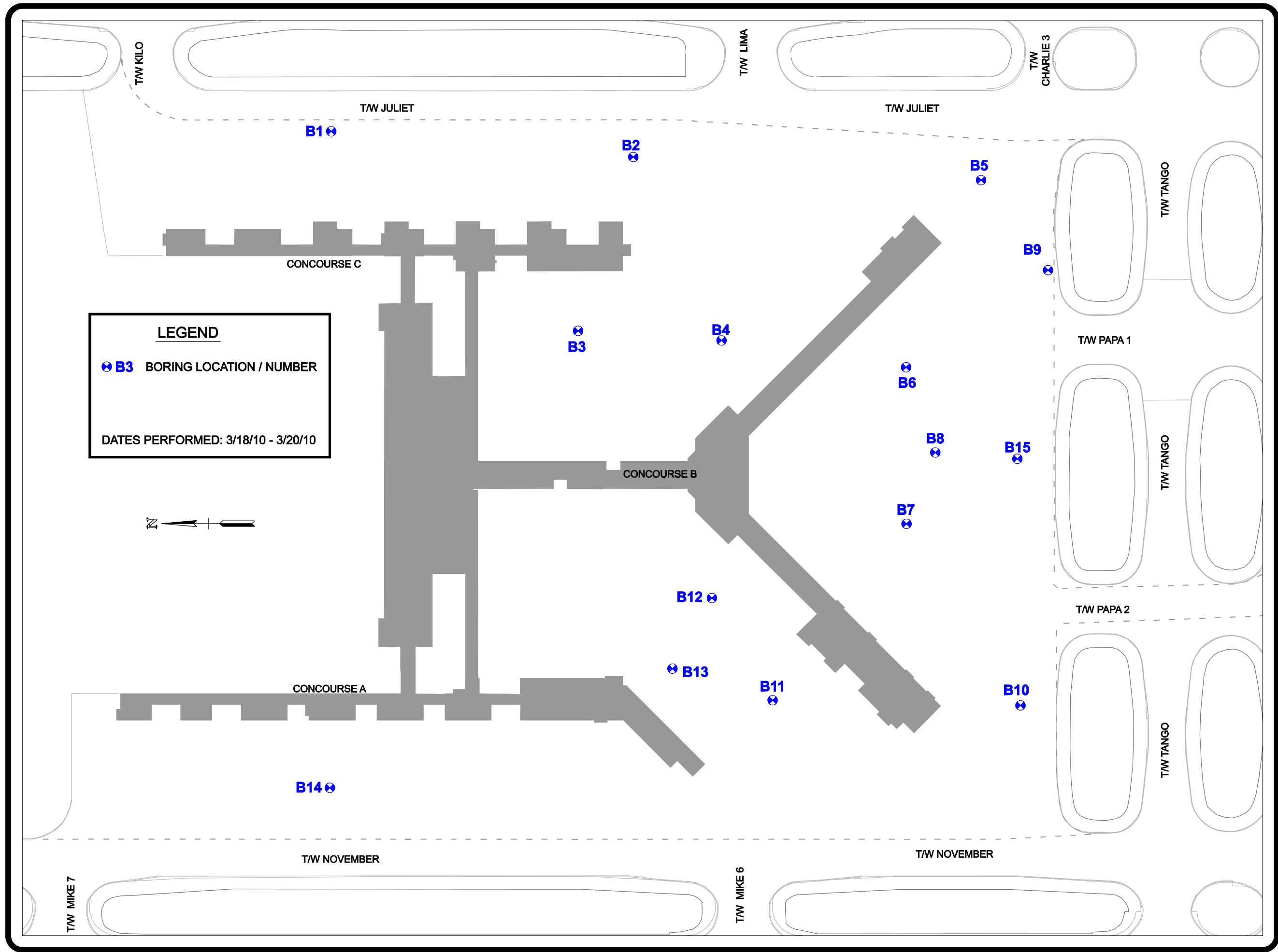
compression tests. We gave due weight to the fact that there is significant quantity of fill at this project site. For any additional or replacement fill we assumed silty clay/clayey silt type of fill material and degree of fill compaction as per the previous recommendations. The field and laboratory data obtained was empirically correlated to bearing capacity and CBR, which can also be correlated to the modulus of subgrade reaction. In addition to the unconfined compression strength tests conducted on some of the samples, SPT blow counts and liquidity index (natural moisture content - plastic limit/plasticity index) were used to estimate unconfined compressive strengths, which were correlated to the bearing capacities and CBR values. In our opinion, this method allows us to get an overview of the soils in the entire project area to a “significant” depth.

Subject to site preparation and earthwork under controlled conditions as previously recommended, we recommend for the pavement subgrade a CBR value of 6 or a modulus of subgrade reaction value of 160 pci.

Refer to **Section H. Pavement Evaluation and Design** for further information regarding pavement designs. Also, refer to **Section D. Subsurface Environmental Investigation** for a further discussion of the direct push boring results.

Refer to **Appendix C.** for the exhibits referred to in this section.

## **APPENDIX C – GEOTECHNICAL INVESTIGATION**





MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY



Pickering Firm  
Incorporated



TST  
TRI-STATE TESTING SERVICES, INC.

**TERMINAL APRON  
RECONSTRUCTION STUDY**

MSCAA PROJ. 08-1259-00

**MEMPHIS INTERNATIONAL AIRPORT**

**EXHIBIT C.1  
GEOTECHNICAL  
BORINGS**

SCALE: 1" = 250'



## STANDARD LEGEND

While the borings are representative of subsurface conditions at their respective locations and for their respective vertical reaches, local variations characteristic of the subsurface materials of the region may be encountered.

Consistency of cohesive soils on boring logs is based on driller's log and visual examination and is approximate, except within those vertical reaches of borings where shear strengths from compression tests are shown.

N – Driving resistances in blows per foot determined with a standard split spoon sampler (1-3/8" I.D. , 2" O.D.) and a 140 LB driving hammer with a 30" drop.

PPR – Pocket penetrometer readings in tons per square foot. (These readings are not allowable bearing values.)

Ground-water elevations shown on boring logs represent ground-water surfaces encountered at the times shown. Absence of water surface data on certain borings implies no ground-water data is available, but does not necessarily mean ground water will not be encountered at the locations or within the vertical reaches of these borings.

If any of the following tests are included in this report, the tests were performed in accordance with the following standards without exception: ASTM C136, ASTM D1140, ASTM D1586, ASTM D2216, ASTM D2487, ASTM D2488, and ASTM D4318. If individual exceptions were made, they are noted on the individual test report.

## DESCRIPTIVE SYMBOLS

| COLOR         |        |
|---------------|--------|
| COLOR         | SYMBOL |
| TAN           | T      |
| YELLOW        | Y      |
| RED           | R      |
| BLACK         | BK     |
| GRAY          | GR     |
| LIGHT GRAY    | LGR    |
| DARK GRAY     | DGR    |
| BROWN         | BR     |
| LIGHT BROWN   | LBR    |
| DARK BROWN    | DBR    |
| BROWNISH-GRAY | BRGR   |
| GRAYISH-BROWN | GYBR   |
| GREENISH-GRAY | GNGR   |
| GRAYISH-GREEN | GYGN   |
| GREEN         | GN     |
| BLUE          | BL     |
| BLUE-GREEN    | BLGN   |
| WHITE         | WH     |
| MOTTLED       | MOT    |

| MODIFICATIONS         |        |
|-----------------------|--------|
| MODIFICATION          | SYMBOL |
| TRACES                | TR     |
| FINE                  | F      |
| MEDIUM                | M      |
| COARSE                | C      |
| CONCRETIONS           | CC     |
| ROOTLETS              | RT     |
| LIGNITE FRAGMENTS     | LG     |
| SHALE FRAGMENTS       | SH     |
| SANDSTONE FRAGMENTS   | SDS    |
| SHELL FRAGMENTS       | SLF    |
| ORGANIC MATTER        | O      |
| CLAY STRATA OR LENSES | CS     |
| SILT STRATA OR LENSES | SIS    |
| SAND STRATA OR LENSES | SS     |
| SANDY                 | S      |
| GRAVELLY              | G      |
| BOULDERS              | B      |
| SLICKENSIDES          | SL     |
| WOOD                  | WD     |
| OXIDIZED              | OX     |

| CONSISTENCY FOR COHESIVE SOILS |  |        |
|--------------------------------|--|--------|
| CONSISTENCY                    | COHESION IN LBS./SQ.FT. FROM UNCONFINED COMPRESSION TEST | SYMBOL |
| VERY SOFT                      | < 250  | VSO    |
| SOFT                           | 250 - 500  | SO     |
| MEDIUM                         | 500 - 1000   | M      |
| STIFF                          | 1000 - 2000  | ST     |
| VERY STIFF                     | 2000 - 4000  | VST    |
| HARD                           | > 4000   | H      |



**Tri-State Testing Services**  
**6756 Buckles Cove**  
**Memphis, Tennessee 38133**  
**TRI-STATE TESTING SERVICES, INC. Tel: 901.385.1199; Fax: 901.386.6614**

**BORING NUMBER B1**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
 PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
 DATE STARTED 3/17/10 COMPLETED 3/17/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
 DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04491834 LONGITUDE 89.97860125  
 DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
 LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
 NOTES Weather - Cool & Cloudy AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Brown and Gray Silty Clay       | SS 1                  | 100                 | 4-6-8<br>(14)               | 1.5                  |                       | 22                      | 37                  | 22               | 15                  |                      |
|               |                | Brown and Gray Silty Clay       | SS 2                  | 100                 | 5-7-9<br>(16)               | 1.0                  |                       | 19                      |                     |                  |                     |                      |
| 10            |                | Brown and Gray Silty Clay       | SS 3                  | 100                 | 5-7-8<br>(15)               | 1.0                  | 100                   | 21                      |                     |                  |                     |                      |
| 15            |                | Brown Silty Clay                | SS 4                  | 100                 | 4-5-7<br>(12)               | 2.0                  | 101                   | 21                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



**Tri-State Testing Services**  
**6756 Buckles Cove**  
**Memphis, Tennessee 38133**  
**TRI-STATE TESTING SERVICES, INC. Tel: 901.385.1199; Fax: 901.386.6614**

**BORING NUMBER B2**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
 PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
 DATE STARTED 3/17/10 COMPLETED 3/17/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
 DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04277884 LONGITUDE 89.97880067  
 DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
 LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
 NOTES Weather - Cool & Cloudy AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                                   | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|--|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |  |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete   |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Top - Brown Sand and Gravel, Bottom - Brown Silty Clay | X SS 1                | 100                 | 7-9-11<br>(20)              | 2.0                  | 104                   | 23                      |                     |                  |                     |                      |
|               |                | Brown and Gray Clay                                    | X SS 2                | 100                 | 6-8-9<br>(17)               | 3.0                  | 103                   | 22                      | 48                  | 24               | 24                  |                      |
| 10            |                | Brown and Gray Clayey Silt                             | X SS 3                | 100                 | 6-7-10<br>(17)              | 1.5                  |                       | 23                      |                     |                  |                     |                      |
| 15            |                | Brown and Gray Silty Clay                              | X SS 4                | 100                 | 3-4-6<br>(10)               | 0.5                  |                       | 26                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.                           |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



**Tri-State Testing Services**  
**6756 Buckles Cove**  
**Memphis, Tennessee 38133**  
**TRI-STATE TESTING SERVICES, INC. Tel: 901.385.1199; Fax: 901.386.6614**

**BORING NUMBER B3**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
 PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
 DATE STARTED 3/17/10 COMPLETED 3/17/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
 DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04315767 LONGITUDE 89.98034728  
 DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
 LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
 NOTES Weather - Cool & Cloudy AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                  | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                       |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                              |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base       |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Brown and Gray Silty Clay with Gravel | X SS 1                | 100                 | 9-7-9<br>(16)               | 3.0                  | 107                   | 17                      | 39                  | 22               | 17                  |                      |
|               |                | Brown and Gray Silty Clay             | X SS 2                | 100                 | 6-8-8<br>(16)               | 4.0                  | 112                   | 17                      |                     |                  |                     |                      |
| 10            |                | Brown and Gray Silt                   | X SS 3                | 100                 | 6-8-9<br>(17)               | 3.0                  |                       | 17                      |                     |                  |                     |                      |
| 15            |                | Brown and Gray Silty Clay             | X SS 4                | 100                 | 6-10-13<br>(23)             | 3.5                  |                       | 20                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.          |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



**Tri-State Testing Services**  
**6756 Buckles Cove**  
**Memphis, Tennessee 38133**  
**TRI-STATE TESTING SERVICES, INC. Tel: 901.385.1199; Fax: 901.386.6614**

**BORING NUMBER B4**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
 PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
 DATE STARTED 3/17/10 COMPLETED 3/17/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
 DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04211376 LONGITUDE 89.9804103  
 DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
 LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
 NOTES Weather - Cool & Cloudy AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Brown and Gray Silty Clay       | X SS 1                | 100                 | 7-9-10<br>(19)              | 4.0                  |                       | 19                      |                     |                  |                     |                      |
|               |                | Brown and Gray Clayey Silt      | X SS 2                | 100                 | 7-11-11<br>(22)             | 3.0                  | 104                   | 20                      |                     |                  |                     |                      |
| 10            |                | Brown and Gray Clayey Silt      | X SS 3                | 100                 | 8-10-13<br>(23)             | 4.0                  |                       | 19                      | 41                  | 23               | 18                  |                      |
| 15            |                | Brown Clayey Silt               | X SS 4                | 100                 | 7-10-13<br>(23)             | 4.5                  | 106                   | 18                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



**Tri-State Testing Services**  
**6756 Buckles Cove**  
**Memphis, Tennessee 38133**  
**TRI-STATE TESTING SERVICES, INC. Tel: 901.385.1199; Fax: 901.386.6614**

**BORING NUMBER B5**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
 PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
 DATE STARTED 3/17/10 COMPLETED 3/17/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
 DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.0402464 LONGITUDE 89.97895156  
 DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
 LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
 NOTES Weather - Cool & Cloudy AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(ROD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Dark Gray Silty Clay            | SS 1                  | 100                 | 6-7-7<br>(14)               | 3.0                  | 95                    | 25                      |                     |                  |                     |                      |
|               |                | Brown and Gray Clayey Silt      | SS 2                  | 100                 | 7-8-9<br>(17)               | 2.0                  |                       | 23                      |                     |                  |                     |                      |
| 10            |                | Brown Clayey Silt               | SS 3                  | 100                 | 5-7-9<br>(16)               | 1.0                  | 94                    | 23                      |                     |                  |                     |                      |
| 15            |                | Brown and Gray Silty Clay       | SS 4                  | 100                 | 4-6-6<br>(12)               | 1.0                  |                       | 24                      | 35                  | 23               | 12                  |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER B6**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/17/10 COMPLETED 3/17/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04076722 LONGITUDE 89.98065091  
DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Cloudy AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(ROD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Brown and Gray Silty Clay       | SS 1                  | 100                 | 7-9-10<br>(19)              | 4.5                  | 92                    | 24                      |                     |                  |                     |                      |
|               |                | Brown and Gray Silty Clay       | SS 2                  | 100                 | 7-8-10<br>(18)              | 2.0                  |                       | 23                      |                     |                  |                     |                      |
| 10            |                | Brown and Gray Silty Clay       | SS 3                  | 100                 | 5-7-8<br>(15)               | 1.5                  | 99                    | 23                      |                     |                  |                     |                      |
| 15            |                | Brown and Gray Clayey Silt      | SS 4                  | 100                 | 4-5-5<br>(10)               | 1.0                  |                       | 24                      | 32                  | 24               | 8                   |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER B7**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/18/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04074475 LONGITUDE 89.98200378  
DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.C. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Brown Silty Clay                | SS 1                  | 100                 | 5-10-11<br>(21)             | 3.0                  | 98                    | 19                      |                     |                  |                     |                      |
|               |                | Brown Silty Clay                | SS 2                  | 100                 | 7-5-8<br>(13)               | 2.0                  |                       | 18                      | 33                  | 23               | 10                  |                      |
| 10            |                | Brown Silty Clay                | SS 3                  | 100                 | 9-10-11<br>(21)             | 3.0                  |                       | 26                      |                     |                  |                     |                      |
| 15            |                | Brown and Gray Silty Clay       | SS 4                  | 100                 | 4-6-7<br>(13)               | 1.5                  | 100                   | 17                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



**Tri-State Testing Services**  
**6756 Buckles Cove**  
**Memphis, Tennessee 38133**  
**TRI-STATE TESTING SERVICES, INC. Tel: 901.385.1199; Fax: 901.386.6614**

# BORING NUMBER B8

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
 PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
 DATE STARTED 3/18/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
 DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04054442 LONGITUDE 89.98136802  
 DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
 LOGGED BY B.C. CHECKED BY D.M. AT TIME OF DRILLING ---  
 NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 99                  |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Brown and Gray Silty Clay       | SS 1                  | 100                 | 6-11-14<br>(25)             | 4.0                  | 112                   | 17                      |                     |                  |                     |                      |
|               |                | Brown Silty Clay                | SS 2                  | 100                 | 8-11-11<br>(22)             | 2.5                  | 95                    | 24                      |                     |                  |                     |                      |
| 10            |                | Brown Silty Clay                | SS 3                  | 100                 | 7-11-11<br>(22)             | 1.5                  |                       | 20                      | 37                  | 23               | 14                  |                      |
| 15            |                | Brown Silty Clay                | SS 4                  | 100                 | 10-8-12<br>(20)             | 0.5                  |                       | 17                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER B9**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/18/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.03975016 LONGITUDE 89.9795582  
DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.C. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Brown Silty Clay                | X SS 1                | 100                 | 5-5-5<br>(10)               | 1.5                  | 98                    | 25                      |                     |                  |                     |                      |
|               |                | Brown Silty Clay                | X SS 2                | 100                 | 3-3-4<br>(7)                | 0.5                  |                       | 17                      | 33                  | 23               | 10                  |                      |
| 10            |                | Brown Silty Clay                | X SS 3                | 100                 | 2-3-3<br>(6)                | 1.0                  |                       | 27                      | 36                  | 22               | 14                  |                      |
| 15            |                | Brown Silty Clay                | X SS 4                | 100                 | 4-4-6<br>(10)               | 2.0                  | 96                    | 28                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
TRI-STATE TESTING SERVICES, INC. Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER B10**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/18/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.03991885 LONGITUDE 89.98356994  
DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.C. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Brown and Gray Silty Clay       | SS 1                  | 100                 | 9-10-10<br>(20)             | 3.0                  |                       | 19                      | 35                  | 23               | 12                  |                      |
|               |                | Brown Silty Clay                | SS 2                  | 100                 | 7-9-10<br>(19)              | 3.0                  | 105                   | 20                      |                     |                  |                     |                      |
| 10            |                | Brown and Gray Silty Clay       | SS 3                  | 100                 | 8-9-8<br>(17)               | 3.5                  |                       | 20                      |                     |                  |                     |                      |
| 15            |                | Brown Silty Clay                | SS 4                  | 100                 | 8-8-10<br>(18)              | 2.5                  | 101                   | 20                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER B11**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/18/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04169593 LONGITUDE 89.98358539  
DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.C. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Brown and Gray Silty Clay       | SS 1                  | 100                 | 9-9-11<br>(20)              | 4.0                  | 107                   | 21                      |                     |                  |                     |                      |
|               |                | Gray and Brown Silty Clay       | SS 2                  | 100                 | 10-10-10<br>(20)            | 2.0                  |                       | 15                      | 34                  | 20               | 14                  |                      |
| 10            |                | Brown Silty Clay                | SS 3                  | 100                 | 5-6-8<br>(14)               | 1.5                  |                       | 20                      | 49                  | 26               | 23                  |                      |
| 15            |                | Brown Silty Clay                | SS 4                  | 100                 | 6-6-8<br>(14)               | 1.5                  | 92                    | 22                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



**Tri-State Testing Services**  
**6756 Buckles Cove**  
**Memphis, Tennessee 38133**  
**TRI-STATE TESTING SERVICES, INC. Tel: 901.385.1199; Fax: 901.386.6614**

**BORING NUMBER B12**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
 PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
 DATE STARTED 3/18/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
 DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04215016 LONGITUDE 89.98269017  
 DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
 LOGGED BY B.C. CHECKED BY D.M. AT TIME OF DRILLING ---  
 NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|-----------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                   |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                          |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base   |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | No Recovery - Obstruction in Shoe | X SS 1                | 0                   | 10-12-15<br>(27)            |                      |                       |                         |                     |                  |                     |                      |
|               |                | Gray Silty Clay                   | X SS 2                | 100                 | 7-5-7<br>(12)               | 2.0                  | 103                   | 20                      | 31                  | 22               | 9                   |                      |
| 10            |                | Brown and Gray Silty Clay         | X SS 3                | 100                 | 5-7-8<br>(15)               | 1.5                  |                       | 24                      | 42                  | 23               | 19                  |                      |
| 15            |                | Brown Silty Clay                  | X SS 4                | 100                 | 7-9-11<br>(20)              | 1.0                  | 97                    | 21                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.      |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
TRI-STATE TESTING SERVICES, INC. Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER B13

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/18/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04242469 LONGITUDE 89.98335168  
DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.C. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Brown Silty Clay                | X SS 1                | 100                 | 10-12-14<br>(26)            | 2.5                  | 110                   | 15                      |                     |                  |                     |                      |
|               |                | Brown Silty Clay                | X SS 2                | 100                 | 8-8-9<br>(17)               | 3.5                  |                       | 24                      |                     |                  |                     |                      |
| 10            |                | Brown Silty Clay                | X SS 3                | 100                 | 5-6-8<br>(14)               | 2.0                  | 95                    | 25                      | 49                  | 26               | 23                  |                      |
| 15            |                | Brown Silty Clay                | X SS 4                | 100                 | 4-4-5<br>(9)                | 1.5                  |                       | 23                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER B14**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/19/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04490446 LONGITUDE 89.98442866  
DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Brown and Gray Silty Clay       | X SS 1                | 100                 | 7-8-10<br>(18)              | 4.0                  |                       | 17                      |                     |                  |                     |                      |
|               |                | Brown and Gray Silty Clay       | X SS 2                | 100                 | 10-10-11<br>(21)            | 3.0                  | 106                   | 18                      | 36                  | 22               | 14                  |                      |
| 10            |                | Brown and Gray Silty Clay       | X SS 3                | 100                 | 6-8-9<br>(17)               | 2.5                  |                       | 18                      |                     |                  |                     |                      |
| 15            |                | Brown and Gray Silty Clay       | X SS 4                | 100                 | 5-7-13<br>(20)              | 2.0                  | 103                   | 23                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
TRI-STATE TESTING SERVICES, INC. Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER B15**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/18/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 7"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.03994714 LONGITUDE 89.98141134  
DRILLING METHOD HSA GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.C. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | SAMPLE TYPE<br>NUMBER | RECOVERY %<br>(RQD) | BLOW<br>COUNTS<br>(N VALUE) | POCKET PEN.<br>(tsf) | DRY UNIT WT.<br>(pcf) | MOISTURE<br>CONTENT (%) | ATTERBERG<br>LIMITS |                  |                     | FINES CONTENT<br>(%) |
|---------------|----------------|---------------------------------|-----------------------|---------------------|-----------------------------|----------------------|-----------------------|-------------------------|---------------------|------------------|---------------------|----------------------|
|               |                |                                 |                       |                     |                             |                      |                       |                         | LIQUID<br>LIMIT     | PLASTIC<br>LIMIT | PLASTICITY<br>INDEX |                      |
| 0             |                | Concrete                        |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
|               |                | Soil Cement/Cement Treated Base |                       | 100                 |                             |                      |                       |                         |                     |                  |                     |                      |
| 5             |                | Gray and Brown Clayey Silt      | X SS 1                | 100                 | 7-9-10<br>(19)              | 3.0                  | 108                   | 20                      | 33                  | 22               | 11                  |                      |
|               |                | Brown Silty Clay                | X SS 2                | 100                 | 7-7-9<br>(16)               | 2.0                  | 94                    | 25                      |                     |                  |                     |                      |
| 10            |                | Brown and Gray Silty Clay       | X SS 3                | 100                 | 4-6-8<br>(14)               | 1.5                  |                       | 24                      |                     |                  |                     |                      |
| 15            |                | Brown Silty Clay                | X SS 4                | 100                 | 6-8-11<br>(19)              | 1.0                  |                       | 21                      |                     |                  |                     |                      |
|               |                | Bottom of hole at 15.0 feet.    |                       |                     |                             |                      |                       |                         |                     |                  |                     |                      |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133

TRI-STATE TESTING SERVICES, INC. Tel: 901.385.1199; Fax: 901.386.6614

## SUMMARY OF LABORATORY RESULTS

PAGE 1 OF 2

CLIENT Pickering

PROJECT NAME MEM Terminal Apron Investigation

PROJECT NUMBER E-9-429

PROJECT LOCATION 2491 Winchester

| Borehole | Depth | Liquid Limit | Plastic Limit | Plasticity Index | Maximum Size (mm) | %<#200 Sieve | Classification | Water Content (%) | Dry Density (pcf) | Saturation (%) | Void Ratio |
|----------|-------|--------------|---------------|------------------|-------------------|--------------|----------------|-------------------|-------------------|----------------|------------|
| B1       | 3.5   | 37           | 22            | 15               |                   |              |                | 21.8              |                   |                |            |
| B1       | 6.0   |              |               |                  |                   |              |                | 19.2              |                   |                |            |
| B1       | 8.5   |              |               |                  |                   |              |                | 21.2              | 99.5              |                |            |
| B1       | 13.5  |              |               |                  |                   |              |                | 20.7              | 101.1             |                |            |
| B10      | 3.5   | 35           | 23            | 12               |                   |              |                | 18.9              |                   |                |            |
| B10      | 6.0   |              |               |                  |                   |              |                | 19.7              | 104.5             |                |            |
| B10      | 8.5   |              |               |                  |                   |              |                | 20.2              |                   |                |            |
| B10      | 13.5  |              |               |                  |                   |              |                | 20.0              | 101.3             |                |            |
| B11      | 3.5   |              |               |                  |                   |              |                | 20.8              | 107.3             |                |            |
| B11      | 6.0   | 34           | 20            | 14               |                   |              |                | 14.7              |                   |                |            |
| B11      | 8.5   | 49           | 26            | 23               |                   |              |                | 19.7              |                   |                |            |
| B11      | 13.5  |              |               |                  |                   |              |                | 22.1              | 92.0              |                |            |
| B12      | 6.0   | 31           | 22            | 9                |                   |              |                | 19.8              | 103.3             |                |            |
| B12      | 8.5   | 42           | 23            | 19               |                   |              |                | 23.8              |                   |                |            |
| B12      | 13.5  |              |               |                  |                   |              |                | 20.5              | 96.6              |                |            |
| B13      | 3.5   |              |               |                  |                   |              |                | 15.4              | 110.2             |                |            |
| B13      | 6.0   |              |               |                  |                   |              |                | 23.6              |                   |                |            |
| B13      | 8.5   | 49           | 26            | 23               |                   |              |                | 25.0              | 94.6              |                |            |
| B13      | 13.5  |              |               |                  |                   |              |                | 23.5              |                   |                |            |
| B14      | 3.5   |              |               |                  |                   |              |                | 17.3              |                   |                |            |
| B14      | 6.0   | 36           | 22            | 14               |                   |              |                | 18.0              | 106.0             |                |            |
| B14      | 8.5   |              |               |                  |                   |              |                | 18.0              |                   |                |            |
| B14      | 13.5  |              |               |                  |                   |              |                | 22.9              | 102.9             |                |            |
| B15      | 3.5   | 33           | 22            | 11               |                   |              |                | 20.4              | 107.8             |                |            |
| B15      | 6.0   |              |               |                  |                   |              |                | 24.5              | 93.8              |                |            |
| B15      | 8.5   |              |               |                  |                   |              |                | 23.7              |                   |                |            |
| B15      | 13.5  |              |               |                  |                   |              |                | 20.5              |                   |                |            |
| B2       | 3.5   |              |               |                  |                   |              |                | 22.5              | 104.1             |                |            |
| B2       | 6.0   | 48           | 24            | 24               |                   |              |                | 22.4              | 102.7             |                |            |
| B2       | 8.5   |              |               |                  |                   |              |                | 23.2              |                   |                |            |
| B2       | 13.5  |              |               |                  |                   |              |                | 26.0              |                   |                |            |
| B3       | 3.5   | 39           | 22            | 17               |                   |              |                | 17.3              | 107.2             |                |            |
| B3       | 6.0   |              |               |                  |                   |              |                | 17.4              | 111.5             |                |            |
| B3       | 8.5   |              |               |                  |                   |              |                | 17.5              |                   |                |            |
| B3       | 13.5  |              |               |                  |                   |              |                | 20.4              |                   |                |            |
| B4       | 3.5   |              |               |                  |                   |              |                | 18.5              |                   |                |            |
| B4       | 6.0   |              |               |                  |                   |              |                | 19.5              | 104.3             |                |            |
| B4       | 8.5   | 41           | 23            | 18               |                   |              |                | 19.2              |                   |                |            |
| B4       | 13.5  |              |               |                  |                   |              |                | 18.3              | 106.2             |                |            |
| B5       | 3.5   |              |               |                  |                   |              |                | 25.0              | 95.1              |                |            |
| B5       | 6.0   |              |               |                  |                   |              |                | 23.3              |                   |                |            |
| B5       | 8.5   |              |               |                  |                   |              |                | 23.1              | 94.2              |                |            |
| B5       | 13.5  | 35           | 23            | 12               |                   |              |                | 23.8              |                   |                |            |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

## SUMMARY OF LABORATORY RESULTS

PAGE 2 OF 2

CLIENT Pickering

PROJECT NAME MEM Terminal Apron Investigation

PROJECT NUMBER E-9-429

PROJECT LOCATION 2491 Winchester

| Borehole | Depth | Liquid Limit | Plastic Limit | Plasticity Index | Maximum Size (mm) | %<#200 Sieve | Classification | Water Content (%) | Dry Density (pcf) | Saturation (%) | Void Ratio |
|----------|-------|--------------|---------------|------------------|-------------------|--------------|----------------|-------------------|-------------------|----------------|------------|
| B6       | 3.5   |              |               |                  |                   |              |                | 24.2              | 91.9              |                |            |
| B6       | 6.0   |              |               |                  |                   |              |                | 22.7              |                   |                |            |
| B6       | 8.5   |              |               |                  |                   |              |                | 22.6              | 98.6              |                |            |
| B6       | 13.5  | 32           | 24            | 8                |                   |              |                | 24.3              |                   |                |            |
| B7       | 3.5   |              |               |                  |                   |              |                | 18.7              | 98.1              |                |            |
| B7       | 6.0   | 33           | 23            | 10               |                   |              |                | 18.2              |                   |                |            |
| B7       | 8.5   |              |               |                  |                   |              |                | 26.0              |                   |                |            |
| B7       | 13.5  |              |               |                  |                   |              |                | 16.5              | 100.1             |                |            |
| B8       | 3.5   |              |               |                  |                   |              |                | 16.7              | 111.8             |                |            |
| B8       | 6.0   |              |               |                  |                   |              |                | 23.8              | 95.3              |                |            |
| B8       | 8.5   | 37           | 23            | 14               |                   |              |                | 19.8              |                   |                |            |
| B8       | 13.5  |              |               |                  |                   |              |                | 17.5              |                   |                |            |
| B9       | 3.5   |              |               |                  |                   |              |                | 25.5              | 97.9              |                |            |
| B9       | 6.0   | 33           | 23            | 10               |                   |              |                | 16.9              |                   |                |            |
| B9       | 8.5   | 36           | 22            | 14               |                   |              |                | 26.5              |                   |                |            |
| B9       | 13.5  |              |               |                  |                   |              |                | 27.7              | 96.1              |                |            |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

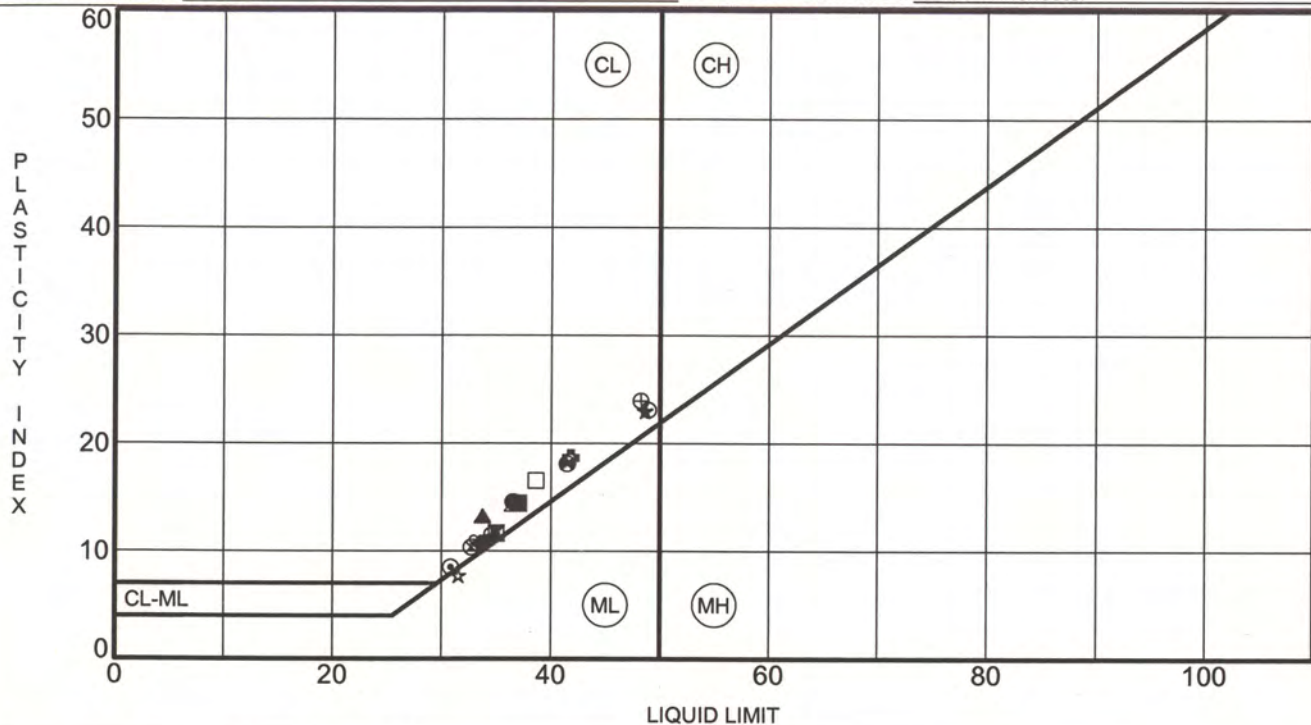
## ATTERBERG LIMITS' RESULTS

CLIENT Pickering

PROJECT NAME MEM Terminal Apron Investigation

PROJECT NUMBER E-9-429

PROJECT LOCATION 2491 Winchester



LIQUID LIMIT

| Specimen Identification | LL   | PL | PI | Fines | Classification                        |
|-------------------------|------|----|----|-------|---------------------------------------|
| ● B1                    | 3.5  | 37 | 22 | 15    | Brown and Gray Silty Clay             |
| ■ B10                   | 3.5  | 35 | 23 | 12    | Brown and Gray Silty Clay             |
| ▲ B11                   | 6.0  | 34 | 20 | 14    | Gray and Brown Silty Clay             |
| ★ B11                   | 8.5  | 49 | 26 | 23    | Brown Silty Clay                      |
| ⊙ B12                   | 6.0  | 31 | 22 | 9     | Gray Silty Clay                       |
| ⊕ B12                   | 8.5  | 42 | 23 | 19    | Brown and Gray Silty Clay             |
| ○ B13                   | 8.5  | 49 | 26 | 23    | Brown Silty Clay                      |
| △ B14                   | 6.0  | 36 | 22 | 14    | Brown and Gray Silty Clay             |
| ⊗ B15                   | 3.5  | 33 | 22 | 11    | Gray and Brown Clayey Silt            |
| ⊕ B2                    | 6.0  | 48 | 24 | 24    | Brown and Gray Silty Clay             |
| □ B3                    | 3.5  | 39 | 22 | 17    | Brown and Gray Silty Clay with Gravel |
| ⊕ B4                    | 8.5  | 41 | 23 | 18    | Brown and Gray Clayey Silt            |
| ⊕ B5                    | 13.5 | 35 | 23 | 12    | Brown and Gray Silty Clay             |
| ★ B6                    | 13.5 | 32 | 24 | 8     | Brown and Gray Clayey Silt            |
| ⊗ B7                    | 6.0  | 33 | 23 | 10    | Brown Silty Clay                      |
| ■ B8                    | 8.5  | 37 | 23 | 14    | Brown Silty Clay                      |
| ◆ B9                    | 6.0  | 33 | 23 | 10    | Brown Silty Clay                      |
| ◇ B9                    | 8.5  | 36 | 22 | 14    | Brown Silty Clay                      |
|                         |      |    |    |       |                                       |
|                         |      |    |    |       |                                       |
|                         |      |    |    |       |                                       |



**MEMPHIS INTERNATIONAL AIRPORT**  
**MSCAA Project 09-1259-00**  
**Terminal Apron Geotechnical Investigation**

**Organic Carbon Content ASTM D2974**

| <b>Boring No.</b> | <b>Sample No.</b> | <b>Depth</b> | <b>Fractional<br/>Organic Carbon<br/>(g-carbon/g-soil)</b> |
|-------------------|-------------------|--------------|--|
| B-1               | S-1               | 3.5'-5'      | 0.017  |
| B-2               | S-2               | 6'-7.5'      | 0.020  |
| B-3               | S-1               | 3.5'-5'      | 0.013  |
| B-4               | S-3               | 8.5'-10      | 0.011  |
| B-5               | S-4               | 13.5'-15'    | 0.015  |
| B-6               | S-4               | 13.5'-15'    | 0.008  |
| B-7               | S-2               | 6'-7.5'      | 0.009  |
| B-8               | S-3               | 8.5'-10      | 0.009  |
| B-9               | S-2               | 6'-7.5'      | 0.015  |
| B-10              | S-1               | 3.5'-5'      | 0.009  |
| B-11              | S-3               | 8.5'-10      | 0.012  |
| B-12              | S-2               | 6'-7.5'      | 0.013  |
| B-13              | S-3               | 8.5'-10      | 0.014  |
| B-14              | S-2               | 6'-7.5'      | 0.017  |
| B-15              | S-1               | 3.5'-5'      | 0.007  |

## Report of Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

Job Name: MEM Terminal Apron Investigation

Job # E-9-429

Client: Arun Wagh

Lab # P-10-015

Boring # B-2

Sample # S-2

Tube Depth: 6' - 7.5'

Tested Sample Depth: 6' - 7.5'

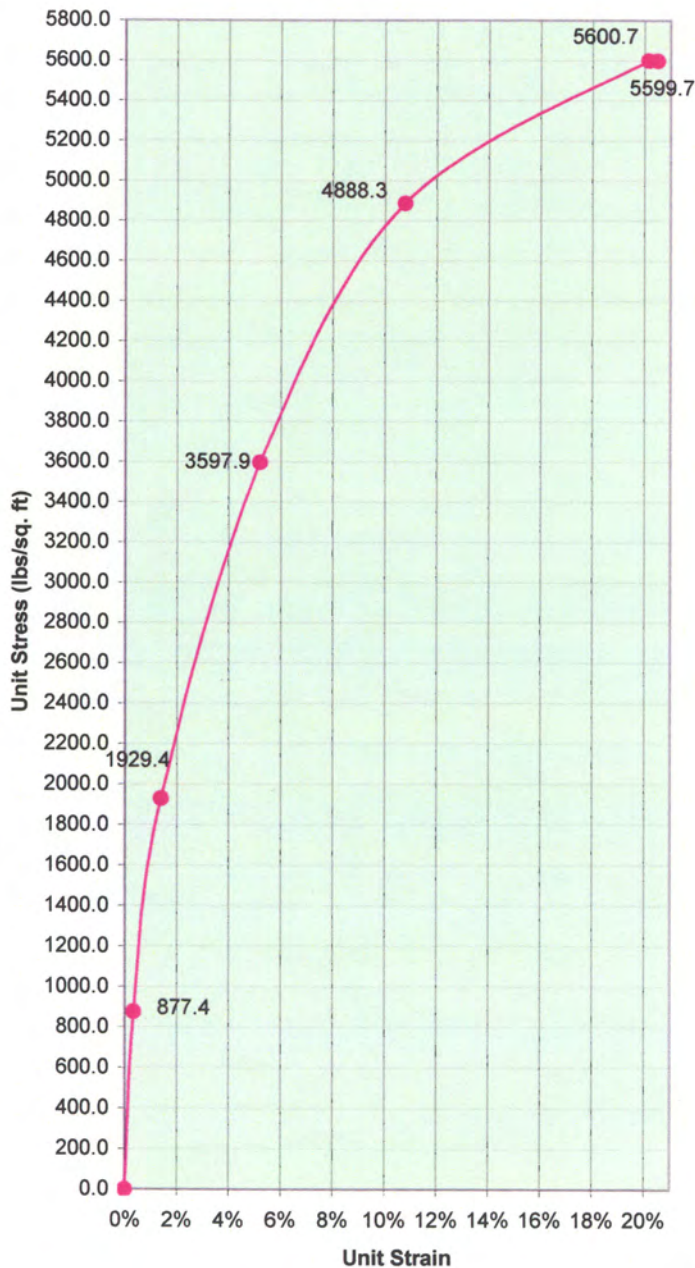
Date Received: 03/18/10

Date Tested: 03/29/10

Lab Tech: J. Nuesch

Sample Description: Brown and Gray Clay

### Unconfined Compression Test



|                            |                              |
|----------------------------|------------------------------|
| UC Strength ( $Q_u$ ):     | 5600.7 lbs / ft <sup>2</sup> |
| Shear Strength:            | 2800.4 lbs / ft <sup>2</sup> |
| Strain at Failure:         | 20.15%                       |
| Average Strain Rate:       | 2.0 % / minute               |
| Water Content:             | 22.7 %                       |
| Wet Density:               | 163.9 lbs / ft <sup>3</sup>  |
| Dry Density:               | 133.6 lbs / ft <sup>3</sup>  |
| Average Height:            | 2.878 in                     |
| Average Diameter:          | 1.369 in                     |
| Height/Diameter Ratio:     | 2.1                          |
| Torvane Shear:             | N/A tons / ft <sup>2</sup>   |
| Pocket Penetrometer:       | 3 tons / ft <sup>2</sup>     |
| Liquid Limit:              | 48                           |
| Plastic Limit:             | 25                           |
| Plasticity Index:          | 23                           |
| Soil Classification (USC): | CL                           |

Specimen Condition: SPT

Water Content Specimen:

Obtained from Sample After Shear

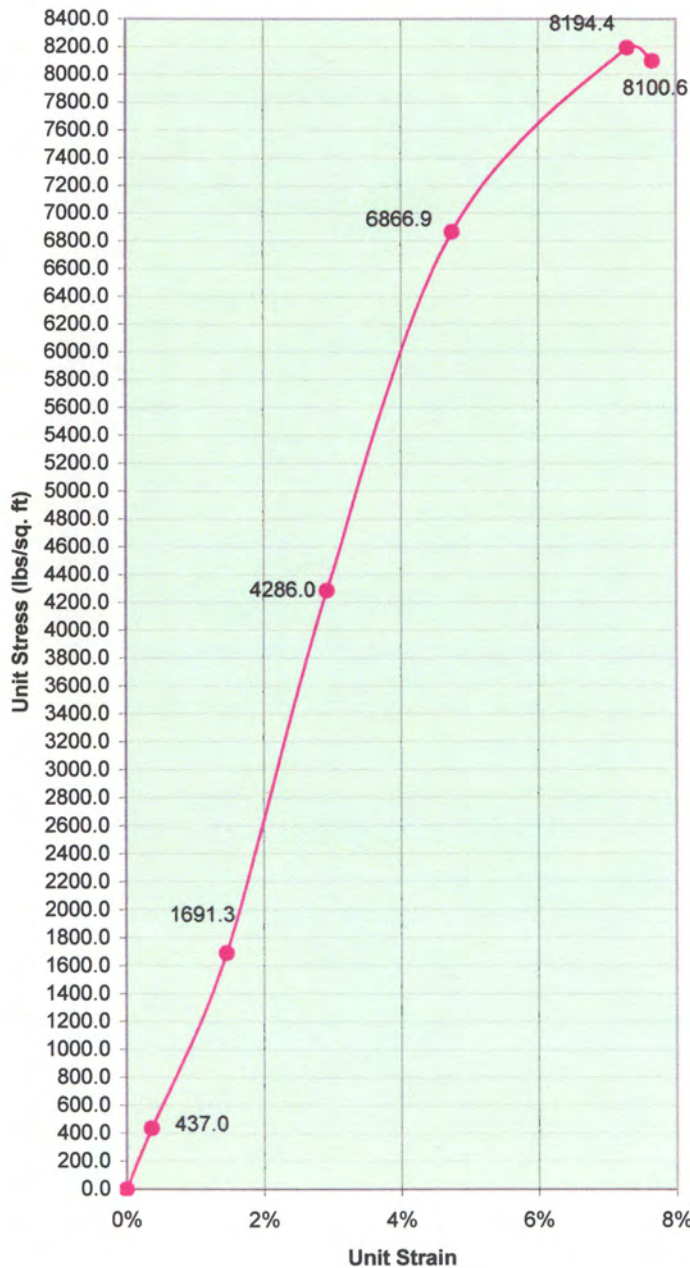
Remarks:



## Report of Unconfined Compressive Strength of Cohesive Soil ASTM D 2166

|   |              |                       |                                |
|---|--------------|-----------------------|--------------------------------|
| Job Name: MEM Terminal Apron Investigation    |              |                       | Job # E-9-429                  |
| Client: Arun Wagh                             |              |                       | Lab # P-10-015                 |
| Boring # B-3                                  | Sample # S-2 | Tube Depth: 6' - 7.5' | Tested Sample Depth: 6' - 7.5' |
| Date Received: 03/18/10                       |              | Date Tested: 03/29/10 | Lab Tech: J. Nuesch            |
| Sample Description: Brown and Gray Silty Clay |              |                       |                                |

**Unconfined Compression Test**



|                            |                              |
|----------------------------|------------------------------|
| UC Strength ( $Q_u$ ):     | 8194.4 lbs / ft <sup>2</sup> |
| Shear Strength:            | 4097.2 lbs / ft <sup>2</sup> |
| Strain at Failure:         | 7.29%                        |
| Average Strain Rate:       | 2.5 % / minute               |
| Water Content:             | 19.4 %                       |
| Wet Density:               | 127.1 lbs / ft <sup>3</sup>  |
| Dry Density:               | 106.5 lbs / ft <sup>3</sup>  |
| Average Height:            | 2.742 in                     |
| Average Diameter:          | 1.387 in                     |
| Height/Diameter Ratio:     | 2.0                          |
| Torvane Shear:             | N/A tons / ft <sup>2</sup>   |
| Pocket Penetrometer:       | 4 tons / ft <sup>2</sup>     |
| Liquid Limit:              |                              |
| Plastic Limit:             |                              |
| Plasticity Index:          |                              |
| Soil Classification (USC): | CL                           |

Specimen Condition: SPT  
 Water Content Specimen:  
 Obtained from Sample After Shear

Remarks:





TRI-STATE TESTING SERVICES, INC.

## Report of Unconfined Compressive Strength of Cohesive Soil ASTM D 2166

Job Name: MEM Terminal Apron Investigation

Job # E-9-429

Client: Arun Wagh

Lab # P-10-015

Boring # B-4

Sample # S-4

Tube Depth: 13.5' - 15'

Tested Sample Depth: 13.5' - 15'

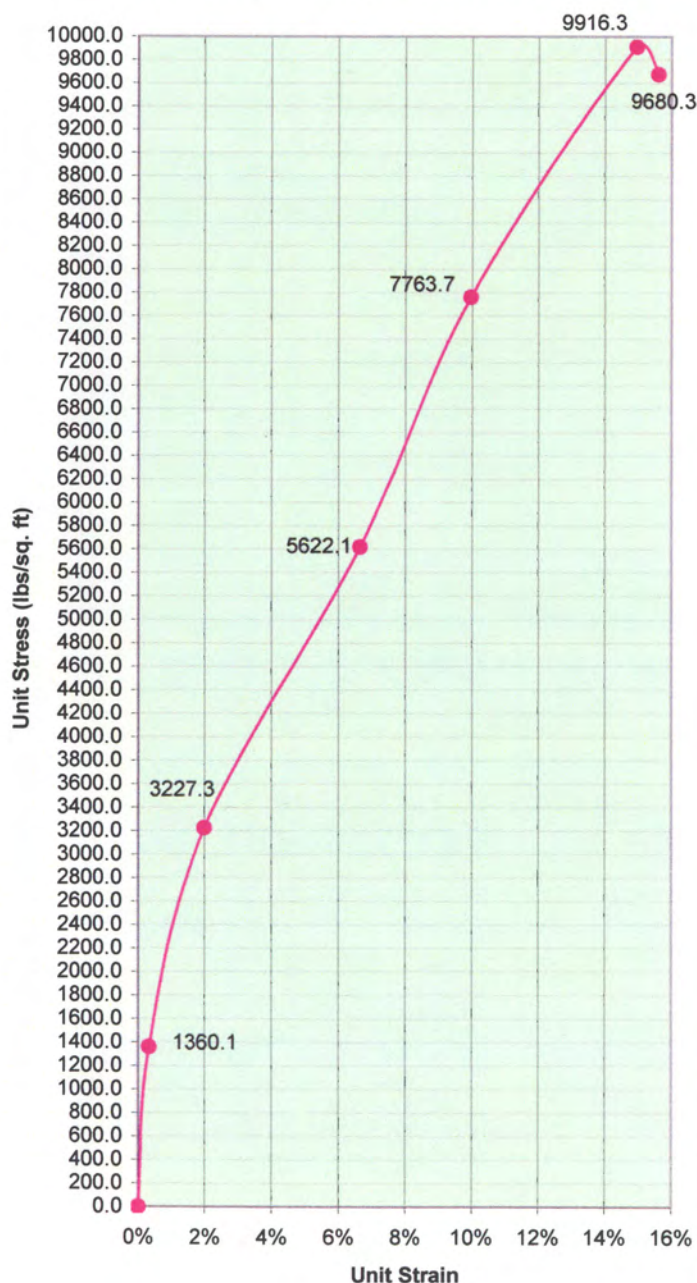
Date Received: 03/18/10

Date Tested: 03/29/10

Lab Tech: J. Nuesch

Sample Description: Brown Clayey Silt

### Unconfined Compression Test



UC Strength ( $Q_u$ ): 9916.3 lbs / ft<sup>2</sup>  
Shear Strength: 4958.2 lbs / ft<sup>2</sup>  
Strain at Failure: 14.94%  
Average Strain Rate: 2.5 % / minute  
Water Content: 21.1 %  
Wet Density: 128.6 lbs / ft<sup>3</sup>  
Dry Density: 106.2 lbs / ft<sup>3</sup>  
Average Height: 3.011 in  
Average Diameter: 1.362 in  
Height/Diameter Ratio: 2.2  
Torvane Shear: N/A tons / ft<sup>2</sup>  
Pocket Penetrometer: 4.5 tons / ft<sup>2</sup>  
Liquid Limit:  
Plastic Limit:  
Plasticity Index:  
Soil Classification (USC): CL

Specimen Condition: SPT

Water Content Specimen:

Obtained from Sample After Shear

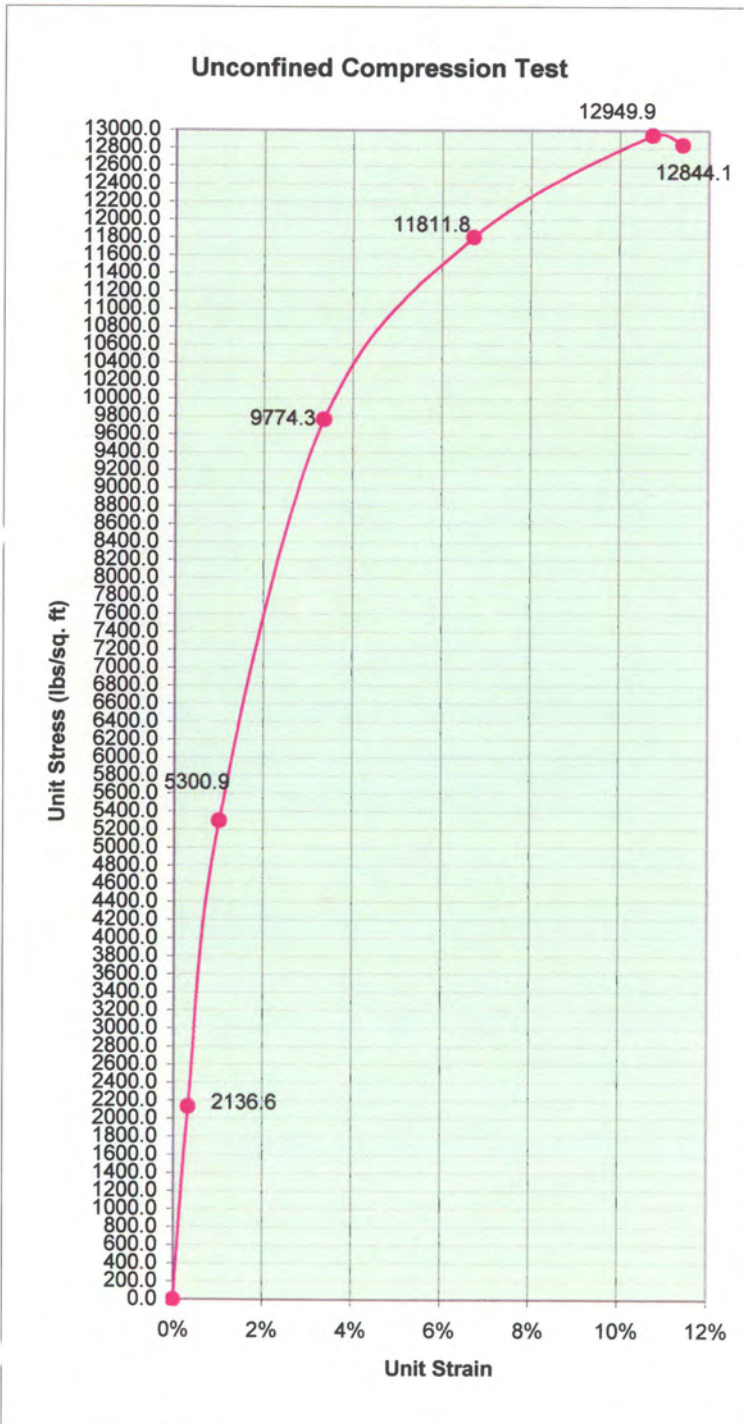
Remarks:



## Report of Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

|   |              |                       |                                |
|---|--------------|-----------------------|--------------------------------|
| Job Name: MEM Terminal Apron Investigation    |              |                       | Job # E-9-429                  |
| Client: Arun Wagh                             |              |                       | Lab # P-10-015                 |
| Boring # B-6                                  | Sample # S-1 | Tube Depth: 3.5' - 5' | Tested Sample Depth: 3.5' - 5' |
| Date Received: 03/18/10                       |              | Date Tested: 03/29/10 | Lab Tech: J. Nuesch            |
| Sample Description: Brown and Gray Silty Clay |              |                       |                                |



|                            |                               |
|----------------------------|-------------------------------|
| UC Strength ( $Q_u$ ):     | 12949.9 lbs / ft <sup>2</sup> |
| Shear Strength:            | 6475.0 lbs / ft <sup>2</sup>  |
| Strain at Failure:         | 10.73%                        |
| Average Strain Rate:       | 2.5 % / minute                |
| Water Content:             | 21.0 %                        |
| Wet Density:               | 129.5 lbs / ft <sup>3</sup>   |
| Dry Density:               | 107.0 lbs / ft <sup>3</sup>   |
| Average Height:            | 2.982 in                      |
| Average Diameter:          | 1.381 in                      |
| Height/Diameter Ratio:     | 2.2                           |
| Torvane Shear:             | N/A tons / ft <sup>2</sup>    |
| Pocket Penetrometer:       | 4.5 tons / ft <sup>2</sup>    |
| Liquid Limit:              |                               |
| Plastic Limit:             |                               |
| Plasticity Index:          |                               |
| Soil Classification (USC): | CL                            |

Specimen Condition: SPT  
 Water Content Specimen:  
 Obtained from Sample After Shear

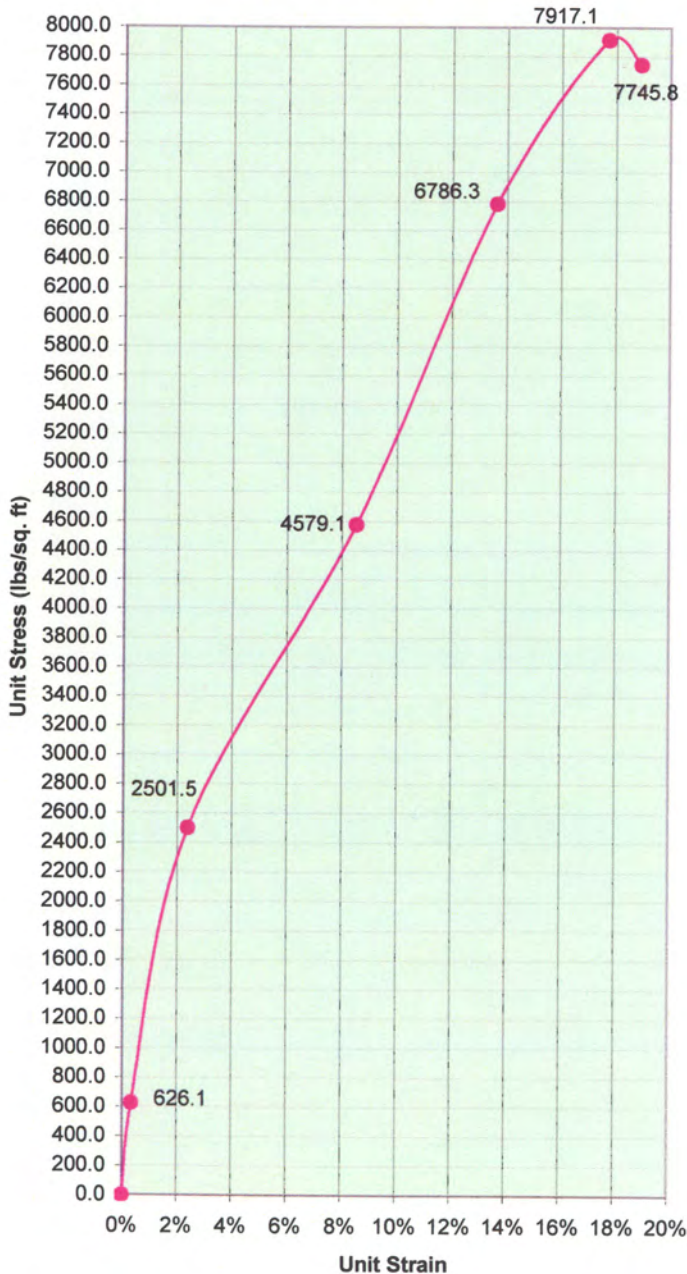
Remarks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



## Report of Unconfined Compressive Strength of Cohesive Soil ASTM D 2166

|   |                       |                       |                                |
|---|-----------------------|-----------------------|--------------------------------|
| Job Name: MEM Terminal Apron Investigation    |                       |                       | Job # E-9-429                  |
| Client: Arun Wagh                             |                       |                       | Lab # P-10-015                 |
| Boring # B-14                                 | Sample # S-2          | Tube Depth: 6' - 7.5' | Tested Sample Depth: 6' - 7.5' |
| Date Received: 03/18/10                       | Date Tested: 03/29/10 | Lab Tech: J. Nuesch   |                                |
| Sample Description: Brown and Gray Silty Clay |                       |                       |                                |

**Unconfined Compression Test**



|                            |                              |
|----------------------------|------------------------------|
| UC Strength ( $Q_u$ ):     | 7917.1 lbs / ft <sup>2</sup> |
| Shear Strength:            | 3958.6 lbs / ft <sup>2</sup> |
| Strain at Failure:         | 17.72%                       |
| Average Strain Rate:       | 2.5 % / minute               |
| Water Content:             | 20.2 %                       |
| Wet Density:               | 127.3 lbs / ft <sup>3</sup>  |
| Dry Density:               | 106.0 lbs / ft <sup>3</sup>  |
| Average Height:            | 2.934 in                     |
| Average Diameter:          | 1.356 in                     |
| Height/Diameter Ratio:     | 2.2                          |
| Torvane Shear:             | N/A tons / ft <sup>2</sup>   |
| Pocket Penetrometer:       | 3 tons / ft <sup>2</sup>     |
| Liquid Limit:              | 36                           |
| Plastic Limit:             | 22                           |
| Plasticity Index:          | 14                           |
| Soil Classification (USC): | CL                           |

Specimen Condition: SPT  
 Water Content Specimen:  
 Obtained from Sample After Shear

Remarks:

---



---



---



## Report of Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

Job Name: MEM Terminal Apron Investigation

Job # E-9-429

Client: Arun Wagh

Lab # P-10-015

Boring # B-14

Sample # S-4

Tube Depth: 13.5' - 15'

Tested Sample Depth: 13.5' - 15'

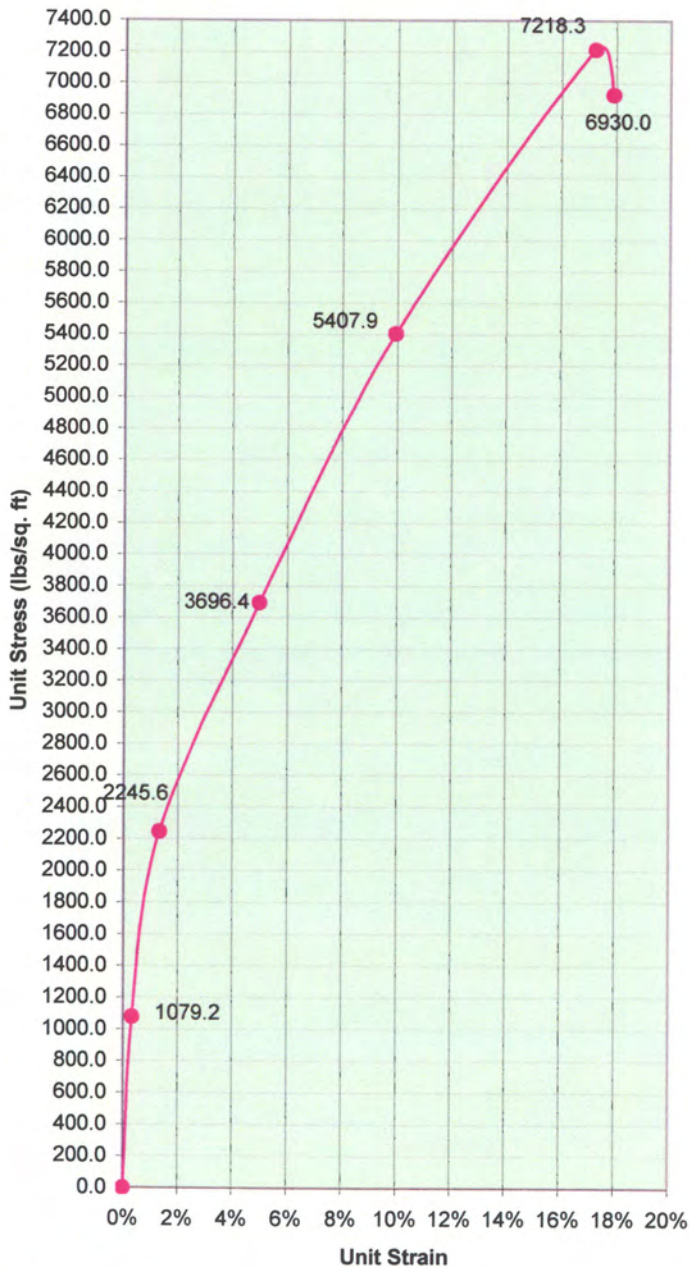
Date Received: 03/18/10

Date Tested: 03/29/10

Lab Tech: J. Nuesch

Sample Description: Brown and Gray Silty Clay

### Unconfined Compression Test



UC Strength ( $Q_u$ ): 7218.3 lbs / ft<sup>2</sup>  
 Shear Strength: 3609.2 lbs / ft<sup>2</sup>  
 Strain at Failure: 17.24%  
 Average Strain Rate: 2.5 % / minute  
 Water Content: 21.7 %  
 Wet Density: 125.2 lbs / ft<sup>3</sup>  
 Dry Density: 102.9 lbs / ft<sup>3</sup>  
 Average Height: 3.016 in  
 Average Diameter: 1.352 in  
 Height/Diameter Ratio: 2.2  
 Torvane Shear: N/A tons / ft<sup>2</sup>  
 Pocket Penetrometer: 2 tons / ft<sup>2</sup>  
 Liquid Limit:  
 Plastic Limit:  
 Plasticity Index:  
 Soil Classification (USC): CL

Specimen Condition: SPT

Water Content Specimen:  
 Obtained from Sample After Shear

Remarks:





TRI-STATE TESTING SERVICES, INC.

**MEMPHIS INTERNATIONAL AIRPORT  
MSCAA Project 08-1259-00  
Terminal Apron Geotechnical Investigation**

**Geotechnical Concrete and Base Matrix**

| Hole # | Concrete Thickness | Soil Cement/CTB Thickness |
|--------|--------------------|---------------------------|
| B-1    | 14.5"              | 12"                       |
| B-2    | 13.5"              | 12"                       |
| B-3    | 14.5"              | 12"                       |
| B-4    | 11"                | 12"                       |
| B-5    | 14.5"              | 12"                       |
| B-6    | 11.5"              | 12"                       |
| B-7    | 11"                | 12"                       |
| B-8    | 11.5"              | 12"                       |
| B-9    | 18"                | 12"                       |
| B-10   | 12"                | 12"                       |
| B-11   | 14"                | 12"                       |
| B-12   | 11.5"              | 12"                       |
| B-13   | 14"                | 12"                       |
| B-14   | 13.5"              | 12"                       |
| B-15   | 10.5"              | 12"                       |

**DOCUMENT 2: SECTION D – SUBSURFACE  
ENVIRONMENTAL INVESTIGATION**

## **SECTION D. SUBSURFACE ENVIRONMENTAL INVESTIGATION**

### **D.1 Introduction**

The purpose of this study is to determine the general subsurface conditions by drilling soil test borings and to evaluate these with respect to the possibility of the apron area subsurface soil being contaminated by jet fuel leaking from the existing hydrant fuel system.

Refer to **Appendix D** for the exhibits referred to in this section.

### **D.2 Site Investigation**

A total of eighty-five (85) borings were drilled utilizing direct push technology from March 17 through 25, 2010. The locations of the direct push technology borings were picked at random along the existing underground refueling line. The existing jet fuel pipeline was physically located by electronic methods and then marked on the surface. The offset to the pipe was carefully considered, since the closer to the pipe the increased likelihood of finding jet fuel but also increased risk of damaging the pipe from the sampling effort. After some debate, a preferred offset of 6 feet was established and utilized in the field. However, this offset was adjusted in the field at a few locations when a subsurface feature, such as another utility, was conflicting. The direct push technology locations are shown on **Exhibits D.1 and D.2** in **Appendix D**.

The concrete pavement and underlying layers were cored and the thicknesses recorded. A 4 foot long macro core sampler loaded with a new polyvinyl chloride liner was advanced through the full depth of the sample interval. The sampler was retracted and

the liner was removed. The sample was cut open and scanned with a Photo Ionization Detection Instrument (minieRAE 3000) for Volatile Organic Compounds (VOC).

These results can be found on the direct push log for each sample. The sampler was decontaminated utilizing a wash with an anionic liquid detergent (liquinox) and a potable water rinse. The sampler was loaded with a new polyvinyl chloride liner and was advanced to the next sample interval. This procedure was repeated to the boring termination depth. One sample from each direct push technology boring was submitted to an analytical laboratory (GTW Analytical Laboratories) for testing. The sample submitted was the highest Photo Ionization Detection (PID) reading from that boring. If all the PID readings for a boring were below the instruments detection level, then a composite sample was submitted for that boring.

The results of these tests can be found in **Appendix D.1 and D.2** and noted on the direct push technology boring log. The concrete cores taken on each direct push technology hole were measured and a picture taken, as indicated in **Appendix D.3**. The cement treated base/soil cement was noted on the boring logs and on a table found in **Appendix D.3**. It is important to note that the referenced lengths are amounts recovered, not totally representative of what actually may exist at each location.

### **D.3 Laboratory Testing**

The direct push technology samples submitted to the analytical laboratory were analyzed for a jet fuel fingerprint in accordance with EPA Method 8015B, *Nonhalogenated Organics Using GC/F10*. These results and explanation of results can be found in **Appendix D.2**.

The analytical results show a “Yes” or “No” answer on whether jet fuel was found in the sample. The Diesel Range Organics (DRO) are shown in mg/Kg (or parts per million). Organics found in these ranges have less burn time and are lighter than Oil Range Organics (ORO) when compared on a gas chromatograph. Jet fuel would typically be

found in the DRO range. Waste oil, motor oil, and hydraulic oil would be typical of the ORO range.

#### **D.4 Findings**

A review of the analytical test results show various quantities of DRO/ORO in the samples submitted for this project. As indicated on **Table D.1**, twenty-three samples total showed a presence of DRO, ORO, or both in the sample. Twenty samples displayed levels less than 60 mg/Kg for either DRO or ORO, at levels not considered significant (less than the EPA's validation level). These results could be from other organic compounds found at the site, such as gasoline, motor oil, hydraulic oil, or glycol. There were seven samples showing the presence of jet fuel. They are from borings P-2, P-11, P-67 as well as borings P-72, P-83, P-84, and P-85. This shows that the largest concentration of jet fuel is on the west side of concourse A (samples P-11, P-83, P-84, and P-85). The remaining three samples were spread out across the apron area. **Only three samples out of eighty-five showed levels above the EPA's validation standard for analytical results, which was considered to be significant for this report - borings P-2, P-11, and P-67.** Boring P-11 had the highest reading with a DRO of 2,160 mg/Kg. The other two samples were approximately eight times less in magnitude, boring P-2 with a DRO reading of 268 mg/Kg and boring P-67 with a DRO reading of 253 mg/Kg.

The Tennessee Department of Environment and Conservation (TDEC) has set guidelines for chemicals of concern and remediation levels for various oils and fuels. This report does not address these limits, and none of the tests were performed. **The Tennessee Department of Environment and Conservation was not contacted about the results of this investigation.** The chemicals of concern outlined by the Tennessee Department of Environment and Conservation are in **Appendix D.2** as Reference 1.

**Table D.1 – Summary of Analytical Testing**

| <b>Sample #</b> | <b>DRO mg/Kg</b> | <b>ORO mg/Kg</b> | <b>Jet Fuel</b> | <b>Above EPA Validation Level</b> |
|-----------------|------------------|------------------|-----------------|-----------------------------------|
| P-2             | 268.0            | 406.0            | Yes             | Yes                               |
| P-7             | 11.9             | 15.5             | No              | No                                |
| P-10            | 18.6             | 20.1             | No              | No                                |
| P-11            | 2,160.0          |                  | Yes             | Yes                               |
| P-14            | 14.2             | 11.3             | No              | No                                |
| P-15            |                  | 11.2             | No              | No                                |
| P-17            | 17.7             | 20.6             | No              | No                                |
| P-21            |                  | 12.5             | No              | No                                |
| P-28            |                  | 10.8             | No              | No                                |
| P-29            | 15.7             | 14.5             | No              | No                                |
| P-30            | 14.8             | 20.0             | No              | No                                |
| P-38            | 30.9             |                  | No              | No                                |
| P-53            | 12.5             | 16.3             | No              | No                                |
| P-67            | 253.0            |                  | Yes             | Yes                               |
| P-71            | 13.6             |                  | No              | No                                |
| P-72            | 24.4             |                  | Yes             | No                                |
| P-74            | 31.4             | 27.9             | No              | No                                |
| P-75            | 34.0             | 40.0             | No              | No                                |
| P-78            |                  | 11.8             | No              | No                                |
| P-82            | 11.5             | 25.3             | No              | No                                |
| P-83            | 56.0             |                  | Yes             | No                                |
| P-84            | 37.7             |                  | Yes             | No                                |
| P-85            | 39.2             |                  | Yes             | No                                |

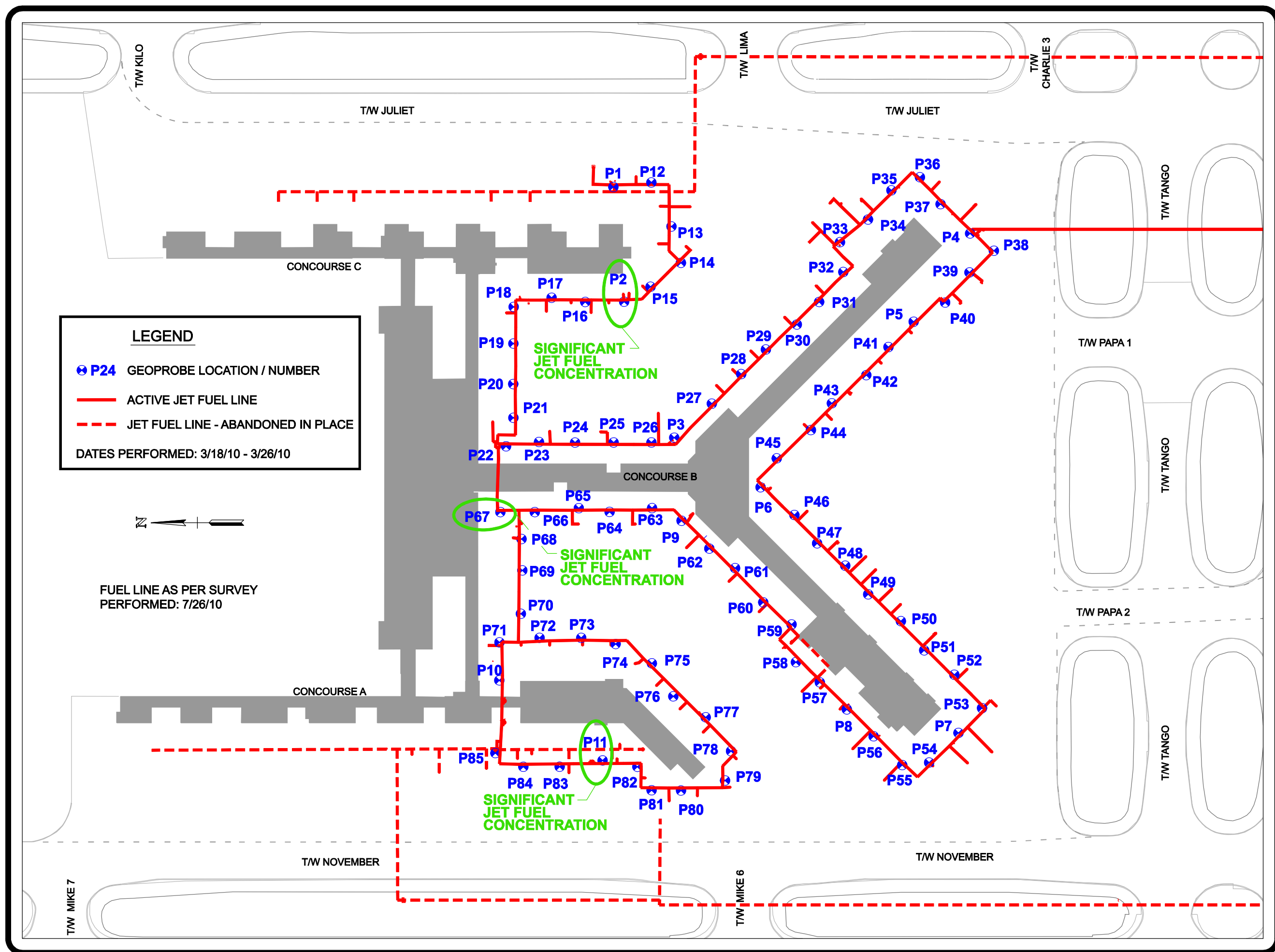
**NOTES:**

1. All samples not listed in table above were below detection.
2. Source: Tri-State Testing Services, Inc.

## **D.5 Recommendations**

1. It is recommended, based on these results, that additional testing be performed on the west side of Concourse A in the vicinity of sample P-11. Samples south of this location showed low or non-detectable levels of jet fuel. Samples north of boring P-11 showed jet fuel at detectable levels. Therefore, it is recommended that additional subsurface investigation north, east, and west of boring P-11 be performed.
2. During design and prior to contractor selection, prepare the appropriate construction specifications section(s) pertaining to potential hydrocarbon contamination and estimated quantities for bidding. The specifications should include a Remedial Action Plan consisting of:
  - Environmental professional on site during concrete pavement and subgrade exposure in areas overlying the existing hydrant fuel lines.
  - Sniff tests and/or field measurement of exposed soils. Consider usage of an on-site mobile laboratory to minimize downtime.
  - Preparation of a sampling protocol conforming to EPA Method 8260.
  - Strict reporting and chain of ownership procedures.
  - Remediation recommendations for contaminated soils.
  - Backfilling with clean soils and/or aggregates.
  - Continuous and complete coordination with Tennessee Department of Environment and Conservation (TDEC) officials.

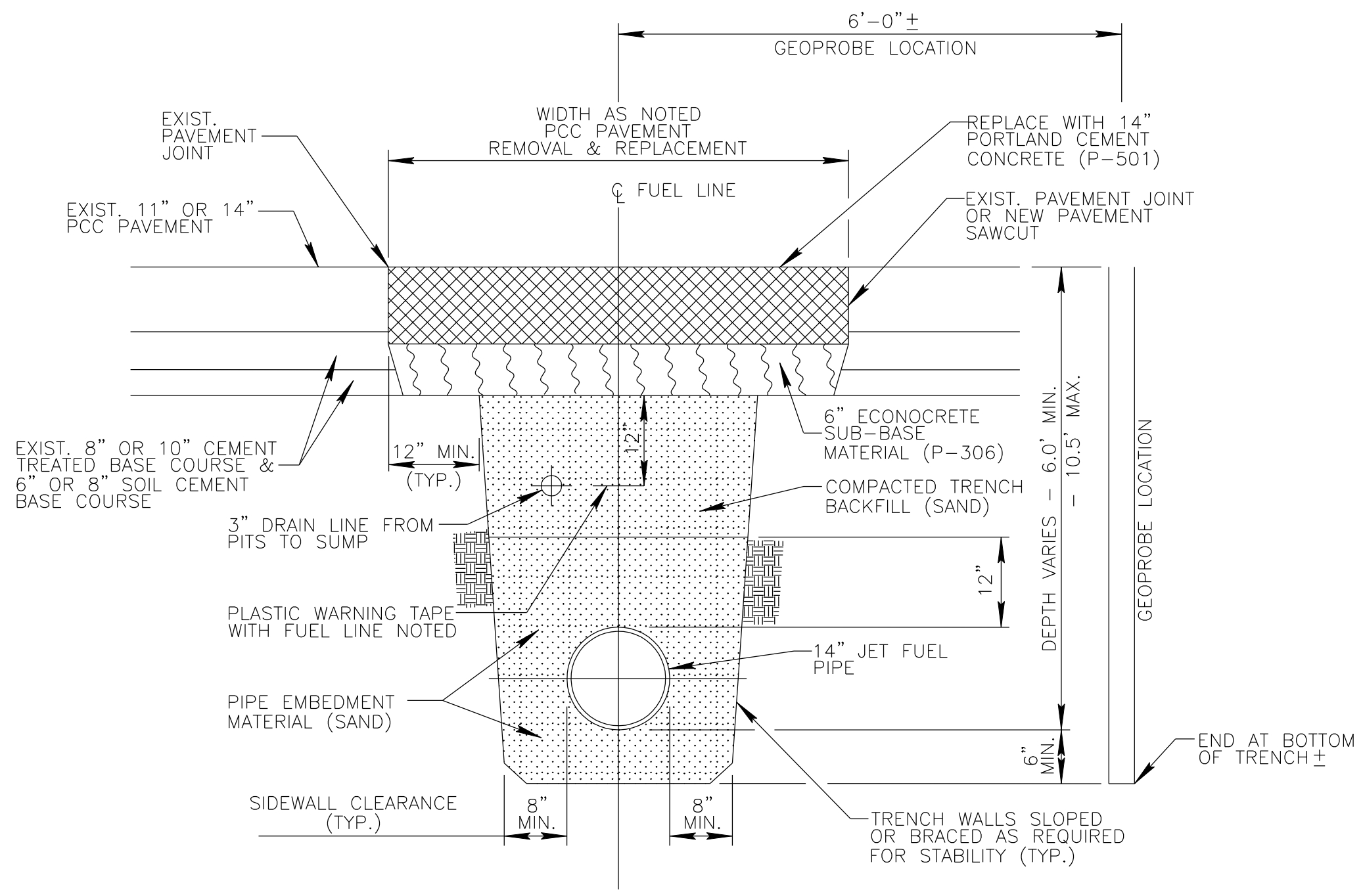
## **APPENDIX D – SUBSURFACE ENVIRONMENTAL INVESTIGATION**



# **TERMINAL APRON RECONSTRUCTION STUDY** MSCAA PROJ. 08-1259-00 **MEMPHIS INTERNATIONAL AIRPORT**

**EXHIBIT D.2  
DIRECT PUSH  
TECHNOLOGY  
BORINGS**

SCALE: 1" = 250'



PIPE TRENCH DETAIL  
N.T.S.



**TERMINAL APRON  
RECONSTRUCTION STUDY**

MSCAA PROJ. 08-1259-00

**MEMPHIS INTERNATIONAL AIRPORT**

**EXHIBIT D.1  
DIRECT PUSH  
TECHNOLOGY  
BORING LOCATION  
SCALE: NTS**

## **APPENDIX D.1 – DIRECT PUSH TECHNOLOGY BORING LOGS**



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P1

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/18/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04293171 LONGITUDE 89.97915426  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                   | PI/D (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|--|------------|
| 0             |                       |            |   |          |                |  |            |
|               |                       | 100        |   |          |                | Concrete                               |            |
|               |                       | 100        |   |          |                | 1.3<br>Soil Cement/Cement Treated Base |            |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay                       | 0.1        |
| 5             |                       |            |   |          |                | 4.0<br>Brown Silty Clay                |            |
|               | DP<br>2               | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg | CL       |                | 7.0<br>Brown Silty Clay                | 2.1        |
|               |                       |            |   |          |                | 10.0<br>Brown Silty Clay               |            |
|               | DP<br>3               | 100        |   | CL       |                | 12.0<br>Brown Silty Clay               | 0.1        |
| 10            |                       |            |   |          |                |  |            |
|               | DP<br>4               | 100        |   | CL       |                |  | 0.1        |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet.           |            |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P2

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/18/10 COMPLETED 3/19/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04285204 LONGITUDE 89.98002324  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION             | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                  |           |
|               |                       | 100        |   |          |                | Concrete                         |           |
|               | DP<br>1               | 100        |   | CL       |                | Gray Silty Clay                  | ND        |
| 5             | DP<br>2               | 100        | DRO - 268 mg/Kg /<br>ORO - 406 mg/Kg<br>(JP5/JP8 - Yes) | SM       |                | Black Silty Sand with Clay Lense | 5.9       |
|               | DP<br>3               | 100        |   | CL       |                | Brown Silty Clay                 | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | Brown Silty Clay                 | ND        |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet.     |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P3**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/20/10 COMPLETED 3/20/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04242451 LONGITUDE 89.98126315  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 1.1 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown and Gray Silty Clay         | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown Silty Clay              |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown and Gray Silty Clay     |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown and Gray Silty Clay    |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |









Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P4**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/24/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04032328 LONGITUDE 89.97940669  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING \_\_\_\_  
NOTES Weather - Cold AFTER DRILLING \_\_\_\_

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG  | MATERIAL DESCRIPTION                          | PID (ppm) |
|---------------|-----------------------|------------|---|----------|---|---|-----------|
| 0             |                       |            |   |          |   |   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |  | Concrete                                      |           |
|               |                       | 100        |   |          |  | 1.4<br>1.9<br>Soil Cement/Cement Treated Base |           |
|               | DP<br>1               | 100        |   | CL       |  | Brown Silty Clay                              | ND        |
| 5             |                       |            |   |          |   | 4.0<br>Brown Sandy Clay                       |           |
|               | DP<br>2               | 100        |   | CL       |  |   | ND        |
|               |                       |            |   |          |   | 7.0<br>Red Sandy Clay                         |           |
|               | DP<br>3               | 100        |   | CL       |  |   | ND        |
| 10            |                       |            |   |          |   | 10.0<br>Red Sandy Clay                        |           |
|               | DP<br>4               | 100        |   | CL       |  |   | ND        |
|               |                       |            |   |          |   | 12.0<br>Bottom of hole at 12.0 feet.          |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P5

PAGE 1 OF 1

|   |  |
|---|--|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u>   |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>                |
| DATE STARTED <u>3/22/10</u> COMPLETED <u>3/22/10</u>        | GROUND ELEVATION _____ HOLE SIZE <u>2.5"</u>           |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.0407257</u> LONGITUDE <u>89.9801992</u> |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS: _____                             |
| LOGGED BY <u>B.W.</u> CHECKED BY <u>D.M.</u>                | AT TIME OF DRILLING <u>---</u>                         |
| NOTES <u>Weather - Cold &amp; Windy</u>                     | AFTER DRILLING <u>---</u>                              |

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 1.0 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown and Gray Silty Clay         | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown Silty Clay              |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown Silty Clay              |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown Silty Clay             |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P6**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/22/10 COMPLETED 3/22/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.0417655 LONGITUDE 89.9816802  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold & Raining AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay                  | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown Silty Clay with Gravel  |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown and Gray Silty Clay     |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown Silty Clay             |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |






Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P7**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04033852 LONGITUDE 89.98381371  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                  | U.S.C.S. | GRAPHIC<br>LOG   | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|--|----------|--|------------------------------|-----------|
| 0             |                       |            |  |          |  |                              |           |
|               |                       | 100        | DRO - 11.9 mg/Kg /<br>ORO - 15.5 mg/Kg |          |   | Concrete                     |           |
|               |                       |            |  |          |   | 1.2                          |           |
|               |                       | 100        |  |          |  | 2.1                          |           |
|               | DP 1                  | 100        |  | CL       |  | Brown and Gray Silty Clay    | ND        |
| 5             |                       |            |  |          |  | 4.0                          |           |
|               | DP 2                  | 100        |  | CL       |  | Brown and Gray Silty Clay    | ND        |
|               |                       |            |  |          |  | 7.0                          |           |
|               | DP 3                  | 100        |  | CL       |  | Brown and Gray Silty Clay    | ND        |
| 10            |                       |            |  |          |  | 10.0                         |           |
|               | DP 4                  | 100        |  | CL       |  | Brown and Gray Silty Clay    | ND        |
|               |                       |            |  |          |  | 12.0                         |           |
|               |                       |            |  |          |  | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P8

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04115135 LONGITUDE 89.98364768  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                 |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               | DP<br>3               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P9**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04238891 LONGITUDE 89.98198955  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 1.0 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay                  | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown and Gray Silty Clay     |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown Silty Clay              |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown and Gray Silty Clay    |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |









Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P10**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/25/10 COMPLETED 3/25/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04368491 LONGITUDE 89.9834308  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. ☒ AT TIME OF DRILLING 4.0 ft  
NOTES Weather - Cool ☒ AFTER DRILLING 8.0 ft

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                  | U.S.C.S. | GRAPHIC<br>LOG   | MATERIAL DESCRIPTION                | PID (ppm) |
|---------------|-----------------------|------------|--|----------|--|-------------------------------------|-----------|
| 0             |                       |            |  |          |  |                                     |           |
|               |                       | 100        | DRO - 18.6 mg/Kg /<br>ORO - 20.1 mg/Kg |          |   | Concrete                            |           |
|               |                       |            |  |          | 1.8  |                                     |           |
|               | DP<br>1               | 100        |  | CL       |   | Gray Silty Clay                     | ND        |
|               |                       |            |  |          | 4.0  | <input checked="" type="checkbox"/> |           |
| 5             | DP<br>2               | 100        |  | CL       |   | Brown Silty Clay                    | ND        |
|               |                       |            |  |          | 7.0  |                                     |           |
|               | DP<br>3               | 100        |  | CL       |   | Brown Silty Clay                    | ND        |
| 10            |                       |            |  |          | 10.0   |                                     |           |
|               | DP<br>4               | 100        |  | CL       |   | Brown Silty Clay                    | ND        |
|               |                       |            |  |          | 13.0   |                                     |           |
|               | DP<br>5               | 100        |  | CL       |  | Brown Silty Clay                    | ND        |
| 15            |                       |            |  |          | 16.0   |                                     |           |
|               |                       |            |  |          |  | Bottom of hole at 16.0 feet.        |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P11**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/25/10 COMPLETED 3/25/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04296911 LONGITUDE 89.9841312  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS  | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | PID (ppm) |
|---------------|-----------------------|------------|--|----------|----------------|---------------------------------|-----------|
| 0             |                       |            |  |          |                |                                 |           |
|               |                       | 100        |  |          |                | Concrete                        |           |
|               |                       |            |  |          |                | 1.2                             |           |
|               |                       |            |  |          |                | 1.7                             |           |
|               | DP 1                  | 100        | DRO - 2,160 mg/Kg<br>/ ORO - < 1,000<br>mg/Kg (JP5/JP8 -<br>Yes) | CL       |                | Soil Cement/Cement Treated Base |           |
|               |                       | 100        |  |          |                | Brown Silty Clay                | 33.1      |
| 5             | DP 2                  | 100        |  | CL       |                | Brown Silty Clay                | 14.7      |
|               |                       |            |  |          |                | 7.0                             |           |
|               | DP 3                  | 100        |  | CL       |                | Brown Silty Clay                | 13.6      |
| 10            |                       |            |  |          |                | 10.0                            |           |
|               | DP 4                  | 100        |  | CL       |                | Brown Silty Clay                | ND        |
|               |                       |            |  |          |                | 12.0                            |           |
|               |                       |            |  |          |                | Bottom of hole at 12.0 feet.    |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P12

PAGE 1 OF 1

TRI-STATE TESTING SERVICES, INC.

|                     |                                  |                      |                                  |
|---------------------|----------------------------------|----------------------|----------------------------------|
| CLIENT              | Pickering                        | PROJECT NAME         | MEM Terminal Apron Investigation |
| PROJECT NUMBER      | E-9-429                          | PROJECT LOCATION     | 2491 Winchester                  |
| DATE STARTED        | 3/18/10                          | COMPLETED            | 3/18/10                          |
| DRILLING CONTRACTOR | Tri-State Testing Services, Inc. | GROUND ELEVATION     |                                  |
| DRILLING METHOD     | DP                               | HOLE SIZE            | 2.5"                             |
| LOGGED BY           | W.S.                             | LATITUDE             | 35.04262818                      |
| CHECKED BY          | D.M.                             | LONGITUDE            | 89.97899749                      |
| NOTES               | Weather - Cool & Cloudy          | GROUND WATER LEVELS: |                                  |
|                     |                                  | AT TIME OF DRILLING  | ---                              |
|                     |                                  | AFTER DRILLING       | ---                              |

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | TESTS                                      | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION            | PID (ppm) |
|------------|--------------------|------------|--|----------|-------------|---------------------------------|-----------|
| 0          |                    |            |  |          |             |                                 |           |
|            |                    | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0 mg/Kg |          | 1.3         | Concrete                        |           |
|            |                    | 100        |  |          | 2.4         | Soil Cement/Cement Treated Base |           |
|            | DP 1               | 100        |  | CL       | 4.0         | Brown Silty Clay                | ND        |
| 5          |                    |            |  |          |             |                                 |           |
|            | DP 2               | 100        |  | CL       | 8.0         | Brown and Gray Silty Clay       | ND        |
| 10         |                    |            |  |          |             |                                 |           |
|            | DP 3               | 100        |  | CL       | 10.5        | Brown Silty Clay                | ND        |
|            | DP 4               | 100        |  | CL       | 12.0        | Brown Silty Clay                | ND        |
|            |                    |            |  |          |             | Bottom of hole at 12.0 feet.    |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P13

PAGE 1 OF 1

|   |  |
|---|--|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u>     |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>                  |
| DATE STARTED <u>3/18/10</u> COMPLETED <u>3/18/10</u>        | GROUND ELEVATION _____ HOLE SIZE <u>2.5"</u>             |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.04250539</u> LONGITUDE <u>89.97938859</u> |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS: _____                               |
| LOGGED BY <u>W.S.</u> CHECKED BY <u>D.M.</u>                | AT TIME OF DRILLING <u>---</u>                           |
| NOTES <u>Weather - Cool &amp; Cloudy</u>                    | AFTER DRILLING <u>---</u>                                |

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | TESTS                                      | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION            | PID (ppm) |
|------------|--------------------|------------|--|----------|-------------|---------------------------------|-----------|
| 0          |                    |            |  |          |             |                                 |           |
|            |                    | 100        |  |          |             | Concrete                        |           |
|            |                    | 100        |  |          |             | 1.3                             |           |
|            |                    |            |  |          |             | 1.8                             |           |
|            | DP 1               | 100        |  | CL       |             | Soil Cement/Cement Treated Base |           |
|            |                    |            |  |          |             | Brown Silty Clay                | ND        |
| 5          |                    |            |  |          |             | 4.0                             |           |
|            | DP 2               | 100        |  | CL       |             | Brown and Gray Silty Clay       | 0.1       |
|            |                    |            |  |          |             | 8.0                             |           |
| 10         | DP 3               | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0 mg/Kg | CL       |             | Brown and Gray Silty Clay       | 0.4       |
|            | DP 4               | 100        |  | CL       |             | 10.0                            |           |
|            |                    |            |  |          |             | Brown and Gray Silty Clay       | ND        |
|            |                    |            |  |          |             | 12.0                            |           |
|            |                    |            |  |          |             | Bottom of hole at 12.0 feet.    |           |












Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P14**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/18/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04241961 LONGITUDE 89.97970062  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Cloudy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                  | U.S.C.S. | GRAPHIC<br>LOG  | MATERIAL DESCRIPTION            | PID (ppm) |
|---------------|-----------------------|------------|--|----------|---|---------------------------------|-----------|
| 0             |                       |            |  |          |   |                                 |           |
|               |                       | 100        |  |          |    | Concrete                        |           |
|               |                       | 100        |  |          |    | Soil Cement/Cement Treated Base |           |
|               | DP<br>1               | 100        |  | CL       |    | Gray Silty Clay                 | 0.3       |
| 5             |                       |            |  |          |    | Brown Silty Clay                |           |
|               | DP<br>2               | 100        | DRO - 14.2 mg/Kg /<br>ORO - 11.3 mg/Kg | CL       |    |                                 | 0.5       |
|               |                       |            |  |          |    | Gray Silty Clay                 |           |
| 10            | DP<br>3               | 100        |  | CL       |  |                                 | ND        |
|               | DP<br>4               | 100        |  | CL       |  | Brown and Gray Silty Clay       | ND        |
|               |                       |            |  |          |  | Bottom of hole at 12.0 feet.    |           |











Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P15**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/18/10 COMPLETED 3/18/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04262472 LONGITUDE 89.97991437  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Cloudy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                    | U.S.C.S. | GRAPHIC<br>LOG   | MATERIAL DESCRIPTION                   | PID (ppm) |
|---------------|-----------------------|------------|--|----------|--|--|-----------|
| 0             |                       |            |  |          |  |  |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - 11.2 mg/Kg |          |   | Concrete                               |           |
|               |                       | 100        |  |          |   | 1.3<br>Soil Cement/Cement Treated Base |           |
|               | DP 1                  | 100        |  | CL       |   | 2.3<br>Brown Silty Clay                | ND        |
| 5             | DP 2                  | 100        |  | CL       |   | 4.0<br>Brown Silty Clay                | ND        |
|               | DP 3                  | 100        |  | CL       |   | 6.0<br>Brown Silty Clay                | ND        |
|               | DP 4                  | 100        |  | CL       |   | 8.0<br>Brown Silty Clay                | ND        |
| 10            | DP 5                  | 100        |  | CL       |   | 10.0<br>Brown Silty Clay               | ND        |
|               |                       |            |  |          |  | 12.0<br>Brown Silty Clay               | ND        |
|               |                       |            |  |          |  | Bottom of hole at 12.0 feet.           |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P16

PAGE 1 OF 1

|   |  |
|---|--|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u>     |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>                  |
| DATE STARTED <u>3/18/10</u> COMPLETED <u>3/18/10</u>        | GROUND ELEVATION _____ HOLE SIZE <u>2.5"</u>             |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.04311448</u> LONGITUDE <u>89.98006865</u> |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS: _____                               |
| LOGGED BY <u>W.S.</u> CHECKED BY <u>D.M.</u>                | AT TIME OF DRILLING <u>---</u>                           |
| NOTES <u>Weather - Cool &amp; Clear</u>                     | AFTER DRILLING <u>---</u>                                |

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                 | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|--------------------------------------|-----------|
| 0             |                       |            |   |          |                |                                      |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                             |           |
|               | DP<br>1               | 100        |   | CL       |                | 1.3<br>Brown and Gray Silty Clay     | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | 4.0<br>Brown Silty Clay              | ND        |
|               | DP<br>3               | 100        |   | CL       |                | 7.0<br>Gray Silty Clay               | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | 10.0<br>Brown and Gray Silty Clay    | ND        |
|               |                       |            |   |          |                | 12.0<br>Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P17**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/19/10 COMPLETED 3/19/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04335321 LONGITUDE 89.98003366  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                  | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|--|----------|----------------|------------------------------|-----------|
| 0             |                       |            |  |          |                |                              |           |
|               |                       | 100        |  |          |                | Concrete                     |           |
|               |                       | 100        |  |          |                | 1.2                          |           |
|               |                       |            |  |          |                | 2.1                          |           |
|               | DP<br>1               | 100        |  | CL       |                | Brown Silty Clay             | 0.1       |
| 5             |                       |            |  |          |                | 4.0                          |           |
|               | DP<br>2               | 100        |  | CL       |                | Brown Silty Clay             | 0.3       |
|               |                       |            |  |          |                | 6.5                          |           |
|               | DP<br>3               | 100        |  | CL       |                | Brown Silty Clay             | 0.5       |
| 10            |                       |            |  |          |                | 10.0                         |           |
|               | DP<br>4               | 100        | DRO - 17.7 mg/Kg /<br>ORO - 20.6 mg/Kg | CL       |                | Brown Silty Clay             | 1.9       |
|               |                       |            |  |          |                | 12.0                         |           |
|               |                       |            |  |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P18**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/19/10 COMPLETED 3/19/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04363048 LONGITUDE 89.98010421  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       |            |   |          |                |                              |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                     |           |
|               |                       |            |   |          | 1.3            |                              |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          | 4.0            |                              |           |
| 5             | DP<br>2               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          | 7.0            |                              |           |
|               | DP<br>3               | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
| 10            |                       |            |   |          | 10.0           |                              |           |
|               | DP<br>4               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          | 12.0           |                              |           |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P19**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/19/10 COMPLETED 3/19/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04362597 LONGITUDE 89.98044433  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                 | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|--------------------------------------|-----------|
| 0             |                       |            |   |          |                |                                      |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                             |           |
|               | DP<br>1               | 100        |   | CL       |                | 1.3<br>Brown Silty Clay              | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | 4.0<br>Brown Silty Clay              | ND        |
|               | DP<br>3               | 100        |   | CL       |                | 7.0<br>Brown Silty Clay              | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | 10.0<br>Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 12.0<br>Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P20

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/19/10 COMPLETED 3/19/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.043621 LONGITUDE 89.9808065  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       |            |   |          |                |                              |           |
|               |                       | 100        |   |          |                | Concrete                     |           |
|               |                       |            |   |          | 1.3            |                              |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay             | 1.5       |
|               |                       |            |   |          | 4.0            |                              |           |
| 5             |                       |            |   |          |                | Brown Silty Clay             |           |
|               | DP<br>2               | 100        |   | CL       |                |                              | 1.5       |
|               |                       |            |   |          | 7.0            |                              |           |
|               | DP<br>3               | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg | CL       |                | Brown Silty Clay             | 1.7       |
| 10            |                       |            |   |          | 10.0           |                              |           |
|               | DP<br>4               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          | 12.0           |                              |           |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



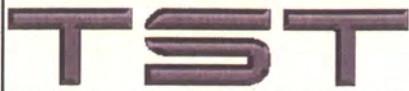
Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P21

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/19/10 COMPLETED 3/19/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04358394 LONGITUDE 89.98110055  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                    | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                       | PID (ppm) |
|---------------|-----------------------|------------|--|----------|----------------|--|-----------|
| 0             |                       |            |  |          |                |  |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - 12.5 mg/Kg |          |                | Concrete                                   |           |
|               |                       | 100        |  |          |                | 1.3<br>1.7 Soil Cement/Cement Treated Base |           |
|               | DP<br>1               | 100        |  | CL       |                | Brown Silty Clay                           | ND        |
| 5             |                       |            |  |          |                | 4.0<br>Brown Silty Clay                    |           |
|               | DP<br>2               | 100        |  | CL       |                |  | ND        |
|               |                       |            |  |          |                | 7.0<br>Brown Silty Clay                    |           |
|               | DP<br>3               | 100        |  | CL       |                |  | ND        |
| 10            |                       |            |  |          |                | 10.0<br>Brown Silty Clay with Sand Lense   |           |
|               | DP<br>4               | 100        |  | CL       |                |  | ND        |
|               |                       |            |  |          |                | 12.0<br>Bottom of hole at 12.0 feet.       |           |










Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P22

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/19/10 COMPLETED 3/19/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04368602 LONGITUDE 89.98136938  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG  | MATERIAL DESCRIPTION                          | PID (ppm) |
|---------------|-----------------------|------------|---|----------|---|---|-----------|
| 0             |                       |            |   |          |   |   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |    | Concrete                                      |           |
|               |                       | 100        |   |          |    | 1.3<br>1.9<br>Soil Cement/Cement Treated Base |           |
|               | DP<br>1               | 100        |   | CL       |    | Brown Silty Clay                              | ND        |
| 5             |                       |            |   |          |   | 4.0<br>Brown Silty Clay                       |           |
|               | DP<br>2               | 100        |   | CL       |    |   | ND        |
|               |                       |            |   |          |   | 7.0<br>Brown Silty Clay                       |           |
|               | DP<br>3               | 100        |   | CL       |    |   | ND        |
| 10            |                       |            |   |          |   | 10.0<br>Brown and Gray Silty Clay             |           |
|               | DP<br>4               | 100        |   | CL       |   |   | ND        |
|               |                       |            |   |          |   | 13.0<br>Brown Silty Clay                      |           |
|               | DP<br>5               | 100        |   | CL       |  |   | ND        |
| 15            |                       |            |   |          |   | 16.0<br>Bottom of hole at 16.0 feet.          |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P23

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/20/10 COMPLETED 3/20/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04343813 LONGITUDE 89.98132468  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|---------------------------------|-----------|
| 0             |                       |            |   |          |                |                                 |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          | 1.3            | Concrete                        |           |
|               |                       | 100        |   |          | 2.2            | Soil Cement/Cement Treated Base |           |
|               | DP<br>1               | 100        |   |          |                | Brown Silty Clay                | ND        |
| 5             |                       |            |   |          |                | Brown Silty Clay                |           |
|               | DP<br>2               | 100        |   | CL<br>CL |                |                                 | ND        |
| 10            |                       |            |   |          |                |                                 |           |
|               | DP<br>3               | 100        |   | CL       |                | Brown Silty Clay                | ND        |
|               |                       |            |   |          | 12.0           | Bottom of hole at 12.0 feet.    |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P24

PAGE 1 OF 1

|   |  |
|---|--|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u>     |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>                  |
| DATE STARTED <u>3/19/10</u> COMPLETED <u>3/19/10</u>        | GROUND ELEVATION _____ HOLE SIZE <u>2.5"</u>             |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.04317543</u> LONGITUDE <u>89.98132004</u> |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS:                                     |
| LOGGED BY <u>W.S.</u> CHECKED BY <u>D.M.</u>                | AT TIME OF DRILLING <u>---</u>                           |
| NOTES <u>Weather - Cool &amp; Clear</u>                     | AFTER DRILLING <u>---</u>                                |

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | TESTS                                      | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION                 | PID (ppm) |
|------------|--------------------|------------|--|----------|-------------|--------------------------------------|-----------|
| 0          |                    |            |  |          |             |                                      |           |
|            |                    | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0 mg/Kg |          |             | Concrete                             |           |
|            | DP 1               | 100        |  | CL       |             | 1.3<br>Brown Silty Clay              | ND        |
| 5          | DP 2               | 100        |  | CL       |             | 4.0<br>Brown Silty Clay              | ND        |
|            | DP 3               | 100        |  | CL       |             | 7.0<br>Brown Silty Clay              | ND        |
| 10         | DP 4               | 100        |  | CL       |             | 10.0<br>Brown Silty Clay             | ND        |
|            |                    |            |  |          |             | 12.0<br>Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P25

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/20/10 COMPLETED 3/20/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04288442 LONGITUDE 89.981315  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay with Sand Lense  | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown Silty Clay              |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown Silty Clay              |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown Silty Clay             |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P26

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/20/10 COMPLETED 3/20/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04260936 LONGITUDE 89.98131008  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay                  | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown Silty Clay              |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown Silty Clay              |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown Silty Clay             |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P27

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/20/10 COMPLETED 3/20/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.0421678 LONGITUDE 89.98093986  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                | PID (ppm) |
|---------------|-----------------------|------------|----------------------|----------|----------------|-------------------------------------|-----------|
| 0             |                       |            |                      |          |                |                                     |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg   |          |                | 1.0 Concrete                        |           |
|               |                       | 100        | / ORO - < 10.0 mg/Kg |          |                | 1.1 Soil Cement/Cement Treated Base |           |
|               | DP 1                  | 100        |                      | CL       |                | Brown Silty Clay                    | ND        |
| 5             | DP 2                  | 100        |                      | CL       |                | Brown Silty Clay                    | ND        |
|               | DP 3                  | 100        |                      | CL       |                | Brown Silty Clay                    | ND        |
| 10            | DP 4                  | 100        |                      | CL       |                | Brown Silty Clay                    | ND        |
|               |                       |            |                      |          |                | Bottom of hole at 12.0 feet.        |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P28**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/20/10 COMPLETED 3/20/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04195935 LONGITUDE 89.9806778  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                    | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|--|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |  |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - 10.8 mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |  | CL       |                | Brown Silty Clay                  | ND        |
| 5             |                       |            |  |          |                | 4.0 Brown Silty Clay              |           |
|               | DP<br>2               | 100        |  | CL       |                |                                   | ND        |
|               |                       |            |  |          |                | 7.0 Brown and Gray Silty Clay     |           |
|               | DP<br>3               | 100        |  | CL       |                |                                   | ND        |
| 10            |                       |            |  |          |                | 10.0 Brown Silty Clay             |           |
|               | DP<br>4               | 100        |  | CL       |                |                                   | ND        |
|               |                       |            |  |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P29

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/20/10 COMPLETED 3/20/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04179577 LONGITUDE 89.98047179  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                  | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|--|----------|----------------|-----------------------------------|-----------|
| 0             |                       | 100        |  |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |  | CL       |                | Brown Silty Clay                  | ND        |
| 5             | DP<br>2               | 100        | DRO - 15.7 mg/Kg /<br>ORO - 14.5 mg/Kg | CL       |                | 4.0 Brown and Gray Silty Clay     | 0.5       |
|               | DP<br>3               | 100        |  | CL       |                | 7.0 Brown Silty Clay              | ND        |
| 10            | DP<br>4               | 100        |  | CL       |                | 10.0 Brown Silty Clay             | ND        |
|               |                       |            |  |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P30

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/20/10 COMPLETED 3/20/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04156701 LONGITUDE 89.98024183  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                  | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|--|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |  |          |                |                                   |           |
|               |                       | 100        | DRO - 14.8 mg/Kg /<br>ORO - 20.0 mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |  | CL       |                | Brown Silty Clay                  | ND        |
| 5             |                       |            |  |          |                | 4.0 Brown Silty Clay              |           |
|               | DP<br>2               | 100        |  | CL       |                |                                   | ND        |
|               |                       |            |  |          |                | 7.0 Brown Silty Clay              |           |
|               | DP<br>3               | 100        |  | CL       |                |                                   | ND        |
| 10            |                       |            |  |          |                | 10.0 Brown Silty Clay             |           |
|               | DP<br>4               | 100        |  | CL       |                |                                   | ND        |
|               |                       |            |  |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P31**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/20/10 COMPLETED 3/20/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04138575 LONGITUDE 89.98001354  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay                  | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown Silty Clay              |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown Silty Clay              |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown Silty Clay             |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P32

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/22/10 COMPLETED 3/22/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04122456 LONGITUDE 89.97975283  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold & Raining AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | plD (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                 |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               | DP<br>3               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P33**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/21/10 COMPLETED 3/21/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04127054 LONGITUDE 89.97950436  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold & Raining AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                 |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               | DP<br>3               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P34**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/21/10 COMPLETED 3/21/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04106634 LONGITUDE 89.97930437  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown and Gray Silty Clay         | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | 4.0 Brown and Gray Silty Clay     | ND        |
|               | DP<br>3               | 100        |   | CL       |                | 7.0 Brown and Gray Silty Clay     | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | 10.0 Brown and Gray Silty Clay    | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P35**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/21/10 COMPLETED 3/21/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04091677 LONGITUDE 89.9790576  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold, Windy, & Raining AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                 | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|--------------------------------------|-----------|
| 0             |                       |            |   |          |                |                                      |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                             |           |
|               | DP<br>1               | 100        |   | CL       |                | 1.3<br>Brown Silty Clay              | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | 4.0<br>Brown Silty Clay              | ND        |
|               | DP<br>3               | 100        |   | CL       |                | 7.0<br>Brown Silty Clay              | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | 10.0<br>Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 12.0<br>Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P36

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/24/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04069015 LONGITUDE 89.97891968  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|---------------------------------|-----------|
| 0             |                       |            |   |          |                |                                 |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          | 1.2            | Concrete                        |           |
|               |                       | 100        |   |          | 1.8            | Soil Cement/Cement Treated Base |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay                | ND        |
| 5             |                       |            |   |          | 4.0            | Brown Silty Clay                |           |
|               | DP<br>2               | 100        |   | CL       |                |                                 | ND        |
|               |                       |            |   |          | 7.0            | Brown Silty Clay                |           |
|               | DP<br>3               | 100        |   | CL       |                |                                 | ND        |
| 10            |                       |            |   |          | 10.0           | Brown Silty Clay                |           |
|               | DP<br>4               | 100        |   | CL       |                |                                 | ND        |
|               |                       |            |   |          | 12.0           | Bottom of hole at 12.0 feet.    |           |









Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P37**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/21/10 COMPLETED 3/21/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.0405368 LONGITUDE 89.97915581  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG  | MATERIAL DESCRIPTION                       | PID (ppm) |
|---------------|-----------------------|------------|---|----------|---|--|-----------|
| 0             |                       |            |   |          |   |  |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |    | Concrete                                   |           |
|               |                       | 100        |   |          |    | 1.3<br>Soil Cement/Cement Treated Base     |           |
|               | DP<br>1               | 100        |   | CL       |    | 2.0<br>Brown Silty Clay                    | ND        |
| 5             | DP<br>2               | 100        |   | CL       |    | 4.0<br>Brown Silty Clay                    | ND        |
|               | DP<br>3               | 100        |   | CL       |   | 7.0<br>Brown and Gray Silty Clay with Wood | ND        |
| 10            | DP<br>4               | 100        |   | CL       |  | 10.0<br>Gray Silty Clay                    | ND        |
|               |                       |            |   |          |   | 12.0<br>Bottom of hole at 12.0 feet.       |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P38**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/22/10 COMPLETED 3/22/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04016294 LONGITUDE 89.9795395  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                    | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|--|----------|----------------|------------------------------|-----------|
| 0             |                       |            |  |          |                |                              |           |
|               |                       | 100        |  |          |                | Concrete                     |           |
|               |                       |            |  |          | 1.3            |                              |           |
|               | DP<br>1               | 100        | DRO - 30.9 mg/Kg /<br>ORO - < 10.0 mg/Kg | CL       |                | Brown and Gray Silty Clay    | 31.00     |
|               |                       |            |  |          | 4.0            |                              |           |
| 5             | DP<br>2               | 100        |  | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |  |          | 7.0            |                              |           |
|               | DP<br>3               | 100        |  | CL       |                | Brown Silty Clay             | ND        |
| 10            |                       |            |  |          | 10.0           |                              |           |
|               | DP<br>4               | 100        |  | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |  |          | 12.0           |                              |           |
|               |                       |            |  |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P39**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/22/10 COMPLETED 3/22/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04032271 LONGITUDE 89.97975267  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold, Windy, & Raining AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION   | PID (ppm) |
|---------------|-----------------------|------------|----------------------|----------|----------------|--|-----------|
| 0             |                       |            |                      |          |                |  |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg   |          |                | Concrete   |           |
|               |                       | 100        | / ORO - < 10.0 mg/Kg |          |                | 1.2  |           |
|               |                       |            |                      |          |                | 1.9  |           |
|               | DP 1                  | 100        |                      | CL       |                | Soil Cement/Cement Treated Base<br>Brown and Gray Silty Clay | ND        |
| 5             |                       |            |                      |          |                | 4.0  |           |
|               | DP 2                  | 100        |                      | CL       |                | Brown and Gray Silty Clay                                    | ND        |
|               |                       |            |                      |          |                | 7.0  |           |
|               | DP 3                  | 100        |                      | CL       |                | Brown Silty Clay   | ND        |
| 10            |                       |            |                      |          |                | 10.0   |           |
|               | DP 4                  | 100        |                      | CL       |                | Brown Silty Clay   | ND        |
|               |                       |            |                      |          |                | 12.0   |           |
|               |                       |            |                      |          |                | Bottom of hole at 12.0 feet.                                 |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P40

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/22/10 COMPLETED 3/22/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04052807 LONGITUDE 89.98000822  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       |            |   |          |                |                              |           |
|               |                       | 100        |   |          |                | Concrete                     |           |
|               | DP 1                  | 100        |   | CL       |                | Gray Silty Clay              | ND        |
| 5             | DP 2                  | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
|               | DP 3                  | 100        |   | CL       |                | Brown and Gray Silty Clay    | 1.2       |
| 10            | DP 4                  | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg | CL       |                | Brown and Gray Silty Clay    | 1.8       |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P41

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/22/10 COMPLETED 3/22/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04090406 LONGITUDE 89.98042332  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       |            |   |          |                |                              |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                 |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown Silty Clay         |           |
|               | DP<br>2               | 100        |   | CL       |                |                              | ND        |
|               |                       |            |   |          |                | 7.0 Brown Silty Clay         |           |
|               | DP<br>3               | 100        |   | CL       |                |                              | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown Silty Clay        |           |
|               | DP<br>4               | 100        |   | CL       |                |                              | ND        |
|               |                       |            |   |          |                | 12.0                         |           |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P42

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/22/10 COMPLETED 3/22/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04107792 LONGITUDE 89.98070005  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                 | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|--------------------------------------|-----------|
| 0             |                       |            |   |          |                |                                      |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                             |           |
|               | DP<br>1               | 100        |   | CL       |                | 1.3<br>Brown Silty Clay              | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | 4.0<br>Brown Silty Clay              | ND        |
|               | DP<br>3               | 100        |   | CL       |                | 7.0<br>Brown Silty Clay              | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | 10.0<br>Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 12.0<br>Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P43**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04143654 LONGITUDE 89.98092775  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown and Gray Silty Clay         | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown and Gray Silty Clay     |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown and Gray Silty Clay     |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown and Gray Silty Clay    |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P44**

PAGE 1 OF 1

|   |  |
|---|--|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u>     |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>                  |
| DATE STARTED <u>3/22/10</u> COMPLETED <u>3/22/10</u>        | GROUND ELEVATION _____ HOLE SIZE <u>2.5"</u>             |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.04145021</u> LONGITUDE <u>89.98116846</u> |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS:                                     |
| LOGGED BY <u>B.W.</u> CHECKED BY <u>D.M.</u>                | AT TIME OF DRILLING <u>---</u>                           |
| NOTES <u>Weather - Cloudy &amp; Raining</u>                 | AFTER DRILLING <u>---</u>                                |

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | TESTS                                      | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|------------|--------------------|------------|--|----------|-------------|------------------------------|-----------|
| 0          |                    |            |  |          |             |                              |           |
|            |                    | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0 mg/Kg |          |             | 0.9 Concrete                 |           |
|            | DP 1               | 100        |  | CL       |             | Brown and Gray Silty Clay    | ND        |
| 5          | DP 2               | 100        |  | CL       |             | Brown and Gray Silty Clay    | ND        |
|            | DP 3               | 100        |  | CL       |             | Brown and Gray Silty Clay    | ND        |
| 10         | DP 4               | 100        |  | CL       |             | Brown and Gray Silty Clay    | ND        |
|            |                    |            |  |          |             | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P45

PAGE 1 OF 1

|   |   |
|---|---|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u>    |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>                 |
| DATE STARTED <u>3/22/10</u> COMPLETED <u>3/22/10</u>        | GROUND ELEVATION _____ HOLE SIZE <u>2.5"</u>            |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.04169665</u> LONGITUDE <u>89.9814207</u> |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS:                                    |
| LOGGED BY <u>W.S.</u> CHECKED BY <u>D.M.</u>                | AT TIME OF DRILLING <u>---</u>                          |
| NOTES <u>Weather - Cold</u>                                 | AFTER DRILLING <u>---</u>                               |

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown and Gray Silty Clay         | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown and Gray Silty Clay     |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown Silty Clay              |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown Silty Clay             |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P46

PAGE 1 OF 1

|   |   |
|---|---|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u>    |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>                 |
| DATE STARTED <u>3/22/10</u> COMPLETED <u>3/22/10</u>        | GROUND ELEVATION _____ HOLE SIZE <u>2.5"</u>            |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.04156374</u> LONGITUDE <u>89.9819166</u> |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS:                                    |
| LOGGED BY <u>B.W.</u> CHECKED BY <u>D.M.</u>                | AT TIME OF DRILLING <u>---</u>                          |
| NOTES <u>Weather - Raining &amp; Windy</u>                  | AFTER DRILLING <u>---</u>                               |

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       |            |   |          |                |                              |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                 |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
|               | DP<br>3               | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P47

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/22/10 COMPLETED 3/22/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04139754 LONGITUDE 89.98216681  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Raining & Cold AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown and Gray Silty Clay         | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown and Gray Silty Clay     |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown and Gray Silty Clay     |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown and Gray Silty Clay    |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P48**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/22/10 COMPLETED 3/22/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04118312 LONGITUDE 89.98236247  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold, Windy, & Raining AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown and Gray Silty Clay         | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown and Gray Silty Clay     |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown and Gray Silty Clay     |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown and Gray Silty Clay    |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P49

PAGE 1 OF 1

TRI-STATE TESTING SERVICES, INC.

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/22/10 COMPLETED 3/22/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04102778 LONGITUDE 89.98260017  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION          | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-------------------------------|-----------|
| 0             |                       |            |   |          |                |                               |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 1.0 Concrete                  |           |
|               | DP<br>1               | 100        |   | CL       |                | 1.0 Brown and Gray Silty Clay | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown Silty Clay          | ND        |
|               | DP<br>2               | 100        |   | CL       |                | 7.0 Brown Silty Clay          | ND        |
|               |                       |            |   |          |                | 10.0 Brown Silty Clay         | ND        |
| 10            |                       |            |   |          |                | 12.0 Brown Silty Clay         | ND        |
|               | DP<br>3               | 100        |   | CL       |                |                               |           |
|               |                       |            |   |          |                |                               |           |
|               | DP<br>4               | 100        |   | CL       |                |                               |           |
|               |                       |            |   |          |                |                               |           |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet.  |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P50**

PAGE 1 OF 1

|   |  |
|---|--|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u>     |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>                  |
| DATE STARTED <u>3/22/10</u> COMPLETED <u>3/22/10</u>        | GROUND ELEVATION _____ HOLE SIZE <u>2.5"</u>             |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.0407693</u> LONGITUDE <u>-89.98284713</u> |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS:                                     |
| LOGGED BY <u>W.S.</u> CHECKED BY <u>D.M.</u>                | AT TIME OF DRILLING <u>---</u>                           |
| NOTES <u>Weather - Cool</u>                                 | AFTER DRILLING <u>---</u>                                |

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                 | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|--------------------------------------|-----------|
| 0             |                       |            |   |          |                |                                      |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                         |           |
|               | DP<br>1               | 100        |   | CL       |                | 0.9 Brown Silty Clay with Sand Lense | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown Silty Clay                 |           |
|               | DP<br>2               | 100        |   | CL       |                | 4.0 Brown Silty Clay                 | ND        |
|               |                       |            |   |          |                | 7.0 Brown Silty Clay                 |           |
|               | DP<br>3               | 100        |   | CL       |                | 7.0 Brown Silty Clay                 | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown Silty Clay                |           |
|               | DP<br>4               | 100        |   | CL       |                | 10.0 Brown Silty Clay                | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet.    |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P51**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/22/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04060252 LONGITUDE 89.98309831  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING \_\_\_\_\_  
NOTES Weather - Cool AFTER DRILLING \_\_\_\_\_

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                 | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|--------------------------------------|-----------|
| 0             |                       |            |   |          |                |                                      |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                             |           |
|               | DP<br>1               | 100        |   | CL       |                | 1.1<br>Brown Silty Clay              | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | 4.0<br>Brown Silty Clay              | ND        |
|               | DP<br>3               | 100        |   | CL       |                | 7.0<br>Brown Silty Clay              | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | 10.0<br>Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 12.0<br>Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P52

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04037871 LONGITUDE 89.98330319  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       |            |   |          |                |                              |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                     |           |
|               |                       | 100        |   |          |                | 1.3                          |           |
|               |                       |            |   |          |                | 1.9                          |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
| 5             |                       |            |   |          |                | 4.0                          |           |
|               | DP<br>2               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 7.0                          |           |
|               | DP<br>3               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
| 10            |                       |            |   |          |                | 10.0                         |           |
|               | DP<br>4               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 12.0                         |           |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P53**

PAGE 1 OF 1

TRI-STATE TESTING SERVICES, INC.

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.0401947 LONGITUDE 89.98357624  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                  | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|--|----------|----------------|------------------------------|-----------|
| 0             |                       |            |  |          |                |                              |           |
|               |                       | 100        | DRO - 12.5 mg/Kg /<br>ORO - 16.3 mg/Kg |          |                | Concrete                     |           |
|               |                       |            |  |          | 1.2            |                              |           |
|               | DP<br>1               | 100        |  | CL       |                | Gray Silty Clay              | ND        |
|               |                       |            |  |          | 4.0            |                              |           |
| 5             | DP<br>2               | 100        |  | CL       |                | Brown and Gray Silty Clay    | ND        |
|               |                       |            |  |          | 7.0            |                              |           |
|               | DP<br>3               | 100        |  | CL       |                | Brown and Gray Silty Clay    | ND        |
| 10            |                       |            |  |          | 10.0           |                              |           |
|               | DP<br>4               | 100        |  | CL       |                | Brown and Gray Silty Clay    | ND        |
|               |                       |            |  |          | 12.0           |                              |           |
|               |                       |            |  |          |                | Bottom of hole at 12.0 feet. |           |









Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P54**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/24/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04055187 LONGITUDE 89.98408504  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG  | MATERIAL DESCRIPTION            | PID (ppm) |
|---------------|-----------------------|------------|---|----------|---|---------------------------------|-----------|
| 0             |                       |            |   |          |   |                                 |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |    | Concrete                        |           |
|               |                       | 100        |   |          |    | Soil Cement/Cement Treated Base |           |
|               | DP<br>1               | 100        |   | CL       |    | Brown Silty Clay                | ND        |
| 5             | DP<br>2               | 100        |   | CL       |    | Brown and Gray Silty Clay       | ND        |
|               | DP<br>3               | 100        |   | CL       |   | Brown Silty Clay                | ND        |
| 10            | DP<br>4               | 100        |   | CL       |  | Brown Silty Clay                | ND        |
|               |                       |            |   |          |   | Bottom of hole at 12.0 feet.    |           |









Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P55**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/24/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04074033 LONGITUDE 89.98413081  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING \_\_\_\_\_  
NOTES Weather - Cool & Windy AFTER DRILLING \_\_\_\_\_

| DEPTH<br>(ft)                | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG  | MATERIAL DESCRIPTION                | PID (ppm) |
|------------------------------|-----------------------|------------|---|----------|---|-------------------------------------|-----------|
| 0                            |                       |            |   |          |   |                                     |           |
|                              |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |  | 1.2 Concrete                        |           |
|                              |                       | 100        |   |          |  | 2.0 Soil Cement/Cement Treated Base |           |
|                              | DP 1                  | 100        |   | CL       |  | Brown Silty Clay                    | ND        |
| 5                            |                       |            |   |          |   | 4.0 Brown Silty Clay                |           |
|                              | DP 2                  | 100        |   | CL       |  |                                     | ND        |
|                              |                       |            |   |          |   | 7.0 Brown Silty Clay                |           |
|                              | DP 3                  | 100        |   | CL       |  |                                     | ND        |
| 10                           |                       |            |   |          |   | 10.0 Brown Silty Clay               |           |
|                              | DP 4                  | 100        |   | CL       |  |                                     | ND        |
|                              |                       |            |   |          |   | 12.0                                |           |
| Bottom of hole at 12.0 feet. |                       |            |   |          |   |                                     |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P56**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04093927 LONGITUDE 89.98389661  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                 | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|--------------------------------------|-----------|
| 0             |                       |            |   |          |                |                                      |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                             |           |
|               | DP<br>1               | 100        |   | CL       |                | 0.9<br>Brown Silty Clay              | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | 4.0<br>Brown Silty Clay              | ND        |
|               | DP<br>3               | 100        |   | CL       |                | 7.0<br>Brown Silty Clay              | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | 10.0<br>Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 12.0<br>Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P57**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04136144 LONGITUDE 89.98340066  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                     |           |
|               | DP 1                  | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
| 5             | DP 2                  | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
|               | DP 3                  | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
| 10            | DP 4                  | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P58**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04152459 LONGITUDE 89.98320882  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                 | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|--------------------------------------|-----------|
| 0             |                       |            |   |          |                |                                      |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                             |           |
|               | DP<br>1               | 100        |   | CL       |                | 1.0<br>Brown Silty Clay              | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | 4.0<br>Brown Silty Clay              | ND        |
|               | DP<br>3               | 100        |   | CL       |                | 7.0<br>Brown Silty Clay              | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | 10.0<br>Brown and Gray Silty Clay    | ND        |
|               |                       |            |   |          |                | 12.0<br>Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P59

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04158248 LONGITUDE 89.98288438  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                | PID (ppm) |
|---------------|-----------------------|------------|----------------------|----------|----------------|-------------------------------------|-----------|
| 0             |                       |            |                      |          |                |                                     |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg   |          |                | 1.0 Concrete                        |           |
|               |                       | 100        | / ORO - < 10.0 mg/Kg |          |                | 1.1 Soil Cement/Cement Treated Base |           |
|               | DP 1                  | 100        |                      | CL       |                | Brown and Gray Silty Clay           | ND        |
| 5             | DP 2                  | 100        |                      | CL       |                | Brown and Gray Silty Clay           | ND        |
|               | DP 3                  | 100        |                      | CL       |                | Brown and Gray Silty Clay           | ND        |
| 10            | DP 4                  | 100        |                      | CL       |                | Brown and Gray Silty Clay           | ND        |
|               |                       |            |                      |          |                | Bottom of hole at 12.0 feet.        |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P60

PAGE 1 OF 1

|   |  |
|---|--|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u>     |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>                  |
| DATE STARTED <u>3/23/10</u> COMPLETED <u>3/23/10</u>        | GROUND ELEVATION _____ HOLE SIZE <u>2.5"</u>             |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.04178979</u> LONGITUDE <u>89.98269573</u> |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS:                                     |
| LOGGED BY <u>W.S.</u> CHECKED BY <u>D.M.</u>                | AT TIME OF DRILLING <u>---</u>                           |
| NOTES <u>Weather - Cold</u>                                 | AFTER DRILLING <u>---</u>                                |

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | TESTS                                      | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|------------|--------------------|------------|--|----------|-------------|-----------------------------------|-----------|
| 0          |                    | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0 mg/Kg |          |             | Concrete                          |           |
|            | DP 1               | 100        |  | CL       |             | 0.9 Brown Silty Clay              | ND        |
| 5          | DP 2               | 100        |  | CL       |             | 4.0 Brown Silty Clay              | ND        |
|            | DP 3               | 100        |  | CL       |             | 7.0 Brown and Gray Silty Clay     | ND        |
| 10         | DP 4               | 100        |  | CL       |             | 10.0 Brown Silty Clay             | ND        |
|            |                    |            |  |          |             | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P61

PAGE 1 OF 1

|   |   |
|---|---|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u>    |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>                 |
| DATE STARTED <u>3/23/10</u> COMPLETED <u>3/23/10</u>        | GROUND ELEVATION _____ HOLE SIZE <u>2.5"</u>            |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.0419884</u> LONGITUDE <u>89.98240534</u> |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS:                                    |
| LOGGED BY <u>W.S.</u> CHECKED BY <u>D.M.</u>                | AT TIME OF DRILLING _____                               |
| NOTES <u>Weather - Cold</u>                                 | AFTER DRILLING _____                                    |

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | TESTS                                      | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION                             | PID (ppm) |
|------------|--------------------|------------|--|----------|-------------|--|-----------|
| 0          |                    |            |  |          |             |  |           |
|            |                    | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0 mg/Kg |          |             | Concrete   |           |
|            | DP 1               | 100        |  | CL       |             | 0.9<br>Brown Silty Clay                          | ND        |
| 5          | DP 2               | 100        |  | CL       |             | 4.0<br>Brown Silty Clay                          | ND        |
|            | DP 3               | 100        |  | CL       |             | 7.0<br>Brown and Gray Silty Clay with Sand Lense | ND        |
| 10         | DP 4               | 100        |  | CL       |             | 10.0<br>Brown Silty Clay                         | ND        |
|            |                    |            |  |          |             | 12.0<br>Bottom of hole at 12.0 feet.             |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P62

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04218196 LONGITUDE 89.98223339  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING \_\_\_\_\_  
NOTES Weather - Cold AFTER DRILLING \_\_\_\_\_

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                          |           |
|               | DP 1                  | 100        |   | CL       |                | 1.0 Brown Silty Clay              | ND        |
| 5             | DP 2                  | 100        |   | CL       |                | 4.0 Brown and Gray Silty Clay     | ND        |
|               | DP 3                  | 100        |   | CL       |                | 7.0 Brown Silty Clay              | ND        |
| 10            | DP 4                  | 100        |   | CL       |                | 10.0 Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P63**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04261528 LONGITUDE 89.98188039  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 1.0 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | 1.0 Brown Silty Clay              | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown Silty Clay              |           |
|               | DP<br>2               | 100        |   | CL       |                | 4.0 Brown Silty Clay              | ND        |
|               |                       |            |   |          |                | 7.0 Brown Silty Clay              |           |
|               | DP<br>3               | 100        |   | CL       |                | 7.0 Brown Silty Clay              | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown Silty Clay             |           |
|               | DP<br>4               | 100        |   | CL       |                | 10.0 Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P64**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04290626 LONGITUDE 89.98192756  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                 | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|--------------------------------------|-----------|
| 0             |                       |            |   |          |                |                                      |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                             |           |
|               | DP<br>1               | 100        |   | CL       |                | 1.0<br>Brown Silty Clay              | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | 4.0<br>Brown Silty Clay              | ND        |
|               | DP<br>3               | 100        |   | CL       |                | 7.0<br>Brown and Gray Silty Clay     | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | 10.0<br>Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 12.0<br>Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P65

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/23/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04314002 LONGITUDE 89.98189333  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION              | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|-----------------------------------|-----------|
| 0             |                       |            |   |          |                |                                   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | 0.9 Concrete                      |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay                  | ND        |
| 5             |                       |            |   |          |                | 4.0 Brown Silty Clay              |           |
|               | DP<br>2               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 7.0 Brown and Gray Silty Clay     |           |
|               | DP<br>3               | 100        |   | CL       |                |                                   | ND        |
| 10            |                       |            |   |          |                | 10.0 Brown Silty Clay             |           |
|               | DP<br>4               | 100        |   | CL       |                |                                   | ND        |
|               |                       |            |   |          |                | 12.0 Bottom of hole at 12.0 feet. |           |



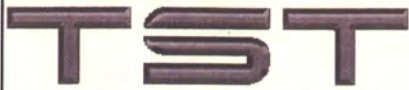
Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P66

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/23/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.0434461 LONGITUDE 89.98194091  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING \_\_\_\_\_  
NOTES Weather - Cool AFTER DRILLING \_\_\_\_\_

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                          | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|---|-----------|
| 0             |                       |            |   |          |                |   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                                      |           |
|               |                       | 100        |   |          |                | 1.4<br>1.8<br>Soil Cement/Cement Treated Base |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay                              | ND        |
| 5             |                       |            |   |          |                | 4.0<br>Brown Silty Clay                       |           |
|               | DP<br>2               | 100        |   | CL       |                |   | ND        |
|               |                       |            |   |          |                | 7.0<br>Brown Silty Clay with Sand Lense       |           |
|               | DP<br>3               | 100        |   | CL       |                |   | ND        |
| 10            |                       |            |   |          |                | 10.0<br>Brown Silty Clay                      |           |
|               | DP<br>4               | 100        |   | CL       |                |   | ND        |
|               |                       |            |   |          |                | 12.0<br>Bottom of hole at 12.0 feet.          |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P67**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/24/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04371643 LONGITUDE 89.9819476  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING \_\_\_\_\_  
NOTES Weather - Cool AFTER DRILLING \_\_\_\_\_

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       |            |   |          |                |                              |           |
|               |                       | 100        |   |          |                | Concrete                     |           |
|               |                       |            |   |          |                | 1.3                          |           |
|               | DP<br>1               | 100        | DRO - 253 mg/Kg /<br>ORO - < 100 mg/Kg<br>(JP5/JP8 - Yes) | CL       |                | Gray Silty Clay              | 2.6       |
|               |                       |            |   |          |                | 4.0                          |           |
| 5             | DP<br>2               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 7.0                          |           |
|               | DP<br>3               | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
| 10            |                       |            |   |          |                | 10.0                         |           |
|               | DP<br>4               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 12.0                         |           |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P68**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/24/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04358243 LONGITUDE 89.98217233  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING \_\_\_\_\_  
NOTES Weather - Cold & Windy AFTER DRILLING \_\_\_\_\_

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       |            |   |          |                |                              |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                     |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
| 5             | DP<br>2               | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
|               | DP<br>3               | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
| 10            | DP<br>4               | 100        |   | CL       |                | Brown and Gray Silty Clay    | ND        |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P69**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/24/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04354557 LONGITUDE 89.98245201  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold & Windy AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|---------------------------------|-----------|
| 0             |                       |            |   |          |                |                                 |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          | 1.2            | Concrete                        |           |
|               |                       | 100        |   |          | 1.6            | Soil Cement/Cement Treated Base |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown and Gray Silty Clay       | ND        |
| 5             |                       |            |   |          | 4.0            | Brown and Gray Silty Clay       |           |
|               | DP<br>2               | 100        |   | CL       |                |                                 | ND        |
|               |                       |            |   |          | 7.0            | Brown and Gray Silty Clay       |           |
|               | DP<br>3               | 100        |   | CL       |                |                                 | ND        |
| 10            |                       |            |   |          | 10.0           | Brown and Gray Silty Clay       |           |
|               | DP<br>4               | 100        |   | CL       |                |                                 | ND        |
|               |                       |            |   |          | 12.0           | Bottom of hole at 12.0 feet.    |           |








Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P70

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/24/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04357364 LONGITUDE 89.98284523  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cold AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG  | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|---|------------------------------|-----------|
| 0             |                       |            |   |          |   |                              |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |    | Concrete                     |           |
|               |                       |            |   |          | 1.7   |                              |           |
|               | DP<br>1               | 100        |   | CL       |    | Brown and Gray Silty Clay    | ND        |
|               |                       |            |   |          | 4.0   |                              |           |
| 5             | DP<br>2               | 100        |   | CL       |    | Brown Silty Clay             | ND        |
|               |                       |            |   |          | 7.0   |                              |           |
|               | DP<br>3               | 100        |   | CH       |   | Brown and Gray Clay          | ND        |
|               |                       |            |   |          | 10.0  |                              |           |
| 10            | DP<br>4               | 100        |   | CH       |  | Gray Clay                    | ND        |
|               |                       |            |   |          | 12.0  |                              |           |
|               |                       |            |   |          |   | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P71

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/24/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04368672 LONGITUDE 89.98307315  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M.  $\nabla$  AT TIME OF DRILLING 4.0 ft  
NOTES Weather - Cool  $\nabla$  AFTER DRILLING 12.7 ft

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | TESTS                                    | U.S.C.S. | GRAPHIC LOG  | MATERIAL DESCRIPTION            | PID (ppm) |
|------------|--------------------|------------|--|----------|--------------|---------------------------------|-----------|
| 0          |                    |            |  |          |              |                                 |           |
|            |                    | 100        | DRO - 13.6 mg/Kg /<br>ORO - < 10.0 mg/Kg |          |              | Concrete                        |           |
|            |                    | 100        |  |          | 1.3          |                                 |           |
|            |                    |            |  |          | 2.0          | Soil Cement/Cement Treated Base |           |
|            | DP 1               | 100        |  | CL       |              | Gray Silty Clay                 | ND        |
|            |                    |            |  |          | 4.0 $\nabla$ |                                 |           |
| 5          | DP 2               | 100        |  | CL       |              | Brown Silty Clay                | ND        |
|            |                    |            |  |          | 6.0          |                                 |           |
|            | DP 3               | 100        |  | CL       |              | Brown Silty Clay                | ND        |
|            |                    |            |  |          | 8.0          |                                 |           |
| 10         | DP 4               | 100        |  | CL       |              | Brown Silty Clay                | ND        |
|            |                    |            |  |          | 12.0         |                                 |           |
|            |                    |            |  |          | $\nabla$     | Bottom of hole at 12.0 feet.    |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P72**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/24/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04339246 LONGITUDE 89.98305023  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M.  $\nabla$  AT TIME OF DRILLING 4.0 ft  
NOTES Weather - Cool  $\nabla$  AFTER DRILLING 12.7 ft

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       |            |   |          |                |                              |           |
|               |                       | 100        | DRO - 24.4 mg/Kg /<br>ORO - < 10.0 mg/Kg<br>(JP5/JP8 - Yes) |          |                | Concrete                     |           |
|               |                       |            |   |          | 1.3            |                              |           |
|               | DP<br>1               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          | 4.0 $\nabla$   |                              |           |
| 5             | DP<br>2               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          | 7.0            |                              |           |
|               | DP<br>3               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
| 10            |                       |            |   |          | 10.0           |                              |           |
|               | DP<br>4               | 100        |   | CL       |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          | 12.0           |                              |           |
|               |                       |            |   |          | $\nabla$       | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P73**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/24/10 COMPLETED 3/24/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04310397 LONGITUDE 89.98304363  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. ☒ AT TIME OF DRILLING 4.0 ft  
NOTES Weather - Cool & Windy ☒ AFTER DRILLING 4.0 ft

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                      | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | PID (ppm) |
|---------------|-----------------------|------------|--|----------|----------------|---------------------------------|-----------|
| 0             |                       |            |  |          |                |                                 |           |
|               |                       | 100        |  |          |                | Concrete                        |           |
|               |                       |            |  |          | 1.2            |                                 |           |
|               |                       |            |  |          |                | Gray Sand with Brown Silty Clay |           |
|               | DP 1                  | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0 mg/Kg | CL       |                |                                 | 11.6      |
|               |                       |            |  |          | 4.0            |                                 |           |
| 5             | DP 2                  | 100        |  | CL       |                | Brown and Gray Silty Clay       | 0.3       |
|               |                       |            |  |          | 6.0            |                                 |           |
|               | DP 3                  | 100        |  | CL       |                | Brown and Gray Silty Clay       | 2.9       |
|               |                       |            |  |          | 8.0            |                                 |           |
|               | DP 4                  | 100        |  | CL       |                | Brown and Gray Silty Clay       | ND        |
|               |                       |            |  |          | 9.4            |                                 |           |
| 10            | DP 5                  | 100        |  | CL       |                | Brown and Gray Silty Clay       | ND        |
|               |                       |            |  |          | 12.0           |                                 |           |
|               |                       |            |  |          |                | Bottom of hole at 12.0 feet.    |           |









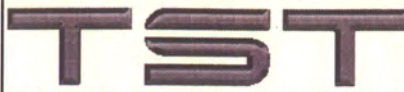
Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

BORING NUMBER P74

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/25/10 COMPLETED 3/25/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.0428419 LONGITUDE 89.9830778  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. ▽ AT TIME OF DRILLING 4.0 ft  
NOTES Weather - Cool ▽ AFTER DRILLING 8.0 ft

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                  | U.S.C.S. | GRAPHIC<br>LOG  | MATERIAL DESCRIPTION             | PID (ppm) |
|---------------|-----------------------|------------|--|----------|---|----------------------------------|-----------|
| 0             |                       |            |  |          |   |                                  |           |
|               |                       | 100        | DRO - 31.4 mg/Kg /<br>ORO - 27.9 mg/Kg |          |  | Concrete                         |           |
|               |                       | 100        |  |          |  | Soil Cement/Cement Treated Base  |           |
|               | DP 1                  | 100        |  | CL       |  | Brown Silty Clay                 | ND        |
| 5             | DP 2                  | 100        |  | CL       |  | Brown Silty Clay                 | ND        |
|               | DP 3                  | 100        |  | CL       |  | Brown Silty Clay with Sand Lense | ND        |
| 10            | DP 4                  | 100        |  | CL       |  | Brown Silty Clay                 | ND        |
|               |                       |            |  |          |   | Bottom of hole at 12.0 feet.     |           |










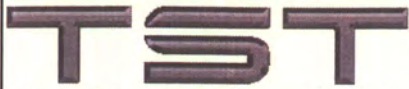
Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P75**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/25/10 COMPLETED 3/25/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04258426 LONGITUDE 89.98326664  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. ☒ AT TIME OF DRILLING 4.0 ft  
NOTES Weather - Cool ☒ AFTER DRILLING 9.0 ft

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                  | U.S.C.S. | GRAPHIC<br>LOG   | MATERIAL DESCRIPTION                                      | PID (ppm) |
|---------------|-----------------------|------------|--|----------|--|---|-----------|
| 0             |                       |            |  |          |  |   |           |
|               |                       | 100        | DRO - 34.0 mg/Kg /<br>ORO - 40.0 mg/Kg |          |   | Concrete  |           |
|               |                       |            |  |          |   | 1.3<br>Soil Cement/Cement Treated Base                    |           |
|               |                       | 100        |  |          |   | 2.4<br>Brown Silty Clay with Sand Lense                   |           |
|               | DP 1                  | 100        |  | CL       |   | 4.0 <input checked="" type="checkbox"/> Brown Silty Clay  | ND        |
| 5             | DP 2                  | 100        |  | CL       |   | 7.0<br>Brown Silty Clay                                   | ND        |
|               | DP 3                  | 100        |  | CL       |   | 10.0 <input checked="" type="checkbox"/> Brown Silty Clay | ND        |
| 10            | DP 4                  | 100        |  | CL       |  | 10.0<br>Brown and Gray Silty Clay                         | ND        |
|               |                       |            |  |          |  | 12.0<br>Bottom of hole at 12.0 feet.                      |           |



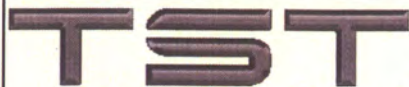
Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P76**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/25/10 COMPLETED 3/25/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04240866 LONGITUDE 89.9835264  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. ☒ AT TIME OF DRILLING 4.0 ft  
NOTES Weather - Cool & Windy ☒ AFTER DRILLING 4.0 ft

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|---------------------------------|-----------|
| 0             |                       |            |   |          |                |                                 |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                        |           |
|               |                       | 100        |   |          |                | Soil Cement/Cement Treated Base |           |
|               | DP 1                  | 100        |   | CL       |                | Brown Silty Clay                | ND        |
| 5             | DP 2                  | 100        |   | CL       |                | Brown Silty Clay                | ND        |
|               | DP 3                  | 100        |   | CL       |                | Brown Silty Clay                | ND        |
| 10            | DP 4                  | 100        |   | CL       |                | Brown Silty Clay                | ND        |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet.    |           |









Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P77**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/25/10 COMPLETED 3/25/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04219344 LONGITUDE 89.98372135  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY B.W. CHECKED BY D.M. ☐ AT TIME OF DRILLING 4.0 ft  
NOTES Weather - Cool & Windy ☒ AFTER DRILLING 4.0 ft

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG  | MATERIAL DESCRIPTION                    | PID (ppm) |
|---------------|-----------------------|------------|---|----------|---|---|-----------|
| 0             |                       |            |   |          |   |   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |  | 1.3 Concrete                            |           |
|               |                       | 100        |   |          |  | 2.6 Soil Cement/Cement Treated Base     |           |
|               | DP 1                  | 100        |   | CL       |  | 4.0 Brown and Gray Silty Clay with Sand | ND        |
| 5             | DP 2                  | 100        |   | CL       |  | 4.0 Brown and Gray Silty Clay           | ND        |
|               | DP 3                  | 100        |   | CL       |  | 7.0 Brown and Gray Silty Clay           | ND        |
| 10            | DP 4                  | 100        |   | CL       |  | 10.0 Brown and Gray Silty Clay          | ND        |
|               |                       |            |   |          |   | 12.0 Bottom of hole at 12.0 feet.       |           |



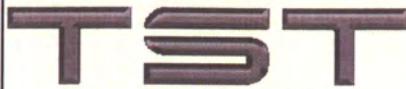
Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P78**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/25/10 COMPLETED 3/25/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04201155 LONGITUDE 89.9839885  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                    | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                | PID (ppm) |
|---------------|-----------------------|------------|--|----------|----------------|-------------------------------------|-----------|
| 0             |                       |            |  |          |                |                                     |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - 11.8 mg/Kg |          |                | 1.2 Concrete                        |           |
|               |                       |            |  |          |                | 2.2 Soil Cement/Cement Treated Base |           |
|               | DP 1                  | 100        |  | CL       |                | Brown Silty Clay                    | ND        |
|               |                       | 100        |  |          |                | 4.0 Brown Silty Clay                |           |
| 5             | DP 2                  | 100        |  | CL       |                | Brown Silty Clay                    | ND        |
|               |                       |            |  |          |                | 7.0 Brown and Gray Silty Clay       |           |
|               | DP 3                  | 100        |  | CL       |                | Brown Silty Clay                    | ND        |
| 10            | DP 4                  | 100        |  | CL       |                | Brown Silty Clay                    | ND        |
|               |                       |            |  |          |                | 12.0 Bottom of hole at 12.0 feet.   |           |









Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P79**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/25/10 COMPLETED 3/25/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04203842 LONGITUDE 89.98426965  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY B.W. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Clear AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG   | MATERIAL DESCRIPTION                          | PID (ppm) |
|---------------|-----------------------|------------|---|----------|--|---|-----------|
| 0             |                       |            |   |          |  |   |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |   | Concrete                                      |           |
|               |                       | 100        |   |          |   | 1.3<br>1.7<br>Soil Cement/Cement Treated Base |           |
|               | DP 1                  | 100        |   | CL       |   | Brown Silty Clay                              | ND        |
| 5             |                       |            |   |          |  | 4.0<br>Brown Silty Clay                       |           |
|               | DP 2                  | 100        |   | CL       |   |   | ND        |
|               |                       |            |   |          |  | 7.0<br>Brown Silty Clay                       |           |
|               | DP 3                  | 100        |   | CL       |   |   | ND        |
| 10            |                       |            |   |          |  | 10.0<br>Brown Silty Clay                      |           |
|               | DP 4                  | 100        |   | CL       |  |   | ND        |
|               |                       |            |   |          |  | 12.0<br>Bottom of hole at 12.0 feet.          |           |



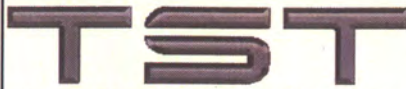
Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P80**

PAGE 1 OF 1

|   |  |                                |                       |
|---|--|--------------------------------|-----------------------|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u> |                                |                       |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>              |                                |                       |
| DATE STARTED <u>3/25/10</u>                                 | COMPLETED <u>3/25/10</u>                             | GROUND ELEVATION _____         | HOLE SIZE <u>2.5"</u> |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.04226713</u>                          | LONGITUDE <u>89.98436155</u>   |                       |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS:                                 |                                |                       |
| LOGGED BY <u>W.S.</u>                                       | CHECKED BY <u>D.M.</u>                               | AT TIME OF DRILLING <u>---</u> |                       |
| NOTES <u>Weather - Cool</u>                                 | AFTER DRILLING <u>---</u>                            |                                |                       |

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|---------------------------------|-----------|
| 0             |                       |            |   |          |                |                                 |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |                | Concrete                        |           |
|               |                       |            |   |          |                | 1.2                             |           |
|               |                       | 100        |   |          |                | 1.8                             |           |
|               | DP<br>1               | 100        |   | CL       |                | Soil Cement/Cement Treated Base |           |
|               |                       |            |   |          |                | Brown Silty Clay                | ND        |
| 5             |                       |            |   |          |                | 4.0                             |           |
|               | DP<br>2               | 100        |   | CL       |                | Brown Silty Clay                | ND        |
|               |                       |            |   |          |                | 7.0                             |           |
|               | DP<br>3               | 100        |   | CL       |                | Brown Silty Clay                | ND        |
| 10            |                       |            |   |          |                | 10.0                            |           |
|               | DP<br>4               | 100        |   | CL       |                | Brown Silty Clay                | ND        |
|               |                       |            |   |          |                | 12.0                            |           |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet.    |           |









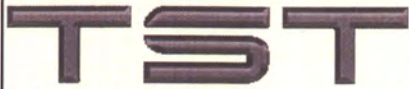
Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P81**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/25/10 COMPLETED 3/25/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04255532 LONGITUDE 89.98436881  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG  | MATERIAL DESCRIPTION                | PID (ppm) |
|---------------|-----------------------|------------|---|----------|---|-------------------------------------|-----------|
| 0             |                       |            |   |          |   |                                     |           |
|               |                       | 100        | DRO - < 10.0 mg/Kg<br>/ ORO - < 10.0<br>mg/Kg |          |  | 1.2 Concrete                        |           |
|               |                       | 100        |   |          |  | 2.2 Soil Cement/Cement Treated Base |           |
|               | DP<br>1               | 100        |   | CL       |  | 4.0 Brown Silty Clay                | ND        |
| 5             | DP<br>2               | 100        |   | CL       |  | 7.0 Brown Silty Clay                | ND        |
|               | DP<br>3               | 100        |   | CL       |  | 10.0 Brown Silty Clay               | ND        |
| 10            | DP<br>4               | 100        |   | CL       |  | 12.0 Brown Silty Clay               | ND        |
|               |                       |            |   |          |   | Bottom of hole at 12.0 feet.        |           |



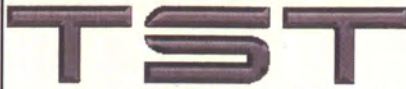
Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P82**

PAGE 1 OF 1

|   |  |                                |                       |
|---|--|--------------------------------|-----------------------|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u> |                                |                       |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>              |                                |                       |
| DATE STARTED <u>3/25/10</u>                                 | COMPLETED <u>3/25/10</u>                             | GROUND ELEVATION _____         | HOLE SIZE <u>2.5"</u> |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.04268968</u>                          | LONGITUDE <u>89.98416618</u>   |                       |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS:                                 |                                |                       |
| LOGGED BY <u>W.S.</u>                                       | CHECKED BY <u>D.M.</u>                               | AT TIME OF DRILLING <u>---</u> |                       |
| NOTES <u>Weather - Cool</u>                                 | AFTER DRILLING <u>---</u>                            |                                |                       |

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS                                  | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION                | PID (ppm) |
|---------------|-----------------------|------------|--|----------|----------------|-------------------------------------|-----------|
| 0             |                       |            |  |          |                |                                     |           |
|               |                       | 100        | DRO - 11.5 mg/Kg /<br>ORO - 25.3 mg/Kg |          |                | 1.2 Concrete                        |           |
|               |                       | 100        |  |          |                | 2.0 Soil Cement/Cement Treated Base |           |
|               | DP<br>1               | 100        |  | CL       |                | Brown Silty Clay                    | ND        |
| 5             |                       |            |  |          |                | 4.0 Brown Silty Clay                |           |
|               | DP<br>2               | 100        |  | CL       |                |                                     | ND        |
|               |                       |            |  |          |                | 7.0 Brown Silty Clay                |           |
|               | DP<br>3               | 100        |  | CL       |                |                                     | ND        |
| 10            |                       |            |  |          |                | 10.0 Brown Silty Clay               |           |
|               | DP<br>4               | 100        |  | CL       |                |                                     | ND        |
|               |                       |            |  |          |                | 12.0 Bottom of hole at 12.0 feet.   |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P83**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/25/10 COMPLETED 3/25/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04324695 LONGITUDE 89.98417639  
DRILLING METHOD DP GROUND WATER LEVELS: \_\_\_\_\_  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING ---  
NOTES Weather - Cool & Raining AFTER DRILLING ---

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|---------------------------------|-----------|
| 0             |                       |            |   |          |                |                                 |           |
|               |                       | 100        |   |          |                | Concrete                        |           |
|               |                       | 100        |   |          |                | Soil Cement/Cement Treated Base |           |
|               | DP 1                  | 100        | DRO - 56.0 mg/Kg /<br>ORO - < 10.0 mg/Kg<br>(JP5/JP8 - Yes) | CL       |                | Brown Silty Clay                | 2.8       |
| 5             | DP 2                  | 100        |   | CL       |                | Brown and Gray Silty Clay       | ND        |
|               | DP 3                  | 100        |   | CL       |                | Brown Silty Clay                | ND        |
| 10            | DP 4                  | 100        |   | CL       |                | Brown Silty Clay                | ND        |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet.    |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

**BORING NUMBER P84**

PAGE 1 OF 1

CLIENT Pickering PROJECT NAME MEM Terminal Apron Investigation  
PROJECT NUMBER E-9-429 PROJECT LOCATION 2491 Winchester  
DATE STARTED 3/25/10 COMPLETED 3/25/10 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 2.5"  
DRILLING CONTRACTOR Tri-State Testing Services, Inc. LATITUDE 35.04349068 LONGITUDE 89.98418111  
DRILLING METHOD DP GROUND WATER LEVELS:  
LOGGED BY W.S. CHECKED BY D.M. AT TIME OF DRILLING \_\_\_\_\_  
NOTES Weather - Cool AFTER DRILLING \_\_\_\_\_

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION         | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|------------------------------|-----------|
| 0             |                       |            |   |          |                |                              |           |
|               |                       | 100        |   |          |                | Concrete                     |           |
|               |                       | 100        |   |          |                | 1.2                          |           |
|               |                       |            |   |          |                | 1.9                          |           |
|               | DP 1                  | 100        | DRO - 37.7 mg/Kg /<br>ORO - < 10.0 mg/Kg<br>(JP5/JP8 - Yes) | CL       |                | Brown Silty Clay             | 18.2      |
| 5             | DP 2                  | 100        |   | CL       |                | 4.0                          |           |
|               |                       |            |   |          |                | Brown Silty Clay             | ND        |
|               | DP 3                  | 100        |   | CL       |                | 7.0                          |           |
|               |                       |            |   |          |                | Brown Silty Clay             | ND        |
| 10            | DP 4                  | 100        |   | CL       |                | 10.0                         |           |
|               |                       |            |   |          |                | Brown Silty Clay             | ND        |
|               |                       |            |   |          |                | 12.0                         |           |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet. |           |



Tri-State Testing Services  
6756 Buckles Cove  
Memphis, Tennessee 38133  
Tel: 901.385.1199; Fax: 901.386.6614

# BORING NUMBER P85

PAGE 1 OF 1

|   |  |                                     |                       |
|---|--|-------------------------------------|-----------------------|
| CLIENT <u>Pickering</u>                                     | PROJECT NAME <u>MEM Terminal Apron Investigation</u> |                                     |                       |
| PROJECT NUMBER <u>E-9-429</u>                               | PROJECT LOCATION <u>2491 Winchester</u>              |                                     |                       |
| DATE STARTED <u>3/25/10</u>                                 | COMPLETED <u>3/25/10</u>                             | GROUND ELEVATION _____              | HOLE SIZE <u>2.5"</u> |
| DRILLING CONTRACTOR <u>Tri-State Testing Services, Inc.</u> | LATITUDE <u>35.04368136</u>                          | LONGITUDE <u>89.98410329</u>        |                       |
| DRILLING METHOD <u>DP</u>                                   | GROUND WATER LEVELS:                                 |                                     |                       |
| LOGGED BY <u>W.S.</u>                                       | CHECKED BY <u>D.M.</u>                               | ▽ AT TIME OF DRILLING <u>3.0 ft</u> |                       |
| NOTES <u>Weather - Cool</u>                                 |  | ▽ AFTER DRILLING <u>9.0 ft</u>      |                       |

| DEPTH<br>(ft) | SAMPLE TYPE<br>NUMBER | RECOVERY % | TESTS   | U.S.C.S. | GRAPHIC<br>LOG | MATERIAL DESCRIPTION            | PID (ppm) |
|---------------|-----------------------|------------|---|----------|----------------|---------------------------------|-----------|
| 0             |                       |            |   |          |                |                                 |           |
|               |                       | 100        |   |          |                | Concrete                        |           |
|               |                       | 100        |   |          |                | Soil Cement/Cement Treated Base |           |
|               | DP 1                  | 100        |   | CL       |                | ▽ Gray Silty Clay               | 1.0       |
| 5             | DP 2                  | 100        | DRO - 39.2 mg/Kg /<br>ORO - < 10.0 mg/Kg<br>(JP5/JP8 - Yes) | CL       |                | Brown Silty Clay                | 13.4      |
|               | DP 3                  | 100        |   | CL       |                | Brown Silty Clay                | ND        |
| 10            | DP 4                  | 100        |   | CL       |                | ▽ Brown Silty Clay              | ND        |
|               |                       |            |   |          |                | Bottom of hole at 12.0 feet.    |           |

**APPENDIX D.2 – DIRECT PUSH TECHNOLOGY  
BORING ANALYTICAL RESULTS**

# REFERENCE 1

## Chemicals of Concern Tennessee Division of Underground Storage Tanks Effective December 1, 2005

| Product Released                | Chemicals To Sample<br>Drinking Water   | Chemicals To Sample<br>Non-Drinking Water   | Chemicals To Sample<br>Surface Drinking<br>Water***   | Chemicals To Sample<br>Surface Non-Drinking<br>Water***       |
|---------------------------------|---|---|---|---|
| Gasoline                        | Benzene<br>Ethylbenzene<br>Toluene<br>Total Xylenes<br>MtBE<br>Naphthalene                            | Benzene<br>Ethylbenzene<br>Toluene<br>Total Xylenes<br>MtBE<br>Naphthalene                              | Benzene<br>Ethylbenzene<br>Toluene<br>Total Xylenes   | Benzene<br>Ethylbenzene<br>Toluene                            |
| Diesel*<br>Jet Fuel<br>Kerosene | Benzene<br>Ethylbenzene<br>Toluene<br>Total Xylenes<br>MtBE<br>PAHs                                   | Benzene<br>Ethylbenzene<br>Toluene<br>Total Xylenes<br>MtBE<br>Naphthalene                              | Benzene<br>Ethylbenzene<br>Toluene<br>Total Xylenes<br>Benzo(a)pyrene                                   | Benzene<br>Ethylbenzene<br>Toluene<br>Modified PAHs****       |
| Waste Oil*<br>Used Oil          | PAHs<br>Cadmium<br>Chromium, Total<br>Lead, Total<br>Silver<br>Zinc                                   | Naphthalene   | Benzo(a)pyrene<br>Cadmium<br>Chromium, Total<br>Lead, Total   | Modified PAHs****   |
| Aviation Fuel*                  | Benzene<br>Ethylbenzene<br>Toluene<br>Total Xylenes<br>MtBE<br>EDB*****<br>EDC<br>PAHs<br>Lead, Total | Benzene<br>Ethylbenzene<br>Toluene<br>Total Xylenes<br>MtBE<br>Naphthalene<br>EDB<br>EDC<br>Lead, Total | Benzene<br>Ethylbenzene<br>Toluene<br>Total Xylenes<br>EDB*****<br>EDC<br>Benzo(a)pyrene<br>Lead, Total | Benzene<br>Ethylbenzene<br>Toluene<br>EDC<br>Modified PAHs*** |
| Unknown**                       | Aviation + Waste Oil  | Aviation + Waste Oil  | Aviation + Waste Oil  | Aviation + Waste Oil  |

\*EPH to be sampled only during closure and analyzed by TN Extractable Petroleum Hydrocarbons (EPH) Method

\*\*Tanks with unknown contents will be required to analyze all COCs

\*\*\*Chemicals to be sampled only at the surface water receptor

\*\*\*\*Modified PAHs - Reference 2 list minus Acenaphthylene, Benzo(g,h,i)perylene, Naphthalene, and Phenanthrene

\*\*\*\*\*EDB drinking water samples shall be analyzed by EPA method 8011

BTEX, MtBE, Naphthalene, EDB and EDC shall be analyzed by EPA method 8260b

PAHs shall be analyzed by either EPA method 8270c SIM or EPA method 8310

Metals shall be analyzed by EPA method 200.7 for water and EPA method 6010/3050 for soil



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

4/2/2010

Tri-State Testing  
Mr. David McCray  
6756 Buckles Cove  
Memphis, TN, 38133

Ref: Analytical Testing  
Report Number: 10-078-0231  
Project Description: Memphis International Airport  
Project #E-9-429

Dear Mr. David McCray:

GTW Analytical Services received 7 sample(s) on 3/19/2010 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA and NELAP.

The results are shown on the attached analysis sheet(s).

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,

*Randell H. Thomas*

Randy Thomas  
Project Manager

RECEIVED  
APR 05 2010

BY: .....



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**CLIENT:** Tri-State Testing  
**Project:** Memphis International Airport  
**Lab Order Number:** 10-078-0231

### CASE NARRATIVE

**Date:** 04/02/10

GTW01

Fingerprint Analysis by Method 8015B  
Jet Fuels

Samples were extracted and analyzed by Method 8015B. Comparisons were made to the chromatographic library, with special attention given to Jet fuels. Results are reported for both Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40), with quantitation achieved using Diesel Fuel and Motor Oil.

The method blank associated with these samples indicated low level contamination in the Oil Range Organics. This contamination did not impact the comparisons with the Jet fuels. All Jet fuels reported and reviewed for comparisons elute within the Diesel Range Organics (C10-C28) area of the chromatogram.

The following sample indicated contamination in Diesel Range Organics (C10-C28) which may be degraded JP5/8. This sample extract also indicated higher levels of what appeared to be waste oil. The sample extract was unable to be concentrated to the default final volume of 1.0 mL due to the viscous nature of the final extract. Reporting limits have been adjusted for the final volume increase.

1003368-002A (P2/6')

The contamination reported as Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40) did not match the Jet fuels used for comparison purposes for the following sample:

1003368-004A (P17/11')



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-078-0231

Lab ID 1003368-001A

Field ID P1/6'

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/19/10

Matrix Soil

Sampled 03/18/10 23:35

### Analytical Method 8015B FIN

|                                 |        |                |                |               |                |                    |                  |
|---------------------------------|--------|----------------|----------------|---------------|----------------|--------------------|------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28782          |               |                | Date/Time Prepped  | 03/24/10 10:06   |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.3 g         | Date/Time Analyzed |                  |
| Compound                        | Result | Units          | MQL            | DF            |                | By                 | Analytical Batch |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          | 10.0           | 1             | 03/26/10 14:42 | MJ                 | 44079            |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          | 10.0           | 1             | 03/26/10 14:42 | MJ                 | 44079            |
| Gasoline/Aviation Jet           | No     |                |                | 1             | 03/26/10 14:42 | MJ                 | 44079            |
| JP4                             | No     |                |                | 1             | 03/26/10 14:42 | MJ                 | 44079            |
| JP5 / JP8                       | No     |                |                | 1             | 03/26/10 14:42 | MJ                 | 44079            |
| JP7                             | No     |                |                | 1             | 03/26/10 14:42 | MJ                 | 44079            |
| JP10                            | No     |                |                | 1             | 03/26/10 14:42 | MJ                 | 44079            |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1             | 03/26/10 14:42 | MJ                 | 44079            |
| Surrogate: o-Terphenyl          |        | 70 %           | Limits: 50-150 | 1             | 03/26/10 14:42 | MJ                 | 44079            |

### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/02/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-078-0231

Lab ID 1003368-002A

Field ID P2/6'

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/19/10

Matrix Soil

Sampled 03/19/10 0:07

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |                |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|----------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28782 |                |        | Date/Time Prepped  | 03/24/10 10:06 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.1 g |                    |                |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By             | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | 268            | mg/Kg | 100            | 1      | 03/26/10 16:33     | MJ             | 44079            |
| Oil Range Organics (>C28-C40)   |       | 406            | mg/Kg | 100            | 1      | 03/26/10 16:33     | MJ             | 44079            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 03/26/10 16:33     | MJ             | 44079            |
| JP4                             |       | No             |       |                | 1      | 03/26/10 16:33     | MJ             | 44079            |
| JP5 / JP8                       |       | Yes            |       |                | 1      | 03/26/10 16:33     | MJ             | 44079            |
| JP7                             |       | No             |       |                | 1      | 03/26/10 16:33     | MJ             | 44079            |
| JP10                            |       | No             |       |                | 1      | 03/26/10 16:33     | MJ             | 44079            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 03/26/10 16:33     | MJ             | 44079            |
| Surrogate: o-Terphenyl          |       |                | 99 %  | Limits: 50-150 | 1      | 03/26/10 16:33     | MJ             | 44079            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/02/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-078-0231

Lab ID 1003368-003A

Field ID P16/1 1/3" to 12'

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/19/10

Matrix Soil

Sampled 03/18/10 22:47

### Analytical Method 8015B FIN

| Prep Method                     | 3550B  | Prep Batch     | 28782 |                |        | Date/Time Prepped  | 03/24/10 10:06   |
|---------------------------------|--------|----------------|-------|----------------|--------|--------------------|------------------|
| Compound                        | Result | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.2 g | Date/Time Analyzed | Analytical Batch |
|                                 |        |                | Units | MQL            | DF     | By                 |                  |
| Diesel Range Organics (C10-C28) | < 10.0 |                | mg/Kg | 10.0           | 1      | 03/26/10 14:55     | MJ 44079         |
| Oil Range Organics (>C28-C40)   | < 10.0 |                | mg/Kg | 10.0           | 1      | 03/26/10 14:55     | MJ 44079         |
| Gasoline/Aviation Jet           | No     |                |       |                | 1      | 03/26/10 14:55     | MJ 44079         |
| JP4                             | No     |                |       |                | 1      | 03/26/10 14:55     | MJ 44079         |
| JP5 / JP8                       | No     |                |       |                | 1      | 03/26/10 14:55     | MJ 44079         |
| JP7                             | No     |                |       |                | 1      | 03/26/10 14:55     | MJ 44079         |
| JP10                            | No     |                |       |                | 1      | 03/26/10 14:55     | MJ 44079         |
| JP18 / Turbine Jet Fuel         | No     |                |       |                | 1      | 03/26/10 14:55     | MJ 44079         |
| Surrogate: o-Terphenyl          |        |                | 98 %  | Limits: 50-150 | 1      | 03/26/10 14:55     | MJ 44079         |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/02/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-078-0231

Lab ID 1003368-004A

Field ID P17/11'

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/19/10

Matrix Soil

Sampled 03/15/10 0:50

### Analytical Method 8015B FIN

| Prep Method                     | 3550B  | Prep Batch     | 28782 |                |        | Date/Time Prepped | 03/24/10 10:06 |
|---------------------------------|--------|----------------|-------|----------------|--------|-------------------|----------------|
| Compound                        | Result | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.6 g | Date/Time         | Analytical     |
|                                 |        |                | Units | MQL            | DF     | Analyzed          | By Batch       |
| Diesel Range Organics (C10-C28) | 17.7   |                | mg/Kg | 10.0           | 1      | 03/26/10 15:08    | MJ 44079       |
| Oil Range Organics (>C28-C40)   | 20.6   |                | mg/Kg | 10.0           | 1      | 03/26/10 15:08    | MJ 44079       |
| Gasoline/Aviation Jet           | No     |                |       |                | 1      | 03/26/10 15:08    | MJ 44079       |
| JP4                             | No     |                |       |                | 1      | 03/26/10 15:08    | MJ 44079       |
| JP5 / JP8                       | No     |                |       |                | 1      | 03/26/10 15:08    | MJ 44079       |
| JP7                             | No     |                |       |                | 1      | 03/26/10 15:08    | MJ 44079       |
| JP10                            | No     |                |       |                | 1      | 03/26/10 15:08    | MJ 44079       |
| JP18 / Turbine Jet Fuel         | No     |                |       |                | 1      | 03/26/10 15:08    | MJ 44079       |
| Surrogate: o-Terphenyl          |        |                | 114 % | Limits: 50-150 | 1      | 03/26/10 15:08    | MJ 44079       |

| Qualifiers/  | * Surrogate Recovery outside accepted limits      | * I Recoveries affected by interferences or high background |
|--|---|---|
| Definitions  | B Analyte detected in the associated Method Blank | DF Dilution Factor  |
| E Value exceeds method calibration range                 |   | H Prepped / Analyzed out of holding time.                   |
| J Estimated Value Analyte below reported detection limit |   | M Minimum value   |
| MDL Method Detection Limit (unadjusted)                  |   | MQL Method Quantitation Limit (adjusted)                    |
| MRL Method Reporting Limit                               |   | N Refer to attached Non-Compliance Report                   |
| Q RPD >40% between primary and confirmation columns      |   | SQL Sample Quantitation Limit (adjusted MDL)                |

04/02/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-078-0231

Lab ID 1003368-005A

Field ID P18/1 1/2" to 12'

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/19/10

Matrix Soil

Sampled 03/19/10 1:37

### Analytical Method 8015B FIN

| Prep Method                     | 3550B  | Prep Batch     | 28782 |                |    | Date/Time Prepped | 03/24/10 10:06 |
|---------------------------------|--------|----------------|-------|----------------|----|-------------------|----------------|
| Compound                        | Result | Default Vol/Wt | 30 g  | Sample Vol/Wt  |    | Date/Time         | Analytical     |
|                                 |        |                | Units | MQL            | DF | Analyzed          | By Batch       |
| Diesel Range Organics (C10-C28) | < 10.0 |                | mg/Kg | 10.0           | 1  | 03/26/10 15:21    | MJ 44079       |
| Oil Range Organics (>C28-C40)   | < 10.0 |                | mg/Kg | 10.0           | 1  | 03/26/10 15:21    | MJ 44079       |
| Gasoline/Aviation Jet           | No     |                |       |                | 1  | 03/26/10 15:21    | MJ 44079       |
| JP4                             | No     |                |       |                | 1  | 03/26/10 15:21    | MJ 44079       |
| JP5 / JP8                       | No     |                |       |                | 1  | 03/26/10 15:21    | MJ 44079       |
| JP7                             | No     |                |       |                | 1  | 03/26/10 15:21    | MJ 44079       |
| JP10                            | No     |                |       |                | 1  | 03/26/10 15:21    | MJ 44079       |
| JP18 / Turbine Jet Fuel         | No     |                |       |                | 1  | 03/26/10 15:21    | MJ 44079       |
| Surrogate: o-Terphenyl          |        |                | 87 %  | Limits: 50-150 | 1  | 03/26/10 15:21    | MJ 44079       |

|                            |     |  |     |   |
|----------------------------|-----|--|-----|---|
| Qualifiers/<br>Definitions | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
|                            | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|                            | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|                            | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|                            | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|                            | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|                            | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |
|                            |     |  |     |   |

04/02/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-078-0231

Lab ID 1003368-006A

Field ID P19/1 1/3" to 12'

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/19/10

Matrix Soil

Sampled 03/19/10 2:14

### Analytical Method 8015B FIN

|                                 |       |                |       |                |      |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28782 |                |      | Date/Time Prepped | 03/24/10 10:06 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 31 g | Date/Time         |                | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF   | Analyzed          | By             | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1    | 03/26/10 15:37    | MJ             | 44079      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1    | 03/26/10 15:37    | MJ             | 44079      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1    | 03/26/10 15:37    | MJ             | 44079      |
| JP4                             |       | No             |       |                | 1    | 03/26/10 15:37    | MJ             | 44079      |
| JP5 / JP8                       |       | No             |       |                | 1    | 03/26/10 15:37    | MJ             | 44079      |
| JP7                             |       | No             |       |                | 1    | 03/26/10 15:37    | MJ             | 44079      |
| JP10                            |       | No             |       |                | 1    | 03/26/10 15:37    | MJ             | 44079      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1    | 03/26/10 15:37    | MJ             | 44079      |
| Surrogate: o-Terphenyl          |       |                | 93 %  | Limits: 50-150 | 1    | 03/26/10 15:37    | MJ             | 44079      |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/02/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-078-0231

Lab ID 1003368-007A

Field ID P20/8'

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/19/10

Matrix Soil

Sampled 03/19/10 3:15

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28782 |                |        | Date/Time Prepped | 03/24/10 10:06 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.4 g | Date/Time         |                | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By             | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 15:50    | MJ             | 44079      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 15:50    | MJ             | 44079      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 03/26/10 15:50    | MJ             | 44079      |
| JP4                             |       | No             |       |                | 1      | 03/26/10 15:50    | MJ             | 44079      |
| JP5 / JP8                       |       | No             |       |                | 1      | 03/26/10 15:50    | MJ             | 44079      |
| JP7                             |       | No             |       |                | 1      | 03/26/10 15:50    | MJ             | 44079      |
| JP10                            |       | No             |       |                | 1      | 03/26/10 15:50    | MJ             | 44079      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 03/26/10 15:50    | MJ             | 44079      |
| Surrogate: o-Terphenyl          |       |                | 66 %  | Limits: 50-150 | 1      | 03/26/10 15:50    | MJ             | 44079      |

### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/02/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Cooler Receipt Form

Customer Number: **05160**

Customer Name: **Tri-State Testing**

Report Number: **10-078-0231**

#### Shipping Method

☐ FedEx ☐ UPS ☐ US Postal ☒ Client ☐ LMP ☐ Courier ☐ Other: \_\_\_\_\_

|  |                                      |                                     |   |
|--|--------------------------------------|-------------------------------------|---|
| Shipping container/cooler uncompromised?           | <input checked="" type="radio"/> Yes | <input type="radio"/> No            | <input type="radio"/> Not Present             |
| Custody seals intact on shipping container/cooler? | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Custody seals intact on sample bottles?            | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Chain of Custody present?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| COC agrees with sample labels?                     | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Samples in proper containers?                      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sample containers intact?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sufficient sample volume for indicated tests?      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| All samples received within holding time?          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Container temperature in compliance?               | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Water - VOA vials free of headspace?               | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Water - Preservation acceptable upon receipt?      | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Samples screened for radioactivity (COE only)?     | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Special precautions or instructions included?      | <input type="radio"/> Yes            | <input checked="" type="radio"/> No |   |

Comments:

Any regulatory non-compliance issues will be recorded on non-compliance report.

Signature:

Date & Time:

10-678-0231

# CHAIN OF CUSTODY RECORD

REPORT NO. 1003368

GTW ANALYTICAL SERVICES, LLC.  
2790 Whitten Rd. Memphis, TN 38133

SUBMIT REPORT TO: David D. McCray  
COMPANY: Tri-State Testing Services, Inc.  
CONTACT: David McCray • 901-385-1199

PHONE 901-213-2400 FAX 901-213-2440

PERMIT/PROJECT NO.: E-9-429

PROJECT NAME:

Memphis International Airport

SAMPLER'S SIGNATURE: *William Stoddard*

| LAB NO. | SEQ NO. | SAMPLE NO. | DATE    | TIME     | SAMPLE LOCATION     | MATRIX | NO. OF CONTAINERS | REMARKS (ANALYSES, ETC.)         | LAB pH |
|---------|---------|------------|---------|----------|---------------------|--------|-------------------|----------------------------------|--------|
|         |         | P1         | 3-18-10 | 11:35 AM | P1 / 6'             | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P2         | 3-19-10 | 12:07 AM | P2 / 6'             | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P16        | 3-18-10 | 10:47 PM | P16 / 13" to 12'    | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P17        | 3-19-10 | 12:52 AM | P17 / 8' to 12' 11" | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P18        | 3-19-10 | 1:37 AM  | P18 / 1'2" to 12'   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P19        | 3-19-10 | 2:14 AM  | P19 / 1'3" to 12'   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P20        | 3-19-10 | 3:15 AM  | P20 / 8'            | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |

RELINQUISHED BY: *[Signature]* DATE/TIME: 3-19-10 0853

METHOD OF SHIPMENT: *[Signature]* SHIPPED BY: *[Signature]* RECEIVED FOR LAB BY: *[Signature]*

CONDITION OF COOLER/SEAL: COOLER OPENED BY: *[Signature]* DATE/TIME: 3-19-10 0823

SHADED AREAS FOR LABORATORY USE ONLY



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

4/2/2010

Tri-State Testing  
Mr. David McCray  
6756 Buckles Cove  
Memphis, TN, 38133

Ref: Analytical Testing  
Report Number: 10-077-0201  
Project Description: Memphis International Airport  
Project # E-9-429

Dear Mr. David McCray:

GTW Analytical Services received 4 sample(s) on 3/18/2010 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA and NELAP.

The results are shown on the attached analysis sheet(s).

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,

*Randell H. Thomas*

Randy Thomas  
Project Manager

RECEIVED  
APR 05 2010

BY: .....



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**CLIENT:** Tri-State Testing  
**Project:** Memphis International Airport  
**Lab Order Number:** 10-077-0201

### CASE NARRATIVE

**Date:** 04/02/10

GTW01

Fingerprint Analysis by Method 8015B  
Jet Fuels

Samples were extracted and analyzed by Method 8015B. Comparisons were made to the chromatographic library, with special attention given to Jet fuels. Results are reported for both Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40), with quantitation achieved using Diesel Fuel and Motor Oil.

The method blank associated with these samples indicated low level contamination in the Oil Range Organics. This contamination did not impact the comparisons with the Jet fuels. All Jet fuels reported and reviewed for comparisons elute within the Diesel Range Organics (C10-C28) area of the chromatogram.

The contamination reported as Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40) did not match the Jet fuels used for comparison purposes.



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-077-0201

Lab ID 1003342-001A

Field ID P-12

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/18/10

Matrix Soil

Sampled 03/18/10 0:30

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28782 |                |        | Date/Time Prepped | 03/24/10 10:06 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.8 g | Date/Time         |                | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By             | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 12:45    | MJ             | 44079      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 12:45    | MJ             | 44079      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 03/26/10 12:45    | MJ             | 44079      |
| JP4                             |       | No             |       |                | 1      | 03/26/10 12:45    | MJ             | 44079      |
| JP5 / JP8                       |       | No             |       |                | 1      | 03/26/10 12:45    | MJ             | 44079      |
| JP7                             |       | No             |       |                | 1      | 03/26/10 12:45    | MJ             | 44079      |
| JP10                            |       | No             |       |                | 1      | 03/26/10 12:45    | MJ             | 44079      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 03/26/10 12:45    | MJ             | 44079      |
| Surrogate: o-Terphenyl          |       |                | 95 %  | Limits: 50-150 | 1      | 03/26/10 12:45    | MJ             | 44079      |

### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/02/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-077-0201

Lab ID 1003342-002A

Field ID P-13

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/18/10

Matrix Soil

Sampled 03/18/10 1:20

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28782 |                |        | Date/Time Prepped | 03/24/10 10:06 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 31.4 g | Date/Time         |                | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By             | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 12:58    | MJ             | 44079      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 12:58    | MJ             | 44079      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 03/26/10 12:58    | MJ             | 44079      |
| JP4                             |       | No             |       |                | 1      | 03/26/10 12:58    | MJ             | 44079      |
| JP5 / JP8                       |       | No             |       |                | 1      | 03/26/10 12:58    | MJ             | 44079      |
| JP7                             |       | No             |       |                | 1      | 03/26/10 12:58    | MJ             | 44079      |
| JP10                            |       | No             |       |                | 1      | 03/26/10 12:58    | MJ             | 44079      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 03/26/10 12:58    | MJ             | 44079      |
| Surrogate: o-Terphenyl          |       |                | 93 %  | Limits: 50-150 | 1      | 03/26/10 12:58    | MJ             | 44079      |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/02/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-077-0201

Lab ID 1003342-003A

Field ID P-14

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/18/10

Matrix Soil

Sampled 03/18/10 2:22

### Analytical Method 8015B FIN

| Prep Method                     | 3550B  | Prep Batch     | 28782          |               |                    | Date/Time Prepped | 03/24/10 10:06   |
|---------------------------------|--------|----------------|----------------|---------------|--------------------|-------------------|------------------|
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 31.6 g             |                   |                  |
| Compound                        | Result | Units          | MQL            | DF            | Date/Time Analyzed | By                | Analytical Batch |
| Diesel Range Organics (C10-C28) | 14.2   | mg/Kg          | 10.0           | 1             | 03/26/10 13:11     | MJ                | 44079            |
| Oil Range Organics (>C28-C40)   | 11.3   | mg/Kg          | 10.0           | 1             | 03/26/10 13:11     | MJ                | 44079            |
| Gasoline/Aviation Jet           | No     |                |                | 1             | 03/26/10 13:11     | MJ                | 44079            |
| JP4                             | No     |                |                | 1             | 03/26/10 13:11     | MJ                | 44079            |
| JP5 / JP8                       | No     |                |                | 1             | 03/26/10 13:11     | MJ                | 44079            |
| JP7                             | No     |                |                | 1             | 03/26/10 13:11     | MJ                | 44079            |
| JP10                            | No     |                |                | 1             | 03/26/10 13:11     | MJ                | 44079            |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1             | 03/26/10 13:11     | MJ                | 44079            |
| Surrogate: o-Terphenyl          |        | 109 %          | Limits: 50-150 | 1             | 03/26/10 13:11     | MJ                | 44079            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/02/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-077-0201

Lab ID 1003342-004A

Field ID P-15

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/18/10

Matrix Soil

Sampled 03/18/10 3:30

### Analytical Method 8015B FIN

| Prep Method                     | 3550B          | Prep Batch | 28782          |        |                | Date/Time Prepped  | 03/24/10 10:06   |
|---------------------------------|----------------|------------|----------------|--------|----------------|--------------------|------------------|
| Compound                        | Default Vol/Wt | 30 g       | Sample Vol/Wt  | 31.1 g |                | Date/Time Analyzed | Analytical Batch |
|                                 | Result         | Units      | MQL            | DF     |                | By                 |                  |
| Diesel Range Organics (C10-C28) | < 10.0         | mg/Kg      | 10.0           | 1      | 03/26/10 13:24 | MJ                 | 44079            |
| Oil Range Organics (>C28-C40)   | 11.2           | mg/Kg      | 10.0           | 1      | 03/26/10 13:24 | MJ                 | 44079            |
| Gasoline/Aviation Jet           | No             |            |                | 1      | 03/26/10 13:24 | MJ                 | 44079            |
| JP4                             | No             |            |                | 1      | 03/26/10 13:24 | MJ                 | 44079            |
| JP5 / JP8                       | No             |            |                | 1      | 03/26/10 13:24 | MJ                 | 44079            |
| JP7                             | No             |            |                | 1      | 03/26/10 13:24 | MJ                 | 44079            |
| JP10                            | No             |            |                | 1      | 03/26/10 13:24 | MJ                 | 44079            |
| JP18 / Turbine Jet Fuel         | No             |            |                | 1      | 03/26/10 13:24 | MJ                 | 44079            |
| Surrogate: o-Terphenyl          |                | 103 %      | Limits: 50-150 | 1      | 03/26/10 13:24 | MJ                 | 44079            |

### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/02/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Cooler Receipt Form

Customer Number: **05160**

Customer Name: **Tri-State Testing**

Report Number: **10-077-0201**

#### Shipping Method

☐ FedEx ☐ UPS ☐ US Postal ☒ Client ☐ LMP ☐ Courier ☐ Other: \_\_\_\_\_

|  |                                      |                                     |   |
|--|--------------------------------------|-------------------------------------|---|
| Shipping container/cooler uncompromised?           | <input checked="" type="radio"/> Yes | <input type="radio"/> No            | <input type="radio"/> Not Present             |
| Custody seals intact on shipping container/cooler? | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Custody seals intact on sample bottles?            | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Chain of Custody present?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| COC agrees with sample labels?                     | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Samples in proper containers?                      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sample containers intact?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sufficient sample volume for indicated tests?      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| All samples received within holding time?          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Container temperature in compliance?               | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Water - VOA vials free of headspace?               | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Water - Preservation acceptable upon receipt?      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            | <input type="radio"/> N/A                     |
| Samples screened for radioactivity (COE only)?     | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Special precautions or instructions included?      | <input type="radio"/> Yes            | <input checked="" type="radio"/> No |   |

Comments:

Any regulatory non-compliance issues will be recorded on non-compliance report.

Signature:

Date & Time:

# CHAIN OF CUSTODY RECORD

REPORT NO. 1003342

GTW ANALYTICAL SERVICES, LLC.  
2790 Whitten Rd. Memphis, TN 38133  
PHONE 901-213-2400 FAX 901-213-2440

SUBMIT REPORT TO: David D. McCray  
COMPANY: Tri-State Testing Services, Inc.  
CONTACT: David McCray • 901-385-1199

PERMIT/PROJECT NO.: E-9-429

PROJECT NAME:

Memphis International Airport

SAMPLER'S SIGNATURE:

*William Shaddy*

MATRIX NO. OF CONTAINERS



7H

SAMPLE LOCATION

TIME

DATE

SAMPLE NO.

SEQ NO.

LAB NO.

Method 8015 Jet Fuel FingerPrint

Method 8015 Jet Fuel FingerPrint

Method 8015 Jet Fuel FingerPrint

Method 8015 Jet Fuel FingerPrint

Method 8015 Jet Fuel FingerPrint

Method 8015 Jet Fuel FingerPrint

Method 8015 Jet Fuel FingerPrint

Method 8015 Jet Fuel FingerPrint

Method 8015 Jet Fuel FingerPrint

Method 8015 Jet Fuel FingerPrint

DATE/TIME:

RELINQUISHED BY:

DATE/TIME:

RECEIVED FOR LAB BY:

DATE/TIME:

METHOD OF SHIPMENT:

SHIPPED BY:

COOLER OPENED BY:

CONDITION OF COOLER/SEAL:

14°C

3.18.10 0830

DATE/TIME:

SHADED AREAS FOR LABORATORY USE ONLY!



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

4/6/2010

Tri-State Testing  
Mr. David McCray  
6756 Buckles Cove  
Memphis, TN, 38133

Ref: Analytical Testing  
Report Number: 10-081-0239  
Project Description: Memphis International Airport  
Project #E-9-429

Dear Mr. David McCray:

GTW Analytical Services received 12 sample(s) on 3/22/2010 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA and NELAP.

The results are shown on the attached analysis sheet(s).

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,

*Randy H. Thomas*

Randy Thomas  
Project Manager

RECEIVED  
APR 08 2010

BY: .....



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**CLIENT:** Tri-State Testing  
**Project:** Memphis International Airport  
**Lab Order Number:** 10-081-0239

### CASE NARRATIVE

**Date:** 04/06/10

GTW01

Fingerprint Analysis by Method 8015B  
Jet Fuels

Samples were extracted and analyzed by Method 8015B. Comparisons were made to the chromatographic library, with special attention given to Jet fuels. Results are reported for both Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40), with quantitation achieved using Diesel Fuel and Motor Oil.



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0239

Lab ID 1003393-001A

Field ID P-21

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/19/10 22:40

### Analytical Method 8015B FIN

|                                 |        |                |                |               |                |                   |                |
|---------------------------------|--------|----------------|----------------|---------------|----------------|-------------------|----------------|
| Prep Method                     | 3550B  | Prep Batch     | 28782          |               |                | Date/Time Prepped | 03/24/10 10:06 |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.6 g         | Date/Time         | Analytical     |
| Compound                        | Result | Units          | MQL            | DF            | Analyzed       | By                | Batch          |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          | 10.0           | 1             | 03/26/10 16:46 | MJ                | 44079          |
| Oil Range Organics (>C28-C40)   | 12.5   | mg/Kg          | 10.0           | 1             | 03/26/10 16:46 | MJ                | 44079          |
| Gasoline/Aviation Jet           | No     |                |                | 1             | 03/26/10 16:46 | MJ                | 44079          |
| JP4                             | No     |                |                | 1             | 03/26/10 16:46 | MJ                | 44079          |
| JP5 / JP8                       | No     |                |                | 1             | 03/26/10 16:46 | MJ                | 44079          |
| JP7                             | No     |                |                | 1             | 03/26/10 16:46 | MJ                | 44079          |
| JP10                            | No     |                |                | 1             | 03/26/10 16:46 | MJ                | 44079          |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1             | 03/26/10 16:46 | MJ                | 44079          |
| Surrogate: o-Terphenyl          |        | 84 %           | Limits: 50-150 | 1             | 03/26/10 16:46 | MJ                | 44079          |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/06/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0239

Lab ID 1003393-002A

Field ID P-22

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/19/10 23:28

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28782 |                |        | Date/Time Prepped | 03/24/10 10:06 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.5 g | Date/Time         |                | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By             | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 16:59    | MJ             | 44079      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 16:59    | MJ             | 44079      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 03/26/10 16:59    | MJ             | 44079      |
| JP4                             |       | No             |       |                | 1      | 03/26/10 16:59    | MJ             | 44079      |
| JP5 / JP8                       |       | No             |       |                | 1      | 03/26/10 16:59    | MJ             | 44079      |
| JP7                             |       | No             |       |                | 1      | 03/26/10 16:59    | MJ             | 44079      |
| JP10                            |       | No             |       |                | 1      | 03/26/10 16:59    | MJ             | 44079      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 03/26/10 16:59    | MJ             | 44079      |
| Surrogate: o-Terphenyl          |       |                | 83 %  | Limits: 50-150 | 1      | 03/26/10 16:59    | MJ             | 44079      |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/06/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0239

Lab ID 1003393-003A

Field ID P-24

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/19/10 23:57

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28782 |                |        | Date/Time Prepped | 03/24/10 10:06 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.4 g | Date/Time         |                | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By             | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 17:12    | MJ             | 44079      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 17:12    | MJ             | 44079      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 03/26/10 17:12    | MJ             | 44079      |
| JP4                             |       | No             |       |                | 1      | 03/26/10 17:12    | MJ             | 44079      |
| JP5 / JP8                       |       | No             |       |                | 1      | 03/26/10 17:12    | MJ             | 44079      |
| JP7                             |       | No             |       |                | 1      | 03/26/10 17:12    | MJ             | 44079      |
| JP10                            |       | No             |       |                | 1      | 03/26/10 17:12    | MJ             | 44079      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 03/26/10 17:12    | MJ             | 44079      |
| Surrogate: o-Terphenyl          |       |                | 86 %  | Limits: 50-150 | 1      | 03/26/10 17:12    | MJ             | 44079      |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | SQL | Sample Quantitation Limit (adjusted MDL)                |
|             | MRL | Method Reporting Limit                                 |     |   |
|             | Q   | RPD >40% between primary and confirmation columns      |     |   |

04/06/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0239

Lab ID 1003393-004A

Field ID P-25

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/20/10 0:27

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28782 |                |        | Date/Time Prepped | 03/24/10 10:06 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.5 g | Date/Time         |                | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By             | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 17:25    | MJ             | 44079      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 17:25    | MJ             | 44079      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 03/26/10 17:25    | MJ             | 44079      |
| JP4                             |       | No             |       |                | 1      | 03/26/10 17:25    | MJ             | 44079      |
| JP5 / JP8                       |       | No             |       |                | 1      | 03/26/10 17:25    | MJ             | 44079      |
| JP7                             |       | No             |       |                | 1      | 03/26/10 17:25    | MJ             | 44079      |
| JP10                            |       | No             |       |                | 1      | 03/26/10 17:25    | MJ             | 44079      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 03/26/10 17:25    | MJ             | 44079      |
| Surrogate: o-Terphenyl          |       |                | 85 %  | Limits: 50-150 | 1      | 03/26/10 17:25    | MJ             | 44079      |

#### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/06/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0239

Lab ID 1003393-005A

Field ID P-26

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/20/10 1:53

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28782 |                |        | Date/Time Prepped | 03/24/10 10:06 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 31.7 g | Date/Time         |                | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By             | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 17:38    | MJ             | 44079      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 03/26/10 17:38    | MJ             | 44079      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 03/26/10 17:38    | MJ             | 44079      |
| JP4                             |       | No             |       |                | 1      | 03/26/10 17:38    | MJ             | 44079      |
| JP5 / JP8                       |       | No             |       |                | 1      | 03/26/10 17:38    | MJ             | 44079      |
| JP7                             |       | No             |       |                | 1      | 03/26/10 17:38    | MJ             | 44079      |
| JP10                            |       | No             |       |                | 1      | 03/26/10 17:38    | MJ             | 44079      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 03/26/10 17:38    | MJ             | 44079      |
| Surrogate: o-Terphenyl          |       |                | 94 %  | Limits: 50-150 | 1      | 03/26/10 17:38    | MJ             | 44079      |

### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/06/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0239

Lab ID 1003393-006A

Field ID P-27

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/20/10 2:38

### Analytical Method 8015B FIN

| Prep Method                     | 3550B          | Prep Batch | 28782          |               |    | Date/Time Prepped | 03/24/10 10:06 |
|---------------------------------|----------------|------------|----------------|---------------|----|-------------------|----------------|
| Compound                        | Default Vol/Wt |            | 30 g           | Sample Vol/Wt |    | Date/Time         | Analytical     |
|                                 | Result         | Units      |                | MQL           | DF | Analyzed          | By Batch       |
| Diesel Range Organics (C10-C28) | < 10.0         | mg/Kg      |                | 10.0          | 1  | 03/26/10 17:51    | MJ 44079       |
| Oil Range Organics (>C28-C40)   | < 10.0         | mg/Kg      |                | 10.0          | 1  | 03/26/10 17:51    | MJ 44079       |
| Gasoline/Aviation Jet           | No             |            |                |               | 1  | 03/26/10 17:51    | MJ 44079       |
| JP4                             | No             |            |                |               | 1  | 03/26/10 17:51    | MJ 44079       |
| JP5 / JP8                       | No             |            |                |               | 1  | 03/26/10 17:51    | MJ 44079       |
| JP7                             | No             |            |                |               | 1  | 03/26/10 17:51    | MJ 44079       |
| JP10                            | No             |            |                |               | 1  | 03/26/10 17:51    | MJ 44079       |
| JP18 / Turbine Jet Fuel         | No             |            |                |               | 1  | 03/26/10 17:51    | MJ 44079       |
| Surrogate: o-Terphenyl          |                | 103 %      | Limits: 50-150 |               | 1  | 03/26/10 17:51    | MJ 44079       |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/06/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38193 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0239

Lab ID 1003393-007A

Field ID P-29

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/20/10 3:11

### Analytical Method 8015B FIN

|                                 |        |                |                |                   |  |
|---------------------------------|--------|----------------|----------------|-------------------|--|
| Prep Method                     | 3550B  | Prep Batch     | 28782          | Date/Time Prepped | 03/24/10 10:06                         |
|                                 |        | Default Vol/Wt | 30 g           |                   |  |
|                                 |        |                | Sample Vol/Wt  | 30.2 g            |  |
| Compound                        | Result | Units          | MQL            | DF                | Date/Time Analyzed By Analytical Batch |
| Diesel Range Organics (C10-C28) | 15.7   | mg/Kg          | 10.0           | 1                 | 03/26/10 18:04 MJ 44079                |
| Oil Range Organics (>C28-C40)   | 14.5   | mg/Kg          | 10.0           | 1                 | 03/26/10 18:04 MJ 44079                |
| Gasoline/Aviation Jet           | No     |                |                | 1                 | 03/26/10 18:04 MJ 44079                |
| JP4                             | No     |                |                | 1                 | 03/26/10 18:04 MJ 44079                |
| JP5 / JP8                       | No     |                |                | 1                 | 03/26/10 18:04 MJ 44079                |
| JP7                             | No     |                |                | 1                 | 03/26/10 18:04 MJ 44079                |
| JP10                            | No     |                |                | 1                 | 03/26/10 18:04 MJ 44079                |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1                 | 03/26/10 18:04 MJ 44079                |
| Surrogate: o-Terphenyl          |        | 95 %           | Limits: 50-150 | 1                 | 03/26/10 18:04 MJ 44079                |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/06/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0239

Lab ID 1003393-008A

Field ID P-31

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/20/10 3:54

### Analytical Method 8015B FIN

|                                 |        |                |                |               |                |                   |                  |
|---------------------------------|--------|----------------|----------------|---------------|----------------|-------------------|------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28782          |               |                | Date/Time Prepped | 03/24/10 10:06   |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.7 g         | Date/Time         |                  |
| Compound                        | Result | Units          | ML             | DF            | Analyzed       | By                | Analytical Batch |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          | 10.0           | 1             | 03/26/10 18:17 | MJ                | 44079            |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          | 10.0           | 1             | 03/26/10 18:17 | MJ                | 44079            |
| Gasoline/Aviation Jet           | No     |                |                | 1             | 03/26/10 18:17 | MJ                | 44079            |
| JP4                             | No     |                |                | 1             | 03/26/10 18:17 | MJ                | 44079            |
| JP5 / JP8                       | No     |                |                | 1             | 03/26/10 18:17 | MJ                | 44079            |
| JP7                             | No     |                |                | 1             | 03/26/10 18:17 | MJ                | 44079            |
| JP10                            | No     |                |                | 1             | 03/26/10 18:17 | MJ                | 44079            |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1             | 03/26/10 18:17 | MJ                | 44079            |
| Surrogate: o-Terphenyl          |        | 95 %           | Limits: 50-150 | 1             | 03/26/10 18:17 | MJ                | 44079            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | ML Method Quantitation Limit (adjusted)                     |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/06/10 5160 TRISTATE\_GTW





## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0239

Lab ID 1003393-010A

Field ID P-23

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/20/10 0:22

### Analytical Method 8015B FIN

| Prep Method                     | 3550B          | Prep Batch | 28791          | Date/Time Prepped | 03/24/10 14:44          |
|---------------------------------|----------------|------------|----------------|-------------------|-------------------------|
| Compound                        | Default Vol/Wt | 30 g       | Sample Vol/Wt  | 30.3 g            |                         |
|                                 | Result         | Units      | MQL            | DF                | Analytical              |
|                                 |                |            |                |                   | By Batch                |
| Diesel Range Organics (C10-C28) | < 10.0         | mg/Kg      | 10.0           | 1                 | 04/01/10 16:03 MJ 44120 |
| Oil Range Organics (>C28-C40)   | < 10.0         | mg/Kg      | 10.0           | 1                 | 04/01/10 16:03 MJ 44120 |
| Gasoline/Aviation Jet           | No             |            |                | 1                 | 04/01/10 16:03 MJ 44120 |
| JP4                             | No             |            |                | 1                 | 04/01/10 16:03 MJ 44120 |
| JP5 / JP8                       | No             |            |                | 1                 | 04/01/10 16:03 MJ 44120 |
| JP7                             | No             |            |                | 1                 | 04/01/10 16:03 MJ 44120 |
| JP10                            | No             |            |                | 1                 | 04/01/10 16:03 MJ 44120 |
| JP18 / Turbine Jet Fuel         | No             |            |                | 1                 | 04/01/10 16:03 MJ 44120 |
| Surrogate: o-Terphenyl          |                | 74 %       | Limits: 50-150 | 1                 | 04/01/10 16:03 MJ 44120 |

### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/06/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0239

Lab ID 1003393-011A

Field ID P-28

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/20/10 3:00

### Analytical Method 8015B FIN

|                                 |        |                |                |                   |  |
|---------------------------------|--------|----------------|----------------|-------------------|--|
| Prep Method                     | 3550B  | Prep Batch     | 28791          | Date/Time Prepped | 03/24/10 14:44                         |
|                                 |        | Default Vol/Wt | 30 g           |                   |  |
| Compound                        | Result | Units          | Sample Vol/Wt  | 30.3 g            |  |
|                                 |        |                | ML             | DF                |  |
|                                 |        |                |                |                   | Date/Time Analyzed By Analytical Batch |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          | 10.0           | 1                 | 04/01/10 16:16 MJ 44120                |
| Oil Range Organics (>C28-C40)   | 10.8   | mg/Kg          | 10.0           | 1                 | 04/01/10 16:16 MJ 44120                |
| Gasoline/Aviation Jet           | No     |                |                | 1                 | 04/01/10 16:16 MJ 44120                |
| JP4                             | No     |                |                | 1                 | 04/01/10 16:16 MJ 44120                |
| JP5 / JP8                       | No     |                |                | 1                 | 04/01/10 16:16 MJ 44120                |
| JP7                             | No     |                |                | 1                 | 04/01/10 16:16 MJ 44120                |
| JP10                            | No     |                |                | 1                 | 04/01/10 16:16 MJ 44120                |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1                 | 04/01/10 16:16 MJ 44120                |
| Surrogate: o-Terphenyl          |        | 88 %           | Limits: 50-150 | 1                 | 04/01/10 16:16 MJ 44120                |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | ML  | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/06/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**Tri-State Testing**  
6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0239

Lab ID 1003393-012A

Field ID P-30

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/20/10 3:52

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |                |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|----------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                |        | Date/Time Prepped | 03/24/10 14:44 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.4 g | Date/Time         |                |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By             | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | 14.8           | mg/Kg | 10.0           | 1      | 04/01/10 16:29    | MJ             | 44120            |
| Oil Range Organics (>C28-C40)   |       | 20.0           | mg/Kg | 10.0           | 1      | 04/01/10 16:29    | MJ             | 44120            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/01/10 16:29    | MJ             | 44120            |
| JP4                             |       | No             |       |                | 1      | 04/01/10 16:29    | MJ             | 44120            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/01/10 16:29    | MJ             | 44120            |
| JP7                             |       | No             |       |                | 1      | 04/01/10 16:29    | MJ             | 44120            |
| JP10                            |       | No             |       |                | 1      | 04/01/10 16:29    | MJ             | 44120            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/01/10 16:29    | MJ             | 44120            |
| Surrogate: o-Terphenyl          |       |                | 81 %  | Limits: 50-150 | 1      | 04/01/10 16:29    | MJ             | 44120            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/06/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Cooler Receipt Form

Customer Number: **05160**

Customer Name: **Tri-State Testing**

Report Number: **10-081-0239**

#### Shipping Method

☐ FedEx ☐ UPS ☐ US Postal ☒ Client ☐ LMP ☐ Courier ☐ Other:

|  |                                      |                                     |   |
|--|--------------------------------------|-------------------------------------|---|
| Shipping container/cooler uncompromised?           | <input checked="" type="radio"/> Yes | <input type="radio"/> No            | <input type="radio"/> Not Present             |
| Custody seals intact on shipping container/cooler? | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Custody seals intact on sample bottles?            | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Chain of Custody present?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| COC agrees with sample labels?                     | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Samples in proper containers?                      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sample containers intact?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sufficient sample volume for indicated tests?      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| All samples received within holding time?          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Container temperature in compliance?               | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Water - VOA vials free of headspace?               | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Water - Preservation acceptable upon receipt?      | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Samples screened for radioactivity (COE only)?     | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Special precautions or instructions included?      | <input type="radio"/> Yes            | <input checked="" type="radio"/> No |   |

Comments:

Any regulatory non-compliance issues will be recorded on non-compliance report.

Signature:

Date & Time:

1003393

CHAP

GTW ANALYTIC

2790 Whitten Rd

PHONE 901-213-2400

PERMIT/PROJECT NO.: E-9-429



FAX 901-213-2440

REPORT NO.

T REPORT TO: David D. McCray  
ANY: Tri-State Testing Services, Inc.  
ACT: David McCray - 901-385-1199

PROJECT NAME:

Memphis International Airport

SAMPLER'S SIGNATURE: *Bt Wood*

| LAB NO. | SEQ NO. | SAMPLE NO. | DATE    | TIME    | SAMPLE LOCATION | MATRIX | NO. OF CONTAINERS | REMARKS (ANALYSES, ETC.)         | LAB pH |
|---------|---------|------------|---------|---------|-----------------|--------|-------------------|----------------------------------|--------|
|         |         | P3         | 3/24/10 | 2:40PM  | P3 / 11" - 12"  | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P23        | 3/24/10 | 12:22PM | P23 / 22" - 12" | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P28        | 3/24/10 | 3:00PM  | P28 / 11" - 12" | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P30        | 3/24/10 | 3:52    | P30 / 11" - 12" | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |

RELINQUISHED BY: *[Signature]*

DATE/TIME: 20MAR 10 / 8:24A

RELINQUISHED BY: *[Signature]*

DATE/TIME: 3/20/10 8:24

METHOD OF SHIPMENT: *[Signature]*

SHIPPED BY:

RECEIVED FOR LAB BY: *[Signature]*

DATE/TIME:

CONDITION OF COOLER/SEAL:

COOLER OPENED BY:

DATE/TIME:

24C

SHADED AREAS FOR LABORATORY USE ONLY!

1003393

10-081-0239  
05160  
2010-03-22  
1:35:28



Tri-State Testing (GTW)  
Memphis International Airport

CHAI

GTW ANALYTIC

2790 Whitten Rd

PHONE 901-213-2400

PERMIT/PROJECT NO.: E-9-429

FAX 901-213-2440

IT REPORT TO: David D. McCray  
ANY: Tri-State Testing Services, Inc.  
CONTACT: David McCray • 901-385-1199

REPORT NO.

PROJECT NAME:

Memphis International Airport

SAMPLER'S SIGNATURE: *William Shadley*

DATE

SAMPLE NO.

TIME

SAMPLE LOCATION

MATRIX

NO OF CONTAINERS

REMARKS  
(ANALYSES, ETC.)

LAB pH

|             |          |             |
|-------------|----------|-------------|
| Method 8015 | Jet Fuel | FingerPrint |
| Method 8015 | Jet Fuel | FingerPrint |
| Method 8015 | Jet Fuel | FingerPrint |
| Method 8015 | Jet Fuel | FingerPrint |
| Method 8015 | Jet Fuel | FingerPrint |
| Method 8015 | Jet Fuel | FingerPrint |
| Method 8015 | Jet Fuel | FingerPrint |
| Method 8015 | Jet Fuel | FingerPrint |
| Method 8015 | Jet Fuel | FingerPrint |
| Method 8015 | Jet Fuel | FingerPrint |
| Method 8015 | Jet Fuel | FingerPrint |
| Method 8015 | Jet Fuel | FingerPrint |

RELINQUISHED BY:

DATE/TIME:

RELINQUISHED BY:

DATE/TIME:

METHOD OF SHIPMENT:

SHIPPED BY:

RECEIVED FOR LAB BY:

DATE/TIME:

CONDITION OF COOLER/SEAL:

COOLER OPENED BY:

DATE/TIME:

SHADED AREAS FOR LABORATORY USE ONLY!



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

4/7/2010

Tri-State Testing  
Mr. David McCray  
6756 Buckles Cove  
Memphis, TN, 38133

Ref: Analytical Testing  
Report Number: 10-081-0242  
Project Description: Memphis International Airport  
Project #E-9-429

Dear Mr. David McCray:

GTW Analytical Services received 15 sample(s) on 3/22/2010 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA and NELAP.

The results are shown on the attached analysis sheet(s).

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,

*Randell H. Thomas*

Randy Thomas  
Project Manager

RECEIVED  
APR 09 2010

BY: .....



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**CLIENT:** Tri-State Testing  
**Project:** Memphis International Airport  
**Lab Order Number:** 10-081-0242

### CASE NARRATIVE

**Date:** 04/07/10

GTW01

Fingerprint Analysis by Method 8015B  
Jet Fuels

Samples were extracted and analyzed by Method 8015B. Comparisons were made to the chromatographic library, with special attention given to Jet fuels. Results are reported for both Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40), with quantitation achieved using Diesel Fuel and Motor Oil.

The following sample indicated contamination in Diesel Range Organics (C10-C28) which may be degraded JP5/8.

1003390-012A (P38)

#### Surrogate Recovery Failure

Surrogates were flagged for recoveries outside QC limits in several of the associated project samples. These samples were re-analyzed for verification, with similar recoveries. Batch QC samples (method blank and laboratory control samples) all showed surrogates within QC limits indicating that failing recoveries were due to the sample matrix.

1003390-010A (P33)

1003390-013A (P41)



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-001A

Field ID P34

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/21/10 23:00

### Analytical Method 8015B FIN

| Prep Method                     | 3550B          | Prep Batch | 28791          | Date/Time Prepped | 03/24/10 14:44         |
|---------------------------------|----------------|------------|----------------|-------------------|------------------------|
| Compound                        | Default Vol/Wt | 30 g       | Sample Vol/Wt  | 30.9 g            |                        |
|                                 | Result         | Units      | MQL            | DF                | Analytical Batch       |
| Diesel Range Organics (C10-C28) | < 10.0         | mg/Kg      | 10.0           | 1                 | 04/05/10 9:29 MJ 44120 |
| Oil Range Organics (>C28-C40)   | < 10.0         | mg/Kg      | 10.0           | 1                 | 04/05/10 9:29 MJ 44120 |
| Gasoline/Aviation Jet           | No             |            |                | 1                 | 04/05/10 9:29 MJ 44120 |
| JP4                             | No             |            |                | 1                 | 04/05/10 9:29 MJ 44120 |
| JP5 / JP8                       | No             |            |                | 1                 | 04/05/10 9:29 MJ 44120 |
| JP7                             | No             |            |                | 1                 | 04/05/10 9:29 MJ 44120 |
| JP10                            | No             |            |                | 1                 | 04/05/10 9:29 MJ 44120 |
| JP18 / Turbine Jet Fuel         | No             |            |                | 1                 | 04/05/10 9:29 MJ 44120 |
| Surrogate: o-Terphenyl          |                | 88 %       | Limits: 50-150 | 1                 | 04/05/10 9:29 MJ 44120 |

### Qualifiers/ Definitions

- \* Surrogate Recovery outside accepted limits
- B Analyte detected in the associated Method Blank
- E Value exceeds method calibration range
- J Estimated Value Analyte below reported detection limit
- MDL Method Detection Limit (unadjusted)
- MRL Method Reporting Limit
- Q RPD >40% between primary and confirmation columns

- \* I Recoveries affected by interferences or high background
- DF Dilution Factor
- H Prepped / Analyzed out of holding time.
- M Minimum value
- MQL Method Quantitation Limit (adjusted)
- N Refer to attached Non-Compliance Report
- SQL Sample Quantitation Limit (adjusted MDL)

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-002A

Field ID P35

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/21/10 23:40

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |                |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|----------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                |        | Date/Time Prepped  | 03/24/10 14:44 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.2 g |                    |                |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By             | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 9:42      | MJ             | 44120            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 9:42      | MJ             | 44120            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 9:42      | MJ             | 44120            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 9:42      | MJ             | 44120            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 9:42      | MJ             | 44120            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 9:42      | MJ             | 44120            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 9:42      | MJ             | 44120            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 9:42      | MJ             | 44120            |
| Surrogate: o-Terphenyl          |       |                | 71 %  | Limits: 50-150 | 1      | 04/05/10 9:42      | MJ             | 44120            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-003A

Field ID P39

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/22/10 0:00

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                |        | Date/Time Prepped | 03/24/10 14:44 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 31.5 g | Date/Time         |                | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By             | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 9:55     | MJ             | 44120      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 9:55     | MJ             | 44120      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 9:55     | MJ             | 44120      |
| JP4                             |       | No             |       |                | 1      | 04/05/10 9:55     | MJ             | 44120      |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 9:55     | MJ             | 44120      |
| JP7                             |       | No             |       |                | 1      | 04/05/10 9:55     | MJ             | 44120      |
| JP10                            |       | No             |       |                | 1      | 04/05/10 9:55     | MJ             | 44120      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 9:55     | MJ             | 44120      |
| Surrogate: o-Terphenyl          |       |                | 72 %  | Limits: 50-150 | 1      | 04/05/10 9:55     | MJ             | 44120      |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**Tri-State Testing**  
6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-004A

Field ID P40

Project **Memphis International**  
Description **Airport**

Project No. **E-9-429**

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/22/10 0:20

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                |        | Date/Time Prepped | 03/24/10 14:44 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.6 g | Date/Time         |                | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By             | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 10:08    | MJ             | 44120      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 10:08    | MJ             | 44120      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 10:08    | MJ             | 44120      |
| JP4                             |       | No             |       |                | 1      | 04/05/10 10:08    | MJ             | 44120      |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 10:08    | MJ             | 44120      |
| JP7                             |       | No             |       |                | 1      | 04/05/10 10:08    | MJ             | 44120      |
| JP10                            |       | No             |       |                | 1      | 04/05/10 10:08    | MJ             | 44120      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 10:08    | MJ             | 44120      |
| Surrogate: o-Terphenyl          |       |                | 61 %  | Limits: 50-150 | 1      | 04/05/10 10:08    | MJ             | 44120      |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-005A

Field ID P5

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/22/10 1:00

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |                |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|----------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                |        | Date/Time Prepped  | 03/24/10 14:44 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.8 g |                    |                |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By             | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 10:21     | MJ             | 44120            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 10:21     | MJ             | 44120            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 10:21     | MJ             | 44120            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 10:21     | MJ             | 44120            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 10:21     | MJ             | 44120            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 10:21     | MJ             | 44120            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 10:21     | MJ             | 44120            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 10:21     | MJ             | 44120            |
| Surrogate: o-Terphenyl          |       |                | 76 %  | Limits: 50-150 | 1      | 04/05/10 10:21     | MJ             | 44120            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-006A

Field ID P44

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/22/10 2:00

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |                |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|----------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                |        | Date/Time Prepped  | 03/24/10 14:44 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.1 g |                    |                |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By             | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 10:34     | MJ             | 44120            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 10:34     | MJ             | 44120            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 10:34     | MJ             | 44120            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 10:34     | MJ             | 44120            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 10:34     | MJ             | 44120            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 10:34     | MJ             | 44120            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 10:34     | MJ             | 44120            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 10:34     | MJ             | 44120            |
| Surrogate: o-Terphenyl          |       |                | 75 %  | Limits: 50-150 | 1      | 04/05/10 10:34     | MJ             | 44120            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | SQL | Sample Quantitation Limit (adjusted MDL)                |
|             | MRL | Method Reporting Limit                                 |     |   |
|             | Q   | RPD >40% between primary and confirmation columns      |     |   |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-007A

Field ID P46

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/22/10 2:30

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                |        | Date/Time Prepped | 03/24/10 14:44 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.2 g | Date/Time         |                | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By             | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 10:47    | MJ             | 44120      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 10:47    | MJ             | 44120      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 10:47    | MJ             | 44120      |
| JP4                             |       | No             |       |                | 1      | 04/05/10 10:47    | MJ             | 44120      |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 10:47    | MJ             | 44120      |
| JP7                             |       | No             |       |                | 1      | 04/05/10 10:47    | MJ             | 44120      |
| JP10                            |       | No             |       |                | 1      | 04/05/10 10:47    | MJ             | 44120      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 10:47    | MJ             | 44120      |
| Surrogate: o-Terphenyl          |       |                | 68 %  | Limits: 50-150 | 1      | 04/05/10 10:47    | MJ             | 44120      |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38183 (901) 218-2400 Fax (901) 218-2440

**Tri-State Testing**  
6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-008A

Field ID P47

Project **Memphis International**  
Description **Airport**

Project No. **E-9-429**

### Report of Analysis

Received 03/22/10

Matrix **Soil**

Sampled 03/22/10 2:50

### Analytical Method 8015B FIN

|                                 |        |                |                |                   |                         |
|---------------------------------|--------|----------------|----------------|-------------------|-------------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28791          | Date/Time Prepped | 03/24/10 14:44          |
|                                 |        | Default Vol/Wt | 30 g           |                   |                         |
| Compound                        | Result | Units          | Sample Vol/Wt  | 30.4 g            |                         |
|                                 |        |                | MQL            | DF                |                         |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          | 10.0           | 1                 | 04/05/10 11:00 MJ 44120 |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          | 10.0           | 1                 | 04/05/10 11:00 MJ 44120 |
| Gasoline/Aviation Jet           | No     |                |                | 1                 | 04/05/10 11:00 MJ 44120 |
| JP4                             | No     |                |                | 1                 | 04/05/10 11:00 MJ 44120 |
| JP5 / JP8                       | No     |                |                | 1                 | 04/05/10 11:00 MJ 44120 |
| JP7                             | No     |                |                | 1                 | 04/05/10 11:00 MJ 44120 |
| JP10                            | No     |                |                | 1                 | 04/05/10 11:00 MJ 44120 |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1                 | 04/05/10 11:00 MJ 44120 |
| Surrogate: o-Terphenyl          |        | 87 %           | Limits: 50-150 | 1                 | 04/05/10 11:00 MJ 44120 |

#### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38183 (901) 218-2400 Fax (901) 218-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-009A

Field ID P48

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/22/10 3:00

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |                |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|----------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                |        | Date/Time Prepped  | 03/24/10 14:44 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.7 g |                    |                |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By             | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 11:13     | MJ             | 44120            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 11:13     | MJ             | 44120            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 11:13     | MJ             | 44120            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 11:13     | MJ             | 44120            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 11:13     | MJ             | 44120            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 11:13     | MJ             | 44120            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 11:13     | MJ             | 44120            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 11:13     | MJ             | 44120            |
| Surrogate: o-Terphenyl          |       |                | 51 %  | Limits: 50-150 | 1      | 04/05/10 11:13     | MJ             | 44120            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | *I  | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38183 (901) 213-2400 Fax (901) 213-2440

**Tri-State Testing**  
6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-010A

Field ID P33

Project **Memphis International**  
Description **Airport**

Project No. **E-9-429**

### Report of Analysis

Received 03/22/10

Matrix **Soil**

Sampled 03/21/10 22:54

### Analytical Method 8015B FIN

|                                 |        |                |                |                   |                         |
|---------------------------------|--------|----------------|----------------|-------------------|-------------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28791          | Date/Time Prepped | 03/24/10 14:44          |
|                                 |        | Default Vol/Wt | 30 g           |                   |                         |
| Compound                        | Result | Units          | Sample Vol/Wt  | 30.8 g            |                         |
|                                 |        |                | MQL            | DF                |                         |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          | 10.0           | 1                 | 04/05/10 11:26 MJ 44120 |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          | 10.0           | 1                 | 04/05/10 11:26 MJ 44120 |
| Gasoline/Aviation Jet           | No     |                |                | 1                 | 04/05/10 11:26 MJ 44120 |
| JP4                             | No     |                |                | 1                 | 04/05/10 11:26 MJ 44120 |
| JP5 / JP8                       | No     |                |                | 1                 | 04/05/10 11:26 MJ 44120 |
| JP7                             | No     |                |                | 1                 | 04/05/10 11:26 MJ 44120 |
| JP10                            | No     |                |                | 1                 | 04/05/10 11:26 MJ 44120 |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1                 | 04/05/10 11:26 MJ 44120 |
| Surrogate: o-Terphenyl          |        | 42 % *         | Limits: 50-150 | 1                 | 04/05/10 11:26 MJ 44120 |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-011A

Field ID P37

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/21/10 23:53

### Analytical Method 8015B FIN

|                                 |       |                |       |                |                   |                |            |
|---------------------------------|-------|----------------|-------|----------------|-------------------|----------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                | Date/Time Prepped | 03/24/10 14:44 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.3 g            | Date/Time      | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF                | Analyzed       | By Batch   |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1                 | 04/05/10 11:39 | MJ 44120   |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1                 | 04/05/10 11:39 | MJ 44120   |
| Gasoline/Aviation Jet           |       | No             |       |                | 1                 | 04/05/10 11:39 | MJ 44120   |
| JP4                             |       | No             |       |                | 1                 | 04/05/10 11:39 | MJ 44120   |
| JP5 / JP8                       |       | No             |       |                | 1                 | 04/05/10 11:39 | MJ 44120   |
| JP7                             |       | No             |       |                | 1                 | 04/05/10 11:39 | MJ 44120   |
| JP10                            |       | No             |       |                | 1                 | 04/05/10 11:39 | MJ 44120   |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1                 | 04/05/10 11:39 | MJ 44120   |
| Surrogate: o-Terphenyl          |       |                | 74 %  | Limits: 50-150 | 1                 | 04/05/10 11:39 | MJ 44120   |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-012A

Field ID P38

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/22/10 0:45

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |                |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|----------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                |        | Date/Time Prepped  | 03/24/10 14:44 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.2 g |                    |                |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By             | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | 30.9           | mg/Kg | 10.0           | 1      | 04/05/10 11:52     | MJ             | 44120            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 11:52     | MJ             | 44120            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 11:52     | MJ             | 44120            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 11:52     | MJ             | 44120            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 11:52     | MJ             | 44120            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 11:52     | MJ             | 44120            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 11:52     | MJ             | 44120            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 11:52     | MJ             | 44120            |
| Surrogate: o-Terphenyl          |       |                | 78 %  | Limits: 50-150 | 1      | 04/05/10 11:52     | MJ             | 44120            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-013A

Field ID P41

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/22/10 1:49

### Analytical Method 8015B FIN

|                                 |             |                |        |                |                   |                |                |       |
|---------------------------------|-------------|----------------|--------|----------------|-------------------|----------------|----------------|-------|
| Prep Method                     | 3550B       | Prep Batch     | 28791  |                | Date/Time Prepped |                | 03/24/10 14:44 |       |
|                                 |             | Default Vol/Wt | 30 g   | Sample Vol/Wt  | 31.6 g            | Date/Time      | Analytical     |       |
| Compound                        |             | Result         | Units  | MQL            | DF                | Analyzed       | By             | Batch |
| Diesel Range Organics (C10-C28) |             | < 10.0         | mg/Kg  | 10.0           | 1                 | 04/05/10 12:05 | MJ             | 44120 |
| Oil Range Organics (>C28-C40)   |             | < 10.0         | mg/Kg  | 10.0           | 1                 | 04/05/10 12:05 | MJ             | 44120 |
| Gasoline/Aviation Jet           |             | No             |        |                | 1                 | 04/05/10 12:05 | MJ             | 44120 |
| JP4                             |             | No             |        |                | 1                 | 04/05/10 12:05 | MJ             | 44120 |
| JP5 / JP8                       |             | No             |        |                | 1                 | 04/05/10 12:05 | MJ             | 44120 |
| JP7                             |             | No             |        |                | 1                 | 04/05/10 12:05 | MJ             | 44120 |
| JP10                            |             | No             |        |                | 1                 | 04/05/10 12:05 | MJ             | 44120 |
| JP18 / Turbine Jet Fuel         |             | No             |        |                | 1                 | 04/05/10 12:05 | MJ             | 44120 |
| Surrogate:                      | o-Terphenyl |                | 47 % * | Limits: 50-150 | 1                 | 04/05/10 12:05 | MJ             | 44120 |

|             |     |  |
|-------------|-----|--|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             |
| Definitions | B   | Analyte detected in the associated Method Blank        |
|             | E   | Value exceeds method calibration range                 |
|             | J   | Estimated Value Analyte below reported detection limit |
|             | MDL | Method Detection Limit (unadjusted)                    |
|             | MRL | Method Reporting Limit                                 |
|             | Q   | RPD >40% between primary and confirmation columns      |

|     |   |
|-----|---|
| * I | Recoveries affected by interferences or high background |
| DF  | Dilution Factor   |
| H   | Prepped / Analyzed out of holding time.                 |
| M   | Minimum value   |
| MQL | Method Quantitation Limit (adjusted)                    |
| N   | Refer to attached Non-Compliance Report                 |
| SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-014A

Field ID P45

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/22/10 2:31

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |                |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|----------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                |        | Date/Time Prepped  | 03/24/10 14:44 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.4 g |                    |                |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By             | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 12:18     | MJ             | 44120            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 12:18     | MJ             | 44120            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 12:18     | MJ             | 44120            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 12:18     | MJ             | 44120            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 12:18     | MJ             | 44120            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 12:18     | MJ             | 44120            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 12:18     | MJ             | 44120            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 12:18     | MJ             | 44120            |
| Surrogate: o-Terphenyl          |       |                | 68 %  | Limits: 50-150 | 1      | 04/05/10 12:18     | MJ             | 44120            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-081-0242

Lab ID 1003390-015A

Field ID P6

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/22/10

Matrix Soil

Sampled 03/22/10 6:10

### Analytical Method 8015B FIN

|                                 |       |                |       |                |                   |                |                |       |
|---------------------------------|-------|----------------|-------|----------------|-------------------|----------------|----------------|-------|
| Prep Method                     | 3550B | Prep Batch     | 28791 |                | Date/Time Prepped |                | 03/24/10 14:44 |       |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.1 g            | Date/Time      | Analytical     |       |
| Compound                        |       | Result         | Units | MQL            | DF                | Analyzed       | By             | Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1                 | 04/05/10 12:31 | MJ             | 44120 |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1                 | 04/05/10 12:31 | MJ             | 44120 |
| Gasoline/Aviation Jet           |       | No             |       |                | 1                 | 04/05/10 12:31 | MJ             | 44120 |
| JP4                             |       | No             |       |                | 1                 | 04/05/10 12:31 | MJ             | 44120 |
| JP5 / JP8                       |       | No             |       |                | 1                 | 04/05/10 12:31 | MJ             | 44120 |
| JP7                             |       | No             |       |                | 1                 | 04/05/10 12:31 | MJ             | 44120 |
| JP10                            |       | No             |       |                | 1                 | 04/05/10 12:31 | MJ             | 44120 |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1                 | 04/05/10 12:31 | MJ             | 44120 |
| Surrogate: o-Terphenyl          |       |                | 73 %  | Limits: 50-150 | 1                 | 04/05/10 12:31 | MJ             | 44120 |

### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Cooler Receipt Form

Customer Number: **05160**

Customer Name: **Tri-State Testing**

Report Number: **10-081-0242**

#### Shipping Method

☐ FedEx ☐ UPS ☐ US Postal ☒ Client ☐ LMP ☐ Courier ☐ Other: \_\_\_\_\_

|  |                                      |                                     |   |
|--|--------------------------------------|-------------------------------------|---|
| Shipping container/cooler uncompromised?           | <input checked="" type="radio"/> Yes | <input type="radio"/> No            | <input type="radio"/> Not Present             |
| Custody seals intact on shipping container/cooler? | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Custody seals intact on sample bottles?            | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Chain of Custody present?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| COC agrees with sample labels?                     | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Samples in proper containers?                      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sample containers intact?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sufficient sample volume for indicated tests?      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| All samples received within holding time?          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Container temperature in compliance?               | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Water - VOA vials free of headspace?               | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Water - Preservation acceptable upon receipt?      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            | <input type="radio"/> N/A                     |
| Samples screened for radioactivity (COE only)?     | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Special precautions or instructions included?      | <input type="radio"/> Yes            | <input checked="" type="radio"/> No |   |

Comments:

Any regulatory non-compliance issues will be recorded on non-compliance report.

Signature: Brooke Shoup

Date & Time: 03/22/2010 10:44:19

# CHAIN OF CUSTODY RECORD

REPORT NO. 1003390

GTW ANALYTICAL SERVICES, LLC.

2790 Whitten Rd. Memphis, TN 38133

PHONE 901-213-2400

FAX 901-213-2440

SUBMIT REPORT TO: David D. McCray  
COMPANY: Tri-State Testing Services, Inc.  
CONTACT: David McCray • 901-385-1199

PERMIT/PROJECT NO.: E-9-429

PROJECT NAME:

Memphis International Airport

SAMPLER'S SIGNATURE: *BF Wood*

| LAB NO. | SEQ NO. | SAMPLE NO. | DATE    | TIME    | SAMPLE LOCATION   | MATRIX | NO. OF CONTAINERS | Method                           |
|---------|---------|------------|---------|---------|-------------------|--------|-------------------|----------------------------------|
|         |         | P34        | 3/21/10 | 11:00PM | P34 / 11" - 12"   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P35        | 3/21/10 | 11:40PM | P35 / 11" - 12"   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P39        | 3/22/10 | 12:00AM | P39 / 22.5" - 12" | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P40        | 3/22/10 | 12:20AM | P40 / 10" - 12"   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P5         | 3/22/10 | 1:00AM  | P5 / 11.5" - 12"  | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P44        | 3/22/10 | 2:00AM  | P44 / 11" - 12"   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P46        | 3/22/10 | 2:30AM  | P46 / 11" - 12"   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P47        | 3/22/10 | 2:50AM  | P47 / 11" - 12"   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P48        | 3/22/10 | 3:00AM  | P48 / 11" - 12"   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         |            |         |         |                   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |



10-081-0242  
95160  
2010-03-22  
042 19  
Tri-State Testing (GTW)  
Memphis International Airport

pH

RELINQUISHED BY:

DATE/TIME:

RELINQUISHED BY:

DATE/TIME:

METHOD OF SHIPMENT:

SHIPPED BY:

RECEIVED FOR LAB BY:

DATE/TIME:

CONDITION OF COOLER/SEAL:

COOLER OPENED BY:

DATE/TIME:

SHADED AREAS FOR LABORATORY USE ONLY!

3.22.10 0828

14°C

## CHAIN OF CUSTODY RECORD

REPORT NO. 1003390

**GTW ANALYTICAL SERVICES, LLC.**

2790 Whitten Rd. Memphis, TN 38133

**PHONE 901-213-2400** **FAX 901-213-2440**

PERMIT/PROJECT NO.:

**E-9-429**

SAMPLER'S SIGNATURE:

William Stedley

PROJECT NAME:

Memphis International Airport

| LAB NO. | SEQ NO. | SAMPLE NO. | DATE    | TIME     | SAMPLE LOCATION         | MATRIX | NO. OF CONTAINERS | Method                           |
|---------|---------|------------|---------|----------|-------------------------|--------|-------------------|----------------------------------|
|         |         | P-33       | 3-21-10 | 10:54    | P-33 / 11" to 12'       | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P-37       | 3-21-10 | 11:53 PM | P-37 / 3' 3 1/2" to 12' | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P-38       | 3-22-10 | 12:45 AM | P-38 / 3'               | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P-41       | 3-22-10 | 1:49 AM  | P-41 / 10" 1/2 to 12'   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P-45       | 3-22-10 | 2:31 AM  | P-45 / 11" to 12'       | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         | P-6        | 3-22-10 | 6:10 AM  | P-6 / 11" to 12'        | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         |            |         |          |                         | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         |            |         |          |                         | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         |            |         |          |                         | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         |            |         |          |                         | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         |            |         |          |                         | S      | 1                 | Method 8015 Jet Fuel FingerPrint |
|         |         |            |         |          |                         | S      | 1                 | Method 8015 Jet Fuel FingerPrint |

RELINQUISHED BY: Bob

METHOD OF SHIPMENT: Box

DATE/TIME: 3-22-10-0838

SHIPPED BY: [Signature]

RELINQUISHED BY: \_\_\_\_\_

RECEIVED FOR LAB BY: J. Smith

DATE/TIME: \_\_\_\_\_

COOLER OPENED BY: Mc

CONDITION OF COOLER/SEAL: MC

DATE/TIME: 3-22-10 0828

SHADED AREAS FOR LABORATORY USE ONLY!



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

4/7/2010

Tri-State Testing  
Mr. David McCray  
6756 Buckles Cove  
Memphis, TN, 38133

Ref: Analytical Testing  
Report Number: 10-082-0215  
Project Description: Memphis International Airport  
Project #E-9-429

Dear Mr. David McCray:

GTW Analytical Services received 16 sample(s) on 3/23/2010 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA and NELAP.

The results are shown on the attached analysis sheet(s).

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,

*Randell H. Thomas*

Randy Thomas  
Project Manager

RECEIVED  
APR 09 2010

BY:.....



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**CLIENT:** Tri-State Testing  
**Project:** Memphis International Airport  
**Lab Order Number:** 10-082-0215

### CASE NARRATIVE

**Date:** 04/07/10

GTW01

Fingerprint Analysis by Method 8015B  
Jet Fuels

Samples were extracted and analyzed by Method 8015B. Comparisons were made to the chromatographic library, with special attention given to Jet fuels. Results are reported for both Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40), with quantitation achieved using Diesel Fuel and Motor Oil.



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-001A

Field ID P-32

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/22/10 22:29

### Analytical Method 8015B FIN

|                                 |       |                |       |                |      |                   |               |            |
|---------------------------------|-------|----------------|-------|----------------|------|-------------------|---------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28797 |                |      | Date/Time Prepped | 03/25/10 9:26 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 31 g | Date/Time         |               | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF   | Analyzed          | By            | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1    | 04/05/10 15:17    | MJ            | 44131      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1    | 04/05/10 15:17    | MJ            | 44131      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1    | 04/05/10 15:17    | MJ            | 44131      |
| JP4                             |       | No             |       |                | 1    | 04/05/10 15:17    | MJ            | 44131      |
| JP5 / JP8                       |       | No             |       |                | 1    | 04/05/10 15:17    | MJ            | 44131      |
| JP7                             |       | No             |       |                | 1    | 04/05/10 15:17    | MJ            | 44131      |
| JP10                            |       | No             |       |                | 1    | 04/05/10 15:17    | MJ            | 44131      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1    | 04/05/10 15:17    | MJ            | 44131      |
| Surrogate: o-Terphenyl          |       |                | 67 %  | Limits: 50-150 | 1    | 04/05/10 15:17    | MJ            | 44131      |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-002A

Field ID P-50

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/22/10 23:40

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28797 |                |        | Date/Time Prepped  | 03/25/10 9:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.4 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 15:30     | MJ            | 44131            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 15:30     | MJ            | 44131            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 15:30     | MJ            | 44131            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 15:30     | MJ            | 44131            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 15:30     | MJ            | 44131            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 15:30     | MJ            | 44131            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 15:30     | MJ            | 44131            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 15:30     | MJ            | 44131            |
| Surrogate: o-Terphenyl          |       |                | 66 %  | Limits: 50-150 | 1      | 04/05/10 15:30     | MJ            | 44131            |

|                            |  |   |
|----------------------------|--|---|
| Qualifiers/<br>Definitions | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
|                            | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|                            | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|                            | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|                            | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|                            | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|                            | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-003A

Field ID P-51

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/22/10 0:09

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28797 |                |        | Date/Time Prepped  | 03/25/10 9:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.3 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 15:43     | MJ            | 44131            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 15:43     | MJ            | 44131            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 15:43     | MJ            | 44131            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 15:43     | MJ            | 44131            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 15:43     | MJ            | 44131            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 15:43     | MJ            | 44131            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 15:43     | MJ            | 44131            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 15:43     | MJ            | 44131            |
| Surrogate: o-Terphenyl          |       |                | 66 %  | Limits: 50-150 | 1      | 04/05/10 15:43     | MJ            | 44131            |

#### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-004A

Field ID P-8

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/23/10 0:59

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28797 |                |        | Date/Time Prepped  | 03/25/10 9:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.1 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 15:56     | MJ            | 44131            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 15:56     | MJ            | 44131            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 15:56     | MJ            | 44131            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 15:56     | MJ            | 44131            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 15:56     | MJ            | 44131            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 15:56     | MJ            | 44131            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 15:56     | MJ            | 44131            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 15:56     | MJ            | 44131            |
| Surrogate: o-Terphenyl          |       |                | 51 %  | Limits: 50-150 | 1      | 04/05/10 15:56     | MJ            | 44131            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**Tri-State Testing**  
6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-005A

Field ID P-58

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/23/10 1:50

### Analytical Method 8015B FIN

|                                 |        |                |                |                   |                         |
|---------------------------------|--------|----------------|----------------|-------------------|-------------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28797          | Date/Time Prepped | 03/25/10 9:26           |
|                                 |        | Default Vol/Wt | 30 g           | Date/Time         |                         |
| Compound                        | Result | Units          | Sample Vol/Wt  | 30.1 g            | Analytical              |
|                                 |        |                | MQL            | DF                | Batch                   |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          | 10.0           | 1                 | 04/05/10 16:09 MJ 44131 |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          | 10.0           | 1                 | 04/05/10 16:09 MJ 44131 |
| Gasoline/Aviation Jet           | No     |                |                | 1                 | 04/05/10 16:09 MJ 44131 |
| JP4                             | No     |                |                | 1                 | 04/05/10 16:09 MJ 44131 |
| JP5 / JP8                       | No     |                |                | 1                 | 04/05/10 16:09 MJ 44131 |
| JP7                             | No     |                |                | 1                 | 04/05/10 16:09 MJ 44131 |
| JP10                            | No     |                |                | 1                 | 04/05/10 16:09 MJ 44131 |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1                 | 04/05/10 16:09 MJ 44131 |
| Surrogate: o-Terphenyl          |        | 65 %           | Limits: 50-150 | 1                 | 04/05/10 16:09 MJ 44131 |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-006A

Field ID P-60

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/23/10 3:14

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28797 |                |        | Date/Time Prepped  | 03/25/10 9:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.9 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 17:14     | MJ            | 44131            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 17:14     | MJ            | 44131            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 17:14     | MJ            | 44131            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 17:14     | MJ            | 44131            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 17:14     | MJ            | 44131            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 17:14     | MJ            | 44131            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 17:14     | MJ            | 44131            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 17:14     | MJ            | 44131            |
| Surrogate: o-Terphenyl          |       |                | 67 %  | Limits: 50-150 | 1      | 04/05/10 17:14     | MJ            | 44131            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-007A

Field ID P-61

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/23/10 2:54

### Analytical Method 8015B FIN

| Prep Method                     | 3550B | Prep Batch     | 28797 |                |        | Date/Time Prepped  | 03/25/10 9:26 |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.2 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 17:27     | MJ            | 44131            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 17:27     | MJ            | 44131            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 17:27     | MJ            | 44131            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 17:27     | MJ            | 44131            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 17:27     | MJ            | 44131            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 17:27     | MJ            | 44131            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 17:27     | MJ            | 44131            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 17:27     | MJ            | 44131            |
| Surrogate: o-Terphenyl          |       |                | 69 %  | Limits: 50-150 | 1      | 04/05/10 17:27     | MJ            | 44131            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**Tri-State Testing**  
6756 Buckles Cove

Memphis, TN 38133

Lab Order Number **10-082-0215**

Lab ID **1003410-008A**

Field ID **P-62**

Project **Memphis International**

Description **Airport**

Project No. **E-9-429**

### Report of Analysis

Received **03/23/10**

Matrix **Soil**

Sampled **03/23/10 3:52**

### Analytical Method 8015B FIN

|                                 |        |                |                |               |                |                   |               |            |
|---------------------------------|--------|----------------|----------------|---------------|----------------|-------------------|---------------|------------|
| Prep Method                     | 3550B  | Prep Batch     | 28797          |               |                | Date/Time Prepped | 03/25/10 9:26 |            |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30 g           | Date/Time         |               | Analytical |
| Compound                        | Result | Units          | MQL            | DF            | Analyzed       | By                | Batch         |            |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          | 10.0           | 1             | 04/05/10 17:40 | MJ                | 44131         |            |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          | 10.0           | 1             | 04/05/10 17:40 | MJ                | 44131         |            |
| Gasoline/Aviation Jet           | No     |                |                | 1             | 04/05/10 17:40 | MJ                | 44131         |            |
| JP4                             | No     |                |                | 1             | 04/05/10 17:40 | MJ                | 44131         |            |
| JP5 / JP8                       | No     |                |                | 1             | 04/05/10 17:40 | MJ                | 44131         |            |
| JP7                             | No     |                |                | 1             | 04/05/10 17:40 | MJ                | 44131         |            |
| JP10                            | No     |                |                | 1             | 04/05/10 17:40 | MJ                | 44131         |            |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1             | 04/05/10 17:40 | MJ                | 44131         |            |
| Surrogate: o-Terphenyl          |        | 53 %           | Limits: 50-150 | 1             | 04/05/10 17:40 | MJ                | 44131         |            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38183 (901) 213-2400 Fax (901) 213-2440

**Tri-State Testing**  
6756 Buckles Cove

Memphis, TN 38133

Lab Order Number **10-082-0215**

Lab ID **1003410-009A**

Field ID **P-42**

Project **Memphis International**  
Description **Airport**  
Project No. **E-9-429**

### Report of Analysis

Received **03/23/10**

Matrix **Soil**

Sampled **03/22/10 22:36**

### Analytical Method 8015B FIN

| Prep Method                     | 3550B               | Prep Batch | 28797              |    |                | Date/Time Prepped | 03/25/10 9:26 |
|---------------------------------|---------------------|------------|--------------------|----|----------------|-------------------|---------------|
| Compound                        | Default Vol/Wt 30 g |            | Sample Vol/Wt 30 g |    | Date/Time      |                   | Analytical    |
|                                 | Result              | Units      | MQL                | DF | Analyzed       | By                | Batch         |
| Diesel Range Organics (C10-C28) | < 10.0              | mg/Kg      | 10.0               | 1  | 04/05/10 17:53 | MJ                | 44131         |
| Oil Range Organics (>C28-C40)   | < 10.0              | mg/Kg      | 10.0               | 1  | 04/05/10 17:53 | MJ                | 44131         |
| Gasoline/Aviation Jet           | No                  |            |                    | 1  | 04/05/10 17:53 | MJ                | 44131         |
| JP4                             | No                  |            |                    | 1  | 04/05/10 17:53 | MJ                | 44131         |
| JP5 / JP8                       | No                  |            |                    | 1  | 04/05/10 17:53 | MJ                | 44131         |
| JP7                             | No                  |            |                    | 1  | 04/05/10 17:53 | MJ                | 44131         |
| JP10                            | No                  |            |                    | 1  | 04/05/10 17:53 | MJ                | 44131         |
| JP18 / Turbine Jet Fuel         | No                  |            |                    | 1  | 04/05/10 17:53 | MJ                | 44131         |
| Surrogate: o-Terphenyl          |                     | 61 %       | Limits: 50-150     | 1  | 04/05/10 17:53 | MJ                | 44131         |

|                            |          |  |     |   |
|----------------------------|----------|--|-----|---|
| Qualifiers/<br>Definitions | *        | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
|                            | B        | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|                            | E        | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|                            | J        | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|                            | MDL      | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|                            | MRL      | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|                            | Q        | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |
|                            | 04/07/10 | 5160 TRISTATE_GTW                                      |     |   |



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38193 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-010A

Field ID P-49

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/22/10 22:56

### Analytical Method 8015B FIN

| Prep Method                     | 3550B  | Prep Batch     | 28797 |                |        | Date/Time Prepped | 03/25/10 9:26 |
|---------------------------------|--------|----------------|-------|----------------|--------|-------------------|---------------|
| Compound                        | Result | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.5 g | Date/Time         | Analytical    |
|                                 |        |                | Units |                | DF     | Analyzed          | By Batch      |
| Diesel Range Organics (C10-C28) | < 10.0 |                | mg/Kg | 10.0           | 1      | 04/05/10 18:06    | MJ 44131      |
| Oil Range Organics (>C28-C40)   | < 10.0 |                | mg/Kg | 10.0           | 1      | 04/05/10 18:06    | MJ 44131      |
| Gasoline/Aviation Jet           | No     |                |       |                | 1      | 04/05/10 18:06    | MJ 44131      |
| JP4                             | No     |                |       |                | 1      | 04/05/10 18:06    | MJ 44131      |
| JP5 / JP8                       | No     |                |       |                | 1      | 04/05/10 18:06    | MJ 44131      |
| JP7                             | No     |                |       |                | 1      | 04/05/10 18:06    | MJ 44131      |
| JP10                            | No     |                |       |                | 1      | 04/05/10 18:06    | MJ 44131      |
| JP18 / Turbine Jet Fuel         | No     |                |       |                | 1      | 04/05/10 18:06    | MJ 44131      |
| Surrogate: o-Terphenyl          |        |                | 63 %  | Limits: 50-150 | 1      | 04/05/10 18:06    | MJ 44131      |

| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
|-------------|-----|--|-----|---|
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-011A

Field ID P-52

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/23/10 0:10

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28797 |                |        | Date/Time Prepped  | 03/25/10 9:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.1 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 18:19     | MJ            | 44131            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 18:19     | MJ            | 44131            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 18:19     | MJ            | 44131            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 18:19     | MJ            | 44131            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 18:19     | MJ            | 44131            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 18:19     | MJ            | 44131            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 18:19     | MJ            | 44131            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 18:19     | MJ            | 44131            |
| Surrogate: o-Terphenyl          |       |                | 62 %  | Limits: 50-150 | 1      | 04/05/10 18:19     | MJ            | 44131            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-012A

Field ID P-56

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/23/10 0:35

### Analytical Method 8015B FIN

|                                 |        |                |                |               |                |                   |                  |
|---------------------------------|--------|----------------|----------------|---------------|----------------|-------------------|------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28797          |               |                | Date/Time Prepped | 03/25/10 9:26    |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.2 g         | Date/Time         |                  |
| Compound                        | Result | Units          | MQL            | DF            | Analyzed       | By                | Analytical Batch |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          | 10.0           | 1             | 04/05/10 18:32 | MJ                | 44131            |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          | 10.0           | 1             | 04/05/10 18:32 | MJ                | 44131            |
| Gasoline/Aviation Jet           | No     |                |                | 1             | 04/05/10 18:32 | MJ                | 44131            |
| JP4                             | No     |                |                | 1             | 04/05/10 18:32 | MJ                | 44131            |
| JP5 / JP8                       | No     |                |                | 1             | 04/05/10 18:32 | MJ                | 44131            |
| JP7                             | No     |                |                | 1             | 04/05/10 18:32 | MJ                | 44131            |
| JP10                            | No     |                |                | 1             | 04/05/10 18:32 | MJ                | 44131            |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1             | 04/05/10 18:32 | MJ                | 44131            |
| Surrogate: o-Terphenyl          |        | 76 %           | Limits: 50-150 | 1             | 04/05/10 18:32 | MJ                | 44131            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-013A

Field ID P-57

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/23/10 2:00

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28797 |                |        | Date/Time Prepped  | 03/25/10 9:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.2 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 18:46     | MJ            | 44131            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 18:46     | MJ            | 44131            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 18:46     | MJ            | 44131            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 18:46     | MJ            | 44131            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 18:46     | MJ            | 44131            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 18:46     | MJ            | 44131            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 18:46     | MJ            | 44131            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 18:46     | MJ            | 44131            |
| Surrogate: o-Terphenyl          |       |                | 66 %  | Limits: 50-150 | 1      | 04/05/10 18:46     | MJ            | 44131            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-014A

Field ID P-59

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/23/10 2:30

### Analytical Method 8015B FIN

|                                 |       |                |       |                |                   |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|-------------------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28797 |                | Date/Time Prepped |                    | 03/25/10 9:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.3 g            | Date/Time Analyzed |               | Analytical Batch |
| Compound                        |       | Result         | Units | MQL            | DF                |                    | By            |                  |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1                 | 04/05/10 18:59     | MJ            | 44131            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1                 | 04/05/10 18:59     | MJ            | 44131            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1                 | 04/05/10 18:59     | MJ            | 44131            |
| JP4                             |       | No             |       |                | 1                 | 04/05/10 18:59     | MJ            | 44131            |
| JP5 / JP8                       |       | No             |       |                | 1                 | 04/05/10 18:59     | MJ            | 44131            |
| JP7                             |       | No             |       |                | 1                 | 04/05/10 18:59     | MJ            | 44131            |
| JP10                            |       | No             |       |                | 1                 | 04/05/10 18:59     | MJ            | 44131            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1                 | 04/05/10 18:59     | MJ            | 44131            |
| Surrogate: o-Terphenyl          |       |                | 59 %  | Limits: 50-150 | 1                 | 04/05/10 18:59     | MJ            | 44131            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-015A

Field ID P-43

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/23/10 3:05

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28797 |                |        | Date/Time Prepped  | 03/25/10 9:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.8 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 19:12     | MJ            | 44131            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 19:12     | MJ            | 44131            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 19:12     | MJ            | 44131            |
| JP4                             |       | No             |       |                | 1      | 04/05/10 19:12     | MJ            | 44131            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 19:12     | MJ            | 44131            |
| JP7                             |       | No             |       |                | 1      | 04/05/10 19:12     | MJ            | 44131            |
| JP10                            |       | No             |       |                | 1      | 04/05/10 19:12     | MJ            | 44131            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 19:12     | MJ            | 44131            |
| Surrogate: o-Terphenyl          |       |                | 54 %  | Limits: 50-150 | 1      | 04/05/10 19:12     | MJ            | 44131            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-082-0215

Lab ID 1003410-016A

Field ID P-9

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/23/10

Matrix Soil

Sampled 03/23/10 3:45

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |               |    |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|---------------|----|------------|
| Prep Method                     | 3550B | Prep Batch     | 28797 |                |        | Date/Time Prepped | 03/25/10 9:26 |    |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.1 g | Date/Time         |               |    | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          |               | By | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 19:25    |               | MJ | 44131      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/05/10 19:25    |               | MJ | 44131      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/05/10 19:25    |               | MJ | 44131      |
| JP4                             |       | No             |       |                | 1      | 04/05/10 19:25    |               | MJ | 44131      |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/05/10 19:25    |               | MJ | 44131      |
| JP7                             |       | No             |       |                | 1      | 04/05/10 19:25    |               | MJ | 44131      |
| JP10                            |       | No             |       |                | 1      | 04/05/10 19:25    |               | MJ | 44131      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/05/10 19:25    |               | MJ | 44131      |
| Surrogate: o-Terphenyl          |       |                | 58 %  | Limits: 50-150 | 1      | 04/05/10 19:25    |               | MJ | 44131      |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/07/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38138 (901) 213-2400 Fax (901) 213-2440

### Cooler Receipt Form

Customer Number: **05160**

Customer Name: **Tri-State Testing**

Report Number: **10-082-0215**

#### Shipping Method

☐ FedEx ☐ UPS ☐ US Postal ☒ Client ☐ LMP ☐ Courier ☐ Other: \_\_\_\_\_

|  |                                      |                                     |   |
|--|--------------------------------------|-------------------------------------|---|
| Shipping container/cooler uncompromised?           | <input checked="" type="radio"/> Yes | <input type="radio"/> No            | <input type="radio"/> Not Present             |
| Custody seals intact on shipping container/cooler? | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Custody seals intact on sample bottles?            | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Chain of Custody present?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| COC agrees with sample labels?                     | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Samples in proper containers?                      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sample containers intact?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sufficient sample volume for indicated tests?      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| All samples received within holding time?          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Container temperature in compliance?               | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Water - VOA vials free of headspace?               | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Water - Preservation acceptable upon receipt?      | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Samples screened for radioactivity (COE only)?     | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Special precautions or instructions included?      | <input type="radio"/> Yes            | <input checked="" type="radio"/> No |   |

Comments:

Any regulatory non-compliance issues will be recorded on non-compliance report.

Signature:

Date & Time:

| C                                       |         | GTW ANAL   |         | 2790 Whit                                  |                   | PHONE 901-213-2400                          |                   | FAX 901-213-2440                     |        | 10-082-0215<br>05160<br>2010-03-23<br>0:24:54 |  | 1003410                              |  | REPORT NO. |  |
|---|---------|------------|---------|--|-------------------|---|-------------------|--------------------------------------|--------|---|--|--------------------------------------|--|------------|--|
| PERMIT/PROJECT NO:                      |         | E-9-429    |         | SAMPLER'S SIGNATURE: <i>William Shaddy</i> |                   | PROJECT NAME: Memphis International Airport |                   | SUBMIT REPORT TO: David D. McCray    |        | COMPANY: Tri-State Testing Services, Inc.     |  | CONTACT: David McCray • 901-385-1199 |  |            |  |
| LAB NO.                                 | SEQ NO. | SAMPLE NO. | DATE    | TIME                                       | SAMPLE LOCATION   | MATRIX                                      | NO. OF CONTAINERS | REMARKS (ANALYSES, ETC.)             | LAB pH |   |  |                                      |  |            |  |
|   |         | P-32       | 3-22-10 | 10:19 PM                                   | P-32 / 11" to 12' | S   | 1                 | Method 8015 Jet Fuel FingerPrint     |        |   |  |                                      |  |            |  |
|   |         | P-50       | 3-22-10 | 11:40 PM                                   | P-50 / 11" to 12' | S   | 1                 | Method 8015 Jet Fuel FingerPrint     |        |   |  |                                      |  |            |  |
|   |         | P-51       | 3-22-10 | 12:09 AM                                   | P-51 / 11" to 12' | S   | 1                 | Method 8015 Jet Fuel FingerPrint     |        |   |  |                                      |  |            |  |
|   |         | P-8        | 3-23-10 | 12:59 AM                                   | P-8 / 11" to 12'  | S   | 1                 | Method 8015 Jet Fuel FingerPrint     |        |   |  |                                      |  |            |  |
|   |         | P-58       | 3-23-10 | 1:58 AM                                    | P-58 / 1' to 12'  | S   | 1                 | Method 8015 Jet Fuel FingerPrint     |        |   |  |                                      |  |            |  |
|   |         | P-60       | 3-23-10 | 3:14                                       | P-60 / 11" to 12' | S   | 1                 | Method 8015 Jet Fuel FingerPrint     |        |   |  |                                      |  |            |  |
|   |         | P-61       | 3-23-10 | 2:54                                       | P-61 / 11" to 12' | S   | 1                 | Method 8015 Jet Fuel FingerPrint     |        |   |  |                                      |  |            |  |
|   |         | P-62       | 3-23-10 | 3:52                                       | P-62 / 1' to 12'  | S   | 1                 | Method 8015 Jet Fuel FingerPrint     |        |   |  |                                      |  |            |  |
|   |         |            |         |  |                   | S   | 1                 | Method 8015 Jet Fuel FingerPrint     |        |   |  |                                      |  |            |  |
| RELINQUISHED BY: <i>David D. McCray</i> |         |            |         |  |                   | RELINQUISHED BY:                            |                   | DATE/TIME: 3/23/10 0935              |        |   |  |                                      |  |            |  |
| METHOD OF SHIPMENT:                     |         |            |         |  |                   | SHIPPED BY:                                 |                   | RECEIVED FOR LAB BY: <i>J. Smith</i> |        |   |  |                                      |  |            |  |
| CONDITION OF COOLER/SEAL:               |         |            |         |  |                   | COOLER OPENED BY:                           |                   | DATE/TIME: 3-23-10 0935              |        |   |  |                                      |  |            |  |
|   |         |            |         |  |                   | 44C   |                   | DATE/TIME:                           |        |   |  |                                      |  |            |  |
| SHADED AREAS FOR LABORATORY USE ONLY!   |         |            |         |  |                   |   |                   |                                      |        |   |  |                                      |  |            |  |

10-082-06.5

## CHAIN OF CUSTODY RECORD

GTW ANALYTICAL SERVICES, LLC.  
2790 Whitten Rd. Memphis, TN 38133  
PHONE 901-213-2400 FAX 901-213-2440

PERMIT/PROJECT NO.: **E-9-429**

SUBMIT REPORT TO: David D. McCray  
COMPANY: Tri-State Testing Services, Inc.  
CONTACT: David McCray • 901-385-1199

REPORT NO.: 1003410

PROJECT NAME:

Memphis International Airport

SAMPLER'S SIGNATURE: *B. White*

| LAB NO. | SEQ NO. | SAMPLE NO. | DATE    | TIME     | SAMPLE LOCATION     | MATRIX | NO. OF CONTAINERS | REMARKS (ANALYSES, ETC.)         | LAB pH |
|---------|---------|------------|---------|----------|---------------------|--------|-------------------|----------------------------------|--------|
|         |         | P42        | 3/22/10 | 10:30AM  | P42 / 15" - 12"     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P49        | 3/22/10 | 10:36PM  | P49 / 11 1/2" - 12" | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P52        | 3/23/10 | 12:10 AM | P52 / 2'4" - 12'    | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P56        | 3/23/10 | 12:35AM  | P56 / 11" - 12"     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P57        | 3/23/10 | 2:00AM   | P57 / 11" - 12"     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P59        | 3/23/10 | 2:30AM   | P59 / 12 1/2" - 12" | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P43        | 3/23/10 | 3:05AM   | P43 / 11" - 12"     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P9         | 3/23/10 | 3:45AM   | P9 / 11 1/2" - 12"  | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |

RELINQUISHED BY:

*David D. McCray*

DATE/TIME:

3/23/10 0935

RELINQUISHED BY:

DATE/TIME:

METHOD OF SHIPMENT:

SHIPPED BY:

RECEIVED FOR LAB

BY *J. Smith*

DATE/TIME:

CONDITION OF COOLER/SEAL:

COOLER OPENED BY:

DATE/TIME:

3.23.10 0935

SHADED AREAS FOR LABORATORY USE ONLY!



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

4/8/2010

Tri-State Testing  
Mr. David McCray  
6756 Buckles Cove  
Memphis, TN, 38133

Ref: Analytical Testing  
Report Number: 10-083-0206  
Project Description: Memphis International Airport  
Project #E-9-429

Dear Mr. David McCray:

GTW Analytical Services received 1 sample(s) on 3/24/2010 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA and NELAP.

The results are shown on the attached analysis sheet(s).

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,

*Randell H. Thomas*

Randy Thomas  
Project Manager

RECEIVED  
APR 12 2010  
BY:.....



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**CLIENT:** Tri-State Testing  
**Project:** Memphis International Airport  
**Lab Order Number:** 10-083-0206

### CASE NARRATIVE

**Date:** 04/08/10

GTW01

Fingerprint Analysis by Method 8015B  
Jet Fuels

Samples were extracted and analyzed by Method 8015B. Comparisons were made to the chromatographic library, with special attention given to Jet fuels. Results are reported for both Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40), with quantitation achieved using Diesel Fuel and Motor Oil.

The following sample indicated contamination in Diesel Range Organics (C10-C28) which may be degraded JP5/8.

1003427-011A (P67)

The following sample(s) indicated contamination in Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40), which consisted of non-specific contamination.

1003427-002A (P53)

1003427-003A (P7)



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38183 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-001A

Field ID P65

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/23/10 22:45

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |               |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|---------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28823 |                |        | Date/Time Prepped | 03/27/10 5:30 |            |
| Compound                        |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 31.7 g | Date/Time         |               | Analytical |
|                                 |       | Result         | Units | MQL            | DF     | Analyzed          | By            | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/06/10 9:51     | MJ            | 44150      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/06/10 9:51     | MJ            | 44150      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/06/10 9:51     | MJ            | 44150      |
| JP4                             |       | No             |       |                | 1      | 04/06/10 9:51     | MJ            | 44150      |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/06/10 9:51     | MJ            | 44150      |
| JP7                             |       | No             |       |                | 1      | 04/06/10 9:51     | MJ            | 44150      |
| JP10                            |       | No             |       |                | 1      | 04/06/10 9:51     | MJ            | 44150      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/06/10 9:51     | MJ            | 44150      |
| Surrogate: o-Terphenyl          |       |                | 67 %  | Limits: 50-150 | 1      | 04/06/10 9:51     | MJ            | 44150      |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/08/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-002A

Field ID P53

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/23/10 23:08

### Analytical Method 8015B FIN

|                                 |        |                |                |               |                |                   |                  |
|---------------------------------|--------|----------------|----------------|---------------|----------------|-------------------|------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28823          |               |                | Date/Time Prepped | 03/27/10 5:30    |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.3 g         | Date/Time         |                  |
| Compound                        | Result | Units          | MQL            | DF            | Analyzed       | By                | Analytical Batch |
| Diesel Range Organics (C10-C28) | 12.5   | mg/Kg          | 10.0           | 1             | 04/06/10 10:04 | MJ                | 44150            |
| Oil Range Organics (>C28-C40)   | 16.3   | mg/Kg          | 10.0           | 1             | 04/06/10 10:04 | MJ                | 44150            |
| Gasoline/Aviation Jet           | No     |                |                | 1             | 04/06/10 10:04 | MJ                | 44150            |
| JP4                             | No     |                |                | 1             | 04/06/10 10:04 | MJ                | 44150            |
| JP5 / JP8                       | No     |                |                | 1             | 04/06/10 10:04 | MJ                | 44150            |
| JP7                             | No     |                |                | 1             | 04/06/10 10:04 | MJ                | 44150            |
| JP10                            | No     |                |                | 1             | 04/06/10 10:04 | MJ                | 44150            |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1             | 04/06/10 10:04 | MJ                | 44150            |
| Surrogate: o-Terphenyl          |        | 70 %           | Limits: 50-150 | 1             | 04/06/10 10:04 | MJ                | 44150            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/08/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-003A

Field ID P7

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/23/10 23:30

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28823 |                |        | Date/Time Prepped  | 03/27/10 5:30 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.4 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | 11.9           | mg/Kg | 10.0           | 1      | 04/06/10 10:17     | MJ            | 44150            |
| Oil Range Organics (>C28-C40)   |       | 15.5           | mg/Kg | 10.0           | 1      | 04/06/10 10:17     | MJ            | 44150            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/06/10 10:17     | MJ            | 44150            |
| JP4                             |       | No             |       |                | 1      | 04/06/10 10:17     | MJ            | 44150            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/06/10 10:17     | MJ            | 44150            |
| JP7                             |       | No             |       |                | 1      | 04/06/10 10:17     | MJ            | 44150            |
| JP10                            |       | No             |       |                | 1      | 04/06/10 10:17     | MJ            | 44150            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/06/10 10:17     | MJ            | 44150            |
| Surrogate: o-Terphenyl          |       |                | 67 %  | Limits: 50-150 | 1      | 04/06/10 10:17     | MJ            | 44150            |

|             |      |  |     |   |
|-------------|------|--|-----|---|
| Qualifiers/ | *    | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B    | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E    | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J    | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL  | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL  | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q    | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |
| 04/08/10    | 5160 | TRISTATE_GTW   |     |   |



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-004A

Field ID P54

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/24/10 0:30

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                   |               |            |
|---------------------------------|-------|----------------|-------|----------------|--------|-------------------|---------------|------------|
| Prep Method                     | 3550B | Prep Batch     | 28823 |                |        | Date/Time Prepped | 03/27/10 5:30 |            |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.3 g | Date/Time         |               | Analytical |
| Compound                        |       | Result         | Units | MQL            | DF     | Analyzed          | By            | Batch      |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/06/10 10:30    | MJ            | 44150      |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/06/10 10:30    | MJ            | 44150      |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/06/10 10:30    | MJ            | 44150      |
| JP4                             |       | No             |       |                | 1      | 04/06/10 10:30    | MJ            | 44150      |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/06/10 10:30    | MJ            | 44150      |
| JP7                             |       | No             |       |                | 1      | 04/06/10 10:30    | MJ            | 44150      |
| JP10                            |       | No             |       |                | 1      | 04/06/10 10:30    | MJ            | 44150      |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/06/10 10:30    | MJ            | 44150      |
| Surrogate: o-Terphenyl          |       |                | 69 %  | Limits: 50-150 | 1      | 04/06/10 10:30    | MJ            | 44150      |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/08/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-005A

Field ID P55

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/24/10 1:00

### Analytical Method 8015B FIN

|                                 |       |                |                |               |        |                   |               |       |
|---------------------------------|-------|----------------|----------------|---------------|--------|-------------------|---------------|-------|
| Prep Method                     | 3550B | Prep Batch     | 28823          |               |        | Date/Time Prepped | 03/27/10 5:30 |       |
|                                 |       | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.4 g | Date/Time         | Analytical    |       |
| Compound                        |       | Result         | Units          | MQL           | DF     | Analyzed          | By            | Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg          | 10.0          | 1      | 04/06/10 10:43    | MJ            | 44150 |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg          | 10.0          | 1      | 04/06/10 10:43    | MJ            | 44150 |
| Gasoline/Aviation Jet           |       | No             |                |               | 1      | 04/06/10 10:43    | MJ            | 44150 |
| JP4                             |       | No             |                |               | 1      | 04/06/10 10:43    | MJ            | 44150 |
| JP5 / JP8                       |       | No             |                |               | 1      | 04/06/10 10:43    | MJ            | 44150 |
| JP7                             |       | No             |                |               | 1      | 04/06/10 10:43    | MJ            | 44150 |
| JP10                            |       | No             |                |               | 1      | 04/06/10 10:43    | MJ            | 44150 |
| JP18 / Turbine Jet Fuel         |       | No             |                |               | 1      | 04/06/10 10:43    | MJ            | 44150 |
| Surrogate: o-Terphenyl          |       | 72 %           | Limits: 50-150 |               | 1      | 04/06/10 10:43    | MJ            | 44150 |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/08/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-006A

Field ID P68

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/24/10 2:30

### Analytical Method 8015B FIN

|                                 |        |                |                |               |                |                    |                  |
|---------------------------------|--------|----------------|----------------|---------------|----------------|--------------------|------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28823          |               |                | Date/Time Prepped  | 03/27/10 5:30    |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.3 g         | Date/Time Analyzed |                  |
| Compound                        | Result | Units          | MQL            | DF            |                | By                 | Analytical Batch |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          | 10.0           | 1             | 04/06/10 10:56 | MJ                 | 44150            |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          | 10.0           | 1             | 04/06/10 10:56 | MJ                 | 44150            |
| Gasoline/Aviation Jet           | No     |                |                | 1             | 04/06/10 10:56 | MJ                 | 44150            |
| JP4                             | No     |                |                | 1             | 04/06/10 10:56 | MJ                 | 44150            |
| JP5 / JP8                       | No     |                |                | 1             | 04/06/10 10:56 | MJ                 | 44150            |
| JP7                             | No     |                |                | 1             | 04/06/10 10:56 | MJ                 | 44150            |
| JP10                            | No     |                |                | 1             | 04/06/10 10:56 | MJ                 | 44150            |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1             | 04/06/10 10:56 | MJ                 | 44150            |
| Surrogate: o-Terphenyl          |        | 74 %           | Limits: 50-150 | 1             | 04/06/10 10:56 | MJ                 | 44150            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |
| 04/08/10    | 5160 TRISTATE_GTW  |   |



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-007A

Field ID P69

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/24/10 3:00

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28823 |                |        | Date/Time Prepped  | 03/27/10 5:30 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 31.6 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/06/10 11:09     | MJ            | 44150            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/06/10 11:09     | MJ            | 44150            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/06/10 11:09     | MJ            | 44150            |
| JP4                             |       | No             |       |                | 1      | 04/06/10 11:09     | MJ            | 44150            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/06/10 11:09     | MJ            | 44150            |
| JP7                             |       | No             |       |                | 1      | 04/06/10 11:09     | MJ            | 44150            |
| JP10                            |       | No             |       |                | 1      | 04/06/10 11:09     | MJ            | 44150            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/06/10 11:09     | MJ            | 44150            |
| Surrogate: o-Terphenyl          |       |                | 66 %  | Limits: 50-150 | 1      | 04/06/10 11:09     | MJ            | 44150            |

### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/08/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-008A

Field ID P63

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/23/10 23:26

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28823 |                |        | Date/Time Prepped  | 03/27/10 5:30 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.2 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/06/10 11:22     | MJ            | 44150            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/06/10 11:22     | MJ            | 44150            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/06/10 11:22     | MJ            | 44150            |
| JP4                             |       | No             |       |                | 1      | 04/06/10 11:22     | MJ            | 44150            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/06/10 11:22     | MJ            | 44150            |
| JP7                             |       | No             |       |                | 1      | 04/06/10 11:22     | MJ            | 44150            |
| JP10                            |       | No             |       |                | 1      | 04/06/10 11:22     | MJ            | 44150            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/06/10 11:22     | MJ            | 44150            |
| Surrogate: o-Terphenyl          |       |                | 79 %  | Limits: 50-150 | 1      | 04/06/10 11:22     | MJ            | 44150            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |
| 04/08/10    | 5160 TRISTATE_GTW  |   |



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-009A

Field ID P64

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/23/10 22:41

### Analytical Method 8015B FIN

| Prep Method                     | 3550B          | Prep Batch | 28823          |        |       | Date/Time Prepped | 03/27/10 5:30 |
|---------------------------------|----------------|------------|----------------|--------|-------|-------------------|---------------|
| Compound                        | Default Vol/Wt | 30 g       | Sample Vol/Wt  | 31 g   |       | Date/Time         | Analytical    |
|                                 |                |            |                | Result | Units | Analyzed          |               |
| Diesel Range Organics (C10-C28) | < 10.0         | mg/Kg      | 10.0           | 1      |       | 04/06/10 11:35    | MJ 44150      |
| Oil Range Organics (>C28-C40)   | < 10.0         | mg/Kg      | 10.0           | 1      |       | 04/06/10 11:35    | MJ 44150      |
| Gasoline/Aviation Jet           | No             |            |                | 1      |       | 04/06/10 11:35    | MJ 44150      |
| JP4                             | No             |            |                | 1      |       | 04/06/10 11:35    | MJ 44150      |
| JP5 / JP8                       | No             |            |                | 1      |       | 04/06/10 11:35    | MJ 44150      |
| JP7                             | No             |            |                | 1      |       | 04/06/10 11:35    | MJ 44150      |
| JP10                            | No             |            |                | 1      |       | 04/06/10 11:35    | MJ 44150      |
| JP18 / Turbine Jet Fuel         | No             |            |                | 1      |       | 04/06/10 11:35    | MJ 44150      |
| Surrogate: o-Terphenyl          |                | 64 %       | Limits: 50-150 | 1      |       | 04/06/10 11:35    | MJ 44150      |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | SQL Sample Quantitation Limit (adjusted MDL)                |
|             | MRL Method Reporting Limit                               |   |
|             | Q RPD >40% between primary and confirmation columns      |   |
| 04/08/10    | 5160 TRISTATE_GTW  |   |



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-010A

Field ID P66 3/23-24/10

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/24/10 0:54

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28823 |                |        | Date/Time Prepped  | 03/27/10 5:30 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.4 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/06/10 11:48     | MJ            | 44150            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/06/10 11:48     | MJ            | 44150            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/06/10 11:48     | MJ            | 44150            |
| JP4                             |       | No             |       |                | 1      | 04/06/10 11:48     | MJ            | 44150            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/06/10 11:48     | MJ            | 44150            |
| JP7                             |       | No             |       |                | 1      | 04/06/10 11:48     | MJ            | 44150            |
| JP10                            |       | No             |       |                | 1      | 04/06/10 11:48     | MJ            | 44150            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/06/10 11:48     | MJ            | 44150            |
| Surrogate: o-Terphenyl          |       |                | 70 %  | Limits: 50-150 | 1      | 04/06/10 11:48     | MJ            | 44150            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |
| 04/08/10    | 5160 TRISTATE_GTW  |   |



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-011A

Field ID P67

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/24/10 0:39

### Analytical Method 8015B FIN

|                                 |                |            |                |                   |                         |
|---------------------------------|----------------|------------|----------------|-------------------|-------------------------|
| Prep Method                     | 3550B          | Prep Batch | 28823          | Date/Time Prepped | 03/27/10 5:30           |
| Compound                        | Default Vol/Wt | 30 g       | Sample Vol/Wt  | 31.3 g            |                         |
|                                 | Result         | Units      | MQL            | DF                | Date/Time Analyzed      |
|                                 |                |            |                |                   | By                      |
|                                 |                |            |                |                   | Analytical Batch        |
| Diesel Range Organics (C10-C28) | 253            | mg/Kg      | 100            | 10                | 04/06/10 14:03 MJ 44150 |
| Oil Range Organics (>C28-C40)   | < 100          | mg/Kg      | 100            | 10                | 04/06/10 14:03 MJ 44150 |
| Gasoline/Aviation Jet           | No             |            |                | 10                | 04/06/10 14:03 MJ 44150 |
| JP4                             | No             |            |                | 10                | 04/06/10 14:03 MJ 44150 |
| JP5 / JP8                       | Yes            |            |                | 10                | 04/06/10 14:03 MJ 44150 |
| JP7                             | No             |            |                | 10                | 04/06/10 14:03 MJ 44150 |
| JP10                            | No             |            |                | 10                | 04/06/10 14:03 MJ 44150 |
| JP18 / Turbine Jet Fuel         | No             |            |                | 10                | 04/06/10 14:03 MJ 44150 |
| Surrogate: o-Terphenyl          |                | 81 %       | Limits: 50-150 | 10                | 04/06/10 14:03 MJ 44150 |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/08/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38183 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing 6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-012A

Field ID P4

Project Memphis International  
Description Airport  
Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/24/10 2:50

### Analytical Method 8015B FIN

|                                 |                |            |                |        |  |                   |               |            |
|---------------------------------|----------------|------------|----------------|--------|--|-------------------|---------------|------------|
| Prep Method                     | 3550B          | Prep Batch | 28823          |        |  | Date/Time Prepped | 03/27/10 5:30 |            |
| Compound                        | Default Vol/Wt | 30 g       | Sample Vol/Wt  | 30.2 g |  | Date/Time         |               | Analytical |
|                                 | Result         | Units      | MQL            | DF     |  | Analyzed          | By            | Batch      |
| Diesel Range Organics (C10-C28) | < 10.0         | mg/Kg      | 10.0           | 1      |  | 04/06/10 12:14    | MJ            | 44150      |
| Oil Range Organics (>C28-C40)   | < 10.0         | mg/Kg      | 10.0           | 1      |  | 04/06/10 12:14    | MJ            | 44150      |
| Gasoline/Aviation Jet           | No             |            |                | 1      |  | 04/06/10 12:14    | MJ            | 44150      |
| JP4                             | No             |            |                | 1      |  | 04/06/10 12:14    | MJ            | 44150      |
| JP5 / JP8                       | No             |            |                | 1      |  | 04/06/10 12:14    | MJ            | 44150      |
| JP7                             | No             |            |                | 1      |  | 04/06/10 12:14    | MJ            | 44150      |
| JP10                            | No             |            |                | 1      |  | 04/06/10 12:14    | MJ            | 44150      |
| JP18 / Turbine Jet Fuel         | No             |            |                | 1      |  | 04/06/10 12:14    | MJ            | 44150      |
| Surrogate: o-Terphenyl          |                | 71 %       | Limits: 50-150 | 1      |  | 04/06/10 12:14    | MJ            | 44150      |

### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/08/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-013A

Field ID P36

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/24/10 3:06

### Analytical Method 8015B FIN

| Prep Method                     | 3550B          | Prep Batch | 28823          |      |                | Date/Time Prepped  | 03/27/10 5:30    |
|---------------------------------|----------------|------------|----------------|------|----------------|--------------------|------------------|
| Compound                        | Default Vol/Wt | 30 g       | Sample Vol/Wt  | 30 g |                | Date/Time Analyzed | Analytical Batch |
|                                 | Result         | Units      | MQL            | DF   |                | By                 |                  |
| Diesel Range Organics (C10-C28) | < 10.0         | mg/Kg      | 10.0           | 1    | 04/06/10 12:27 | MJ                 | 44150            |
| Oil Range Organics (>C28-C40)   | < 10.0         | mg/Kg      | 10.0           | 1    | 04/06/10 12:27 | MJ                 | 44150            |
| Gasoline/Aviation Jet           | No             |            |                | 1    | 04/06/10 12:27 | MJ                 | 44150            |
| JP4                             | No             |            |                | 1    | 04/06/10 12:27 | MJ                 | 44150            |
| JP5 / JP8                       | No             |            |                | 1    | 04/06/10 12:27 | MJ                 | 44150            |
| JP7                             | No             |            |                | 1    | 04/06/10 12:27 | MJ                 | 44150            |
| JP10                            | No             |            |                | 1    | 04/06/10 12:27 | MJ                 | 44150            |
| JP18 / Turbine Jet Fuel         | No             |            |                | 1    | 04/06/10 12:27 | MJ                 | 44150            |
| Surrogate: o-Terphenyl          |                | 64 %       | Limits: 50-150 | 1    | 04/06/10 12:27 | MJ                 | 44150            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/08/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**Tri-State Testing**  
6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-083-0206

Lab ID 1003427-014A

Field ID P70

Project **Memphis International**  
Description **Airport**  
Project No. **E-9-429**

### Report of Analysis

Received 03/24/10

Matrix Soil

Sampled 03/24/10 3:57

### Analytical Method 8015B FIN

|                                 |       |                |       |                |                   |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|-------------------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28823 |                | Date/Time Prepped |                    | 03/27/10 5:30 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.1 g            |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF                | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1                 | 04/06/10 13:24     | MJ            | 44150            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1                 | 04/06/10 13:24     | MJ            | 44150            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1                 | 04/06/10 13:24     | MJ            | 44150            |
| JP4                             |       | No             |       |                | 1                 | 04/06/10 13:24     | MJ            | 44150            |
| JP5 / JP8                       |       | No             |       |                | 1                 | 04/06/10 13:24     | MJ            | 44150            |
| JP7                             |       | No             |       |                | 1                 | 04/06/10 13:24     | MJ            | 44150            |
| JP10                            |       | No             |       |                | 1                 | 04/06/10 13:24     | MJ            | 44150            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1                 | 04/06/10 13:24     | MJ            | 44150            |
| Surrogate: o-Terphenyl          |       |                | 68 %  | Limits: 50-150 | 1                 | 04/06/10 13:24     | MJ            | 44150            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |
| 04/08/10    | 5160 TRISTATE_GTW  |   |



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Cooler Receipt Form

Customer Number: **05160**

Customer Name: **Tri-State Testing**

Report Number: **10-083-0206**

#### Shipping Method

☐ FedEx ☐ UPS ☐ US Postal ☒ Client ☐ LMP ☐ Courier ☐ Other: \_\_\_\_\_

|  |                                      |                                     |   |
|--|--------------------------------------|-------------------------------------|---|
| Shipping container/cooler uncompromised?           | <input checked="" type="radio"/> Yes | <input type="radio"/> No            | <input type="radio"/> Not Present             |
| Custody seals intact on shipping container/cooler? | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Custody seals intact on sample bottles?            | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Chain of Custody present?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| COC agrees with sample labels?                     | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Samples in proper containers?                      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sample containers intact?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sufficient sample volume for indicated tests?      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| All samples received within holding time?          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Container temperature in compliance?               | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Water - VOA vials free of headspace?               | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Water - Preservation acceptable upon receipt?      | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Samples screened for radioactivity (COE only)?     | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Special precautions or instructions included?      | <input type="radio"/> Yes            | <input checked="" type="radio"/> No |   |

Comments:

Any regulatory non-compliance issues will be recorded on non-compliance report.

Signature: Rebekah Ross

Date & Time: 03/24/2010 11:40:27

1003427

REPORT NO.

10-083-0206  
05160  
2010-03-24  
1-40 18Tri-State Testing (GTM)  
Memphis International Airport

CHA

GTW ANALYTICAL

2790 Whitten R

PHONE 901-213-2400

REPORT TO: David D. McCray  
NY: Tri-State Testing Services, Inc.  
CONTACT: David McCray • 901-385-1199

PERMIT/PROJECT NO.: E-9-429

PROJECT NAME:

Memphis International Airport

SAMPLER'S SIGNATURE: *B. Wood*

| LAB NO. | SEQ NO. | SAMPLE NO. | DATE    | TIME     | SAMPLE LOCATION     | MATRIX | NO. OF CONTAINERS | REMARKS (ANALYSES, ETC.)         | LAB pH |
|---------|---------|------------|---------|----------|---------------------|--------|-------------------|----------------------------------|--------|
|         |         | P65        | 3/23/10 | 10:45 PM | P65 / 11" - 12"     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P53        | 3/23/10 | 11:08 PM | P53 / 14" - 12"     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P7         | 3/23/10 | 11:30 PM | P7 / 25 1/2" - 12"  | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P54        | 3/24/10 | 12:30 AM | P54 / 24 1/2" - 12" | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P55        | 3/24/10 | 1:00 AM  | P55 / 23 1/2" - 12" | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P68        | 3/24/10 | 2:30 AM  | P68 / 14 1/2" - 12" | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P69        | 3/24/10 | 3:00 AM  | P69 / 19" - 12"     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |

RELINQUISHED BY: *[Signature]*

DATE/TIME: 3/24/10 9:15 AM

RELINQUISHED BY:

DATE/TIME:

METHOD OF SHIPMENT: *[Signature]*

SHIPPED BY:

RECEIVED FOR LAB BY: *[Signature]*

DATE/TIME:

CONDITION OF COOLER/SEAL:

COOLER OPENED BY:

DATE/TIME: 3.24.10 0915

24°C

SHADED AREAS FOR LABORATORY USE ONLY!

CHA

GTW ANALYTIC

2790 Whitten Rd.

PHONE 901-213-2400

PERMIT/PROJECT NO.: E-9-429

SAMPLER'S SIGNATURE: *William Stodley*

| LAB NO. | SEQ NO. | SAMPLE NO. | DATE               | TIME                | SAMPLE LOCATION    | MATRIX | NO OF CONTAINERS | REMARKS (ANALYSES, ETC.)         | LAB pH |
|---------|---------|------------|--------------------|---------------------|--------------------|--------|------------------|----------------------------------|--------|
|         |         | P-63       | 3-23-10            | 11:26 <sup>PM</sup> | P63 / 11 1/2" - 12 | S      | 1                | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-64       | 3-23-10            | 10:41 <sup>PM</sup> | P64 / 1' - 12      | S      | 1                | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-66       | 3-23-10<br>3-24-10 | 12:54 <sup>PM</sup> | P66 / 1.9" - 12    | S      | 1                | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-67       | 3-24-10            | 12:39 <sup>PM</sup> | P67 / 4'           | S      | 1                | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-4        | 3-24-10            | 2:50 <sup>PM</sup>  | P4 / 1.11" - 12    | S      | 1                | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-36       | 3-24-10            | 3:06 <sup>PM</sup>  | P36 / 1.9" - 12    | S      | 1                | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-70       | 3-24-10            | 3:57 <sup>PM</sup>  | P70 / 1.10" - 12   | S      | 1                | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |                    |                     |                    | S      | 1                | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |                    |                     |                    | S      | 1                | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |                    |                     |                    | S      | 1                | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |                    |                     |                    | S      | 1                | Method 8015 Jet Fuel FingerPrint |        |

RELINQUISHED BY: *W. Stodley*

DATE/TIME: 3/24/10 9:15 Am

RELINQUISHED BY:

DATE/TIME:

METHOD OF SHIPMENT:

SHIPPED BY:

RECEIVED FOR LAB BY: *D. Smith*

DATE/TIME:

CONDITION OF COOLER/SEAL:

COOLER OPENED BY:

DATE/TIME: 3/24/10 0915

DATE/TIME:

SHADED AREAS FOR LABORATORY USE ONLY!

10-083-0206  
05160  
2010-03-24  
1 40 18Tri-State Testing (GTW)  
Memphis International Airport

FAX 901-213-2440

IT REPORT TO: David D. McCray  
ANY: Tri-State Testing Services, Inc.  
ACT: David McCray • 901-385-1199

PROJECT NAME: Memphis International Airport

REPORT NO. 1003427



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

4/12/2010

Tri-State Testing  
Mr. David McCray  
6756 Buckles Cove  
Memphis, TN, 38133

Ref: Analytical Testing  
Report Number: 10-084-0221  
Project Description: Memphis International Airport  
Project #E-9-429

Dear Mr. David McCray:

GTW Analytical Services received 15 sample(s) on 3/25/2010 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA and NELAP.

The results are shown on the attached analysis sheet(s).

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,

*Randell H. Thomas*

Randy Thomas  
Project Manager

RECEIVED  
APR 16 2010

BY:.....



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**CLIENT:** Tri-State Testing  
**Project:** Memphis International Airport  
**Lab Order Number:** 10-084-0221

### CASE NARRATIVE

**Date:** 04/12/10

GTW01

Fingerprint Analysis by Method 8015B  
Jet Fuels

Samples were extracted and analyzed by Method 8015B. Comparisons were made to the chromatographic library, with special attention given to Jet fuels. Results are reported for both Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40), with quantitation achieved using Diesel Fuel and Motor Oil.

The following sample indicated contamination in Diesel Range Organics (C10-C28) which may be degraded JP5/8.

1003474-001A (P84)  
1003474-002A (P85)

The contamination reported as Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40) did not match the Jet fuels used for comparison purposes for the following sample:  
1003368-004A (P17/11')



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-001A

Field ID P-10

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/25/10 0:26

### Analytical Method 8015B FIN

|                                 |       |                |                |                    |                        |
|---------------------------------|-------|----------------|----------------|--------------------|------------------------|
| Prep Method                     | 3550B | Prep Batch     | 28833          | Date/Time Prepped  | 03/28/10 7:26          |
|                                 |       | Default Vol/Wt | 30 g           |                    |                        |
|                                 |       | Result         | Units          | Sample Vol/Wt      | 30.2 g                 |
| Compound                        |       |                |                | MQL                | DF                     |
|                                 |       |                |                | Date/Time Analyzed | Analytical By Batch    |
| Diesel Range Organics (C10-C28) | 18.6  | mg/Kg          | 10.0           | 1                  | 04/07/10 9:19 MJ 44151 |
| Oil Range Organics (>C28-C40)   | 20.1  | mg/Kg          | 10.0           | 1                  | 04/07/10 9:19 MJ 44151 |
| Gasoline/Aviation Jet           | No    |                |                | 1                  | 04/07/10 9:19 MJ 44151 |
| JP4                             | No    |                |                | 1                  | 04/07/10 9:19 MJ 44151 |
| JP5 / JP8                       | No    |                |                | 1                  | 04/07/10 9:19 MJ 44151 |
| JP7                             | No    |                |                | 1                  | 04/07/10 9:19 MJ 44151 |
| JP10                            | No    |                |                | 1                  | 04/07/10 9:19 MJ 44151 |
| JP18 / Turbine Jet Fuel         | No    |                |                | 1                  | 04/07/10 9:19 MJ 44151 |
| Surrogate: o-Terphenyl          |       | 88 %           | Limits: 50-150 | 1                  | 04/07/10 9:19 MJ 44151 |

### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38183 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-002A

Field ID P-11

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/25/10 5:12

### Analytical Method 8015B FIN

|                                 |         |                |                |               |        |                   |                  |
|---------------------------------|---------|----------------|----------------|---------------|--------|-------------------|------------------|
| Prep Method                     | 3550B   | Prep Batch     | 28833          |               |        | Date/Time Prepped | 03/28/10 7:26    |
|                                 |         | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.8 g | Date/Time         |                  |
| Compound                        | Result  | Units          |                | MQL           | DF     | Analyzed          | Analytical Batch |
| Diesel Range Organics (C10-C28) | 2,160   | mg/Kg          |                | 1,000         | 100    | 04/07/10 15:55    | MJ 44151         |
| Oil Range Organics (>C28-C40)   | < 1,000 | mg/Kg          |                | 1,000         | 100    | 04/07/10 15:55    | MJ 44151         |
| Gasoline/Aviation Jet           | No      |                |                |               | 100    | 04/07/10 15:55    | MJ 44151         |
| JP4                             | No      |                |                |               | 100    | 04/07/10 15:55    | MJ 44151         |
| JP5 / JP8                       | Yes     |                |                |               | 100    | 04/07/10 15:55    | MJ 44151         |
| JP7                             | No      |                |                |               | 100    | 04/07/10 15:55    | MJ 44151         |
| JP10                            | No      |                |                |               | 100    | 04/07/10 15:55    | MJ 44151         |
| JP18 / Turbine Jet Fuel         | No      |                |                |               | 100    | 04/07/10 15:55    | MJ 44151         |
| Surrogate: o-Terphenyl          |         | 76 %           | Limits: 50-150 |               | 100    | 04/07/10 15:55    | MJ 44151         |

#### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-003A

Field ID P-71

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/24/10 22:34

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28833 |                |        | Date/Time Prepped  | 03/28/10 7:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.3 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | 13.6           | mg/Kg | 10.0           | 1      | 04/07/10 9:45      | MJ            | 44151            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/07/10 9:45      | MJ            | 44151            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/07/10 9:45      | MJ            | 44151            |
| JP4                             |       | No             |       |                | 1      | 04/07/10 9:45      | MJ            | 44151            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/07/10 9:45      | MJ            | 44151            |
| JP7                             |       | No             |       |                | 1      | 04/07/10 9:45      | MJ            | 44151            |
| JP10                            |       | No             |       |                | 1      | 04/07/10 9:45      | MJ            | 44151            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/07/10 9:45      | MJ            | 44151            |
| Surrogate: o-Terphenyl          |       |                | 74 %  | Limits: 50-150 | 1      | 04/07/10 9:45      | MJ            | 44151            |

|             |     |  |
|-------------|-----|--|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             |
| Definitions | B   | Analyte detected in the associated Method Blank        |
|             | E   | Value exceeds method calibration range                 |
|             | J   | Estimated Value Analyte below reported detection limit |
|             | MDL | Method Detection Limit (unadjusted)                    |
|             | MRL | Method Reporting Limit                                 |
|             | Q   | RPD >40% between primary and confirmation columns      |

|     |   |
|-----|---|
| * I | Recoveries affected by interferences or high background |
| DF  | Dilution Factor   |
| H   | Prepped / Analyzed out of holding time.                 |
| M   | Minimum value   |
| MQL | Method Quantitation Limit (adjusted)                    |
| N   | Refer to attached Non-Compliance Report                 |
| SQL | Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38183 (901) 218-2400 Fax (901) 218-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-004A

Field ID P-72

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/24/10 23:45

### Analytical Method 8015B FIN

| Prep Method                     | 3550B          | Prep Batch | 28833          |        |               | Date/Time Prepped  | 03/28/10 7:26    |
|---------------------------------|----------------|------------|----------------|--------|---------------|--------------------|------------------|
| Compound                        | Default Vol/Wt | 30 g       | Sample Vol/Wt  | 30.5 g |               | Date/Time Analyzed | Analytical Batch |
|                                 | Result         | Units      | ML             | DF     |               |                    |                  |
| Diesel Range Organics (C10-C28) | 24.4           | mg/Kg      | 10.0           | 1      | 04/07/10 9:58 | MJ                 | 44151            |
| Oil Range Organics (>C28-C40)   | < 10.0         | mg/Kg      | 10.0           | 1      | 04/07/10 9:58 | MJ                 | 44151            |
| Gasoline/Aviation Jet           | No             |            |                | 1      | 04/07/10 9:58 | MJ                 | 44151            |
| JP4                             | No             |            |                | 1      | 04/07/10 9:58 | MJ                 | 44151            |
| JP5 / JP8                       | Yes            |            |                | 1      | 04/07/10 9:58 | MJ                 | 44151            |
| JP7                             | No             |            |                | 1      | 04/07/10 9:58 | MJ                 | 44151            |
| JP10                            | No             |            |                | 1      | 04/07/10 9:58 | MJ                 | 44151            |
| JP18 / Turbine Jet Fuel         | No             |            |                | 1      | 04/07/10 9:58 | MJ                 | 44151            |
| Surrogate: o-Terphenyl          |                | 66 %       | Limits: 50-150 | 1      | 04/07/10 9:58 | MJ                 | 44151            |

#### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38183 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-005A

Field ID P-74

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/25/10 1:06

### Analytical Method 8015B FIN

|                                 |        |                |                |               |        |                   |                  |
|---------------------------------|--------|----------------|----------------|---------------|--------|-------------------|------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28833          |               |        | Date/Time Prepped | 03/28/10 7:26    |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.9 g | Date/Time         |                  |
| Compound                        | Result | Units          |                | MQL           | DF     | Analyzed          | Analytical Batch |
| Diesel Range Organics (C10-C28) | 31.4   | mg/Kg          |                | 10.0          | 1      | 04/07/10 10:11    | MJ 44151         |
| Oil Range Organics (>C28-C40)   | 27.9   | mg/Kg          |                | 10.0          | 1      | 04/07/10 10:11    | MJ 44151         |
| Gasoline/Aviation Jet           | No     |                |                |               | 1      | 04/07/10 10:11    | MJ 44151         |
| JP4                             | No     |                |                |               | 1      | 04/07/10 10:11    | MJ 44151         |
| JP5 / JP8                       | No     |                |                |               | 1      | 04/07/10 10:11    | MJ 44151         |
| JP7                             | No     |                |                |               | 1      | 04/07/10 10:11    | MJ 44151         |
| JP10                            | No     |                |                |               | 1      | 04/07/10 10:11    | MJ 44151         |
| JP18 / Turbine Jet Fuel         | No     |                |                |               | 1      | 04/07/10 10:11    | MJ 44151         |
| Surrogate: o-Terphenyl          |        | 61 %           | Limits: 50-150 |               | 1      | 04/07/10 10:11    | MJ 44151         |

|             |     |  |
|-------------|-----|--|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             |
| Definitions | B   | Analyte detected in the associated Method Blank        |
|             | E   | Value exceeds method calibration range                 |
|             | J   | Estimated Value Analyte below reported detection limit |
|             | MDL | Method Detection Limit (unadjusted)                    |
|             | MRL | Method Reporting Limit                                 |
|             | Q   | RPD >40% between primary and confirmation columns      |

|     |   |
|-----|---|
| * I | Recoveries affected by interferences or high background |
| DF  | Dilution Factor   |
| H   | Prepped / Analyzed out of holding time.                 |
| M   | Minimum value   |
| MQL | Method Quantitation Limit (adjusted)                    |
| N   | Refer to attached Non-Compliance Report                 |
| SQL | Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-006A

Field ID P-75

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/25/10 1:41

### Analytical Method 8015B FIN

|                                 |        |                |                |               |                |                   |                  |
|---------------------------------|--------|----------------|----------------|---------------|----------------|-------------------|------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28833          |               |                | Date/Time Prepped | 03/28/10 7:26    |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.7 g         | Date/Time         |                  |
| Compound                        | Result | Units          | MQL            | DF            | Analyzed       | By                | Analytical Batch |
| Diesel Range Organics (C10-C28) | 34.0   | mg/Kg          | 10.0           | 1             | 04/07/10 16:08 | MJ                | 44151            |
| Oil Range Organics (>C28-C40)   | 40.0   | mg/Kg          | 10.0           | 1             | 04/07/10 16:08 | MJ                | 44151            |
| Gasoline/Aviation Jet           | No     |                |                | 1             | 04/07/10 16:08 | MJ                | 44151            |
| JP4                             | No     |                |                | 1             | 04/07/10 16:08 | MJ                | 44151            |
| JP5 / JP8                       | No     |                |                | 1             | 04/07/10 16:08 | MJ                | 44151            |
| JP7                             | No     |                |                | 1             | 04/07/10 16:08 | MJ                | 44151            |
| JP10                            | No     |                |                | 1             | 04/07/10 16:08 | MJ                | 44151            |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1             | 04/07/10 16:08 | MJ                | 44151            |
| Surrogate: o-Terphenyl          |        | 50 %           | Limits: 50-150 | 1             | 04/07/10 16:08 | MJ                | 44151            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-007A

Field ID P-78

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/25/10 2:20

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28833 |                |        | Date/Time Prepped  | 03/28/10 7:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.2 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/07/10 10:37     | MJ            | 44151            |
| Oil Range Organics (>C28-C40)   |       | 11.8           | mg/Kg | 10.0           | 1      | 04/07/10 10:37     | MJ            | 44151            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/07/10 10:37     | MJ            | 44151            |
| JP4                             |       | No             |       |                | 1      | 04/07/10 10:37     | MJ            | 44151            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/07/10 10:37     | MJ            | 44151            |
| JP7                             |       | No             |       |                | 1      | 04/07/10 10:37     | MJ            | 44151            |
| JP10                            |       | No             |       |                | 1      | 04/07/10 10:37     | MJ            | 44151            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/07/10 10:37     | MJ            | 44151            |
| Surrogate: o-Terphenyl          |       |                | 69 %  | Limits: 50-150 | 1      | 04/07/10 10:37     | MJ            | 44151            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-008A

Field ID P-80

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/25/10 7:06

### Analytical Method 8015B FIN

|                                 |        |                |                |               |        |                   |                  |
|---------------------------------|--------|----------------|----------------|---------------|--------|-------------------|------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28833          |               |        | Date/Time Prepped | 03/28/10 7:26    |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.7 g | Date/Time         |                  |
| Compound                        | Result | Units          |                | MQL           | DF     | Analyzed          | Analytical Batch |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          |                | 10.0          | 1      | 04/07/10 10:50    | MJ 44151         |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          |                | 10.0          | 1      | 04/07/10 10:50    | MJ 44151         |
| Gasoline/Aviation Jet           | No     |                |                |               | 1      | 04/07/10 10:50    | MJ 44151         |
| JP4                             | No     |                |                |               | 1      | 04/07/10 10:50    | MJ 44151         |
| JP5 / JP8                       | No     |                |                |               | 1      | 04/07/10 10:50    | MJ 44151         |
| JP7                             | No     |                |                |               | 1      | 04/07/10 10:50    | MJ 44151         |
| JP10                            | No     |                |                |               | 1      | 04/07/10 10:50    | MJ 44151         |
| JP18 / Turbine Jet Fuel         | No     |                |                |               | 1      | 04/07/10 10:50    | MJ 44151         |
| Surrogate: o-Terphenyl          |        | 61 %           | Limits: 50-150 |               | 1      | 04/07/10 10:50    | MJ 44151         |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-009A

Field ID P-81

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/25/10 5:38

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28833 |                |        | Date/Time Prepped  | 03/28/10 7:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.5 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/07/10 11:03     | MJ            | 44151            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/07/10 11:03     | MJ            | 44151            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/07/10 11:03     | MJ            | 44151            |
| JP4                             |       | No             |       |                | 1      | 04/07/10 11:03     | MJ            | 44151            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/07/10 11:03     | MJ            | 44151            |
| JP7                             |       | No             |       |                | 1      | 04/07/10 11:03     | MJ            | 44151            |
| JP10                            |       | No             |       |                | 1      | 04/07/10 11:03     | MJ            | 44151            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/07/10 11:03     | MJ            | 44151            |
| Surrogate: o-Terphenyl          |       |                | 61 %  | Limits: 50-150 | 1      | 04/07/10 11:03     | MJ            | 44151            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-010A

Field ID P-82

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/25/10 5:27

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28833 |                |        | Date/Time Prepped  | 03/28/10 7:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.3 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | 11.5           | mg/Kg | 10.0           | 1      | 04/07/10 11:16     | MJ            | 44151            |
| Oil Range Organics (>C28-C40)   |       | 25.3           | mg/Kg | 10.0           | 1      | 04/07/10 11:16     | MJ            | 44151            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/07/10 11:16     | MJ            | 44151            |
| JP4                             |       | No             |       |                | 1      | 04/07/10 11:16     | MJ            | 44151            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/07/10 11:16     | MJ            | 44151            |
| JP7                             |       | No             |       |                | 1      | 04/07/10 11:16     | MJ            | 44151            |
| JP10                            |       | No             |       |                | 1      | 04/07/10 11:16     | MJ            | 44151            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/07/10 11:16     | MJ            | 44151            |
| Surrogate: o-Terphenyl          |       |                | 59 %  | Limits: 50-150 | 1      | 04/07/10 11:16     | MJ            | 44151            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-011A

Field ID P-73

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/24/10 23:07

### Analytical Method 8015B FIN

| Prep Method                     | 3550B          | Prep Batch | 28833          |        |    | Date/Time Prepped  | 03/28/10 7:26 |                  |  |
|---------------------------------|----------------|------------|----------------|--------|----|--------------------|---------------|------------------|--|
| Compound                        | Default Vol/Wt | 30 g       | Sample Vol/Wt  | 30.8 g |    | Date/Time Analyzed | By            | Analytical Batch |  |
|                                 | Result         | Units      |                | MQL    | DF |                    |               |                  |  |
| Diesel Range Organics (C10-C28) | < 10.0         | mg/Kg      |                | 10.0   | 1  | 04/07/10 11:29     | MJ            | 44151            |  |
| Oil Range Organics (>C28-C40)   | < 10.0         | mg/Kg      |                | 10.0   | 1  | 04/07/10 11:29     | MJ            | 44151            |  |
| Gasoline/Aviation Jet           | No             |            |                |        | 1  | 04/07/10 11:29     | MJ            | 44151            |  |
| JP4                             | No             |            |                |        | 1  | 04/07/10 11:29     | MJ            | 44151            |  |
| JP5 / JP8                       | No             |            |                |        | 1  | 04/07/10 11:29     | MJ            | 44151            |  |
| JP7                             | No             |            |                |        | 1  | 04/07/10 11:29     | MJ            | 44151            |  |
| JP10                            | No             |            |                |        | 1  | 04/07/10 11:29     | MJ            | 44151            |  |
| JP18 / Turbine Jet Fuel         | No             |            |                |        | 1  | 04/07/10 11:29     | MJ            | 44151            |  |
| Surrogate: o-Terphenyl          |                | 31 % *     | Limits: 50-150 |        | 1  | 04/07/10 11:29     | MJ            | 44151            |  |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-012A

Field ID P-76

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/25/10 2:00

### Analytical Method 8015B FIN

|                                 |        |                |                |                   |                         |
|---------------------------------|--------|----------------|----------------|-------------------|-------------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28833          | Date/Time Prepped | 03/28/10 7:26           |
|                                 |        | Default Vol/Wt | 30 g           |                   |                         |
| Compound                        | Result | Units          | Sample Vol/Wt  | 30.6 g            |                         |
|                                 |        |                | MQL            | DF                |                         |
| Diesel Range Organics (C10-C28) | < 10.0 | mg/Kg          | 10.0           | 1                 | 04/07/10 11:42 MJ 44151 |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          | 10.0           | 1                 | 04/07/10 11:42 MJ 44151 |
| Gasoline/Aviation Jet           | No     |                |                | 1                 | 04/07/10 11:42 MJ 44151 |
| JP4                             | No     |                |                | 1                 | 04/07/10 11:42 MJ 44151 |
| JP5 / JP8                       | No     |                |                | 1                 | 04/07/10 11:42 MJ 44151 |
| JP7                             | No     |                |                | 1                 | 04/07/10 11:42 MJ 44151 |
| JP10                            | No     |                |                | 1                 | 04/07/10 11:42 MJ 44151 |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1                 | 04/07/10 11:42 MJ 44151 |
| Surrogate: o-Terphenyl          |        | 58 %           | Limits: 50-150 | 1                 | 04/07/10 11:42 MJ 44151 |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**Tri-State Testing**  
6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-013A

Field ID P-77

Project Memphis International  
Description Airport  
Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/25/10 2:30

### Analytical Method 8015B FIN

|                                 |       |                |       |                |                   |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|-------------------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28833 |                | Date/Time Prepped |                    | 03/28/10 7:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 31 g              |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF                | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1                 | 04/07/10 11:55     | MJ            | 44151            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1                 | 04/07/10 11:55     | MJ            | 44151            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1                 | 04/07/10 11:55     | MJ            | 44151            |
| JP4                             |       | No             |       |                | 1                 | 04/07/10 11:55     | MJ            | 44151            |
| JP5 / JP8                       |       | No             |       |                | 1                 | 04/07/10 11:55     | MJ            | 44151            |
| JP7                             |       | No             |       |                | 1                 | 04/07/10 11:55     | MJ            | 44151            |
| JP10                            |       | No             |       |                | 1                 | 04/07/10 11:55     | MJ            | 44151            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1                 | 04/07/10 11:55     | MJ            | 44151            |
| Surrogate: o-Terphenyl          |       |                | 77 %  | Limits: 50-150 | 1                 | 04/07/10 11:55     | MJ            | 44151            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-014A

Field ID P-79

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/25/10

Matrix Soil

Sampled 03/25/10 3:00

### Analytical Method 8015B FIN

|                                 |       |                |       |                |        |                    |               |                  |
|---------------------------------|-------|----------------|-------|----------------|--------|--------------------|---------------|------------------|
| Prep Method                     | 3550B | Prep Batch     | 28833 |                |        | Date/Time Prepped  | 03/28/10 7:26 |                  |
|                                 |       | Default Vol/Wt | 30 g  | Sample Vol/Wt  | 30.1 g |                    |               |                  |
| Compound                        |       | Result         | Units | MQL            | DF     | Date/Time Analyzed | By            | Analytical Batch |
| Diesel Range Organics (C10-C28) |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/07/10 12:08     | MJ            | 44151            |
| Oil Range Organics (>C28-C40)   |       | < 10.0         | mg/Kg | 10.0           | 1      | 04/07/10 12:08     | MJ            | 44151            |
| Gasoline/Aviation Jet           |       | No             |       |                | 1      | 04/07/10 12:08     | MJ            | 44151            |
| JP4                             |       | No             |       |                | 1      | 04/07/10 12:08     | MJ            | 44151            |
| JP5 / JP8                       |       | No             |       |                | 1      | 04/07/10 12:08     | MJ            | 44151            |
| JP7                             |       | No             |       |                | 1      | 04/07/10 12:08     | MJ            | 44151            |
| JP10                            |       | No             |       |                | 1      | 04/07/10 12:08     | MJ            | 44151            |
| JP18 / Turbine Jet Fuel         |       | No             |       |                | 1      | 04/07/10 12:08     | MJ            | 44151            |
| Surrogate: o-Terphenyl          |       |                | 60 %  | Limits: 50-150 | 1      | 04/07/10 12:08     | MJ            | 44151            |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**Tri-State Testing**  
6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-084-0221

Lab ID 1003449-015A

Field ID P-83

Project **Memphis International**  
Description **Airport**  
Project No. **E-9-429**

### Report of Analysis

Received 03/25/10  
Matrix Soil  
Sampled 03/25/10 4:55

### Analytical Method 8015B FIN

|                                 |        |                |                |               |        |                   |                  |
|---------------------------------|--------|----------------|----------------|---------------|--------|-------------------|------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28833          |               |        | Date/Time Prepped | 03/28/10 7:26    |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.4 g | Date/Time         |                  |
| Compound                        | Result | Units          |                | MQL           | DF     | Analyzed          | Analytical Batch |
| Diesel Range Organics (C10-C28) | 56.0   | mg/Kg          |                | 10.0          | 1      | 04/07/10 12:21    | MJ 44151         |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          |                | 10.0          | 1      | 04/07/10 12:21    | MJ 44151         |
| Gasoline/Aviation Jet           | No     |                |                |               | 1      | 04/07/10 12:21    | MJ 44151         |
| JP4                             | No     |                |                |               | 1      | 04/07/10 12:21    | MJ 44151         |
| JP5 / JP8                       | Yes    |                |                |               | 1      | 04/07/10 12:21    | MJ 44151         |
| JP7                             | No     |                |                |               | 1      | 04/07/10 12:21    | MJ 44151         |
| JP10                            | No     |                |                |               | 1      | 04/07/10 12:21    | MJ 44151         |
| JP18 / Turbine Jet Fuel         | No     |                |                |               | 1      | 04/07/10 12:21    | MJ 44151         |
| Surrogate: o-Terphenyl          |        | 51 %           | Limits: 50-150 |               | 1      | 04/07/10 12:21    | MJ 44151         |

|             |     |  |     |   |
|-------------|-----|--|-----|---|
| Qualifiers/ | *   | Surrogate Recovery outside accepted limits             | * I | Recoveries affected by interferences or high background |
| Definitions | B   | Analyte detected in the associated Method Blank        | DF  | Dilution Factor   |
|             | E   | Value exceeds method calibration range                 | H   | Prepped / Analyzed out of holding time.                 |
|             | J   | Estimated Value Analyte below reported detection limit | M   | Minimum value   |
|             | MDL | Method Detection Limit (unadjusted)                    | MQL | Method Quantitation Limit (adjusted)                    |
|             | MRL | Method Reporting Limit                                 | N   | Refer to attached Non-Compliance Report                 |
|             | Q   | RPD >40% between primary and confirmation columns      | SQL | Sample Quantitation Limit (adjusted MDL)                |

04/12/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Cooler Receipt Form

Customer Number: **05160**

Customer Name: **Tri-State Testing**

Report Number: **10-084-0221**

#### Shipping Method

☐ FedEx ☐ UPS ☐ US Postal ☒ Client ☐ LMP ☐ Courier ☐ Other: \_\_\_\_\_

|  |                                      |                                     |   |
|--|--------------------------------------|-------------------------------------|---|
| Shipping container/cooler uncompromised?           | <input checked="" type="radio"/> Yes | <input type="radio"/> No            | <input type="radio"/> Not Present             |
| Custody seals intact on shipping container/cooler? | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Custody seals intact on sample bottles?            | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Chain of Custody present?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| COC agrees with sample labels?                     | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Samples in proper containers?                      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sample containers intact?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sufficient sample volume for indicated tests?      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| All samples received within holding time?          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Container temperature in compliance?               | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Water - VOA vials free of headspace?               | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Water - Preservation acceptable upon receipt?      | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Samples screened for radioactivity (COE only)?     | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Special precautions or instructions included?      | <input type="radio"/> Yes            | <input checked="" type="radio"/> No |   |

Comments:

Any regulatory non-compliance issues will be recorded on non-compliance report.

Signature:

Date & Time:

1003449

## CHAIN

GTW ANALYTIC

2790 Whitten Rd.

PHONE 901-213-2400


 Tri-State Testing (GTW)  
 Memphis International Airport

 10-084-0221  
 05160  
 2010-03-25  
 9-01-56

REPORT NO.

 REPORT TO: David D. McCray  
 NY: Tri-State Testing Services, Inc.  
 CT: David McCray • 901-385-1199

PERMIT/PROJECT NO.: E-9-429

PROJECT NAME:

Memphis International Airport

SAMPLER'S SIGNATURE: *William Shadley*

| LAB NO. | SEQ NO. | SAMPLE NO. | DATE    | TIME     | SAMPLE LOCATION        | MATRIX | NO. OF CONTAINERS | REMARKS (ANALYSES, ETC.)         | LAB pH |
|---------|---------|------------|---------|----------|------------------------|--------|-------------------|----------------------------------|--------|
|         |         | P-10       | 3-25-10 | 12:26 PM | P-10 / 1'9" to 16'     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-11       | 3-25-10 | 5:12 PM  | P-11 / 3'              | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-71       | 3-24-10 | 10:34 PM | P-71 / 1'11" to 12'    | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-72       | 3-24-10 | 11:45 PM | P-72 / 1'3" to 12'     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-74       | 3-25-10 | 1:06 PM  | P-74 / 1'5" to 12'     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-75       | 3-25-10 | 1:41 PM  | P-75 / 2'4 1/2" to 12' | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-78       | 3-25-10 | 2:20 PM  | P-78 / 2'2 1/2" to 12' | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-80       | 3-25-10 | 7:06 PM  | P-80 / 1'9" to 12'     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-81       | 3-25-10 | 5:38 PM  | P-81 / 2'2" to 12'     | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P-82       | 3-25-10 | 5:27 PM  | P-82 / 2' to 12'       | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |

RELINQUISHED BY:

DATE/TIME:

RELINQUISHED BY:

DATE/TIME:

METHOD OF SHIPMENT: *McLary*

SHIPPED BY:

RECEIVED FOR LAB BY:

DATE/TIME:

CONDITION OF COOLER/SEAL:

COOLER OPENED BY:

DATE/TIME:

SHADED AREAS FOR LABORATORY USE ONLY!

1003449

10-084-0221  
05180  
2010-03-25  
9:01:56Tri-State Testing (GTW)  
Memphis International Airport

GTW ANAI

2790 Whi

PHONE 901-213

PERMIT/PROJECT NO.: E-9-429

10-084-0221

05180

2010-03-25

9:01:56

SUBMIT REPORT TO: David D. McCray  
COMPANY: Tri-State Testing Services, Inc.  
CONTACT: David McCray • 901-385-1199

REPORT NO.

PROJECT NAME:

Memphis International Airport

SAMPLER'S SIGNATURE: *B. Woods*

| SAMPLER'S SIGNATURE: |         |            |         | MATRIX  |                      | NO. OF CONTAINERS |   | REMARKS<br>(ANALYSES, ETC.)      |  | LAB pH |
|----------------------|---------|------------|---------|---------|----------------------|-------------------|---|----------------------------------|--|--------|
| LAB NO.              | SEQ NO. | SAMPLE NO. | DATE    | TIME    | SAMPLE LOCATION      |                   |   |                                  |  |        |
|                      |         | P-73       | 3-24-10 | 11:07am | P-73 / 1'-4'         | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         | P-76       | 3-25-10 | 2:00am  | P-76 / 26" - 12'     | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         | P-77       | 3-25-10 | 2:30am  | P-77 / 31" - 12'     | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         | P-79       | 3-25-10 | 3:00am  | P-79 / 19 3/4" - 12' | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         |            |         |         | 20"                  | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         |            |         |         |                      | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         |            |         |         |                      | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         |            |         |         |                      | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         |            |         |         |                      | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         |            |         |         |                      | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         |            |         |         |                      | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         |            |         |         |                      | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |
|                      |         |            |         |         |                      | S                 | 1 | Method 8015 Jet Fuel FingerPrint |  |        |

|                                       |                              |                                      |                         |
|---------------------------------------|------------------------------|--------------------------------------|-------------------------|
| RELINQUISHED BY: <i>McG</i>           | DATE/TIME: 3/25/10 90835     | RELINQUISHED BY:                     | DATE/TIME:              |
| METHOD OF SHIPMENT:                   | SHIPPED BY:                  | RECEIVED FOR LAB BY: <i>J. Smith</i> | DATE/TIME: 3-25-10 0835 |
| CONDITION OF COOLER/SEAL:             | COOLER OPENED BY: <i>L4C</i> | DATE/TIME:                           |                         |
| SHADED AREAS FOR LABORATORY USE ONLY! |                              |                                      |                         |

1003449

REPORT NO.



GTW AN  
2790

PHONE 901-213-2400

PERMIT/PROJECT NO.:

E-9-429

SUBMIT REPORT TO: David D. McCray  
COMPANY: Tri-State Testing Services, Inc.  
CONTACT: David McCray • 901-385-1199

PROJECT NAME:

Memphis International Airport

SAMPLER'S SIGNATURE: *William Sheddley*

| LAB NO. | SEQ NO. | SAMPLE NO. | DATE    | TIME    | SAMPLE LOCATION   | MATRIX | NO. OF CONTAINERS | REMARKS (ANALYSES, ETC.)         | LAB pH |
|---------|---------|------------|---------|---------|---|--------|-------------------|----------------------------------|--------|
|         |         | P-83       | 3-25-10 | 4:55 PM | P-83 / 264 <sup>th</sup> / 1012 <sup>th</sup> / 4 <sup>th</sup> | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |         |   | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |

RELINQUISHED BY: *David D. McCray*

DATE/TIME:

3/25/10 9 0835

RELINQUISHED BY:

DATE/TIME:

METHOD OF SHIPMENT:

SHIPPED BY:

RECEIVED FOR LAB BY: *J. Smith*

DATE/TIME:

CONDITION OF COOLER/SEAL:

COOLER OPENED BY: *L4C*

DATE/TIME:

3.25.10 0835

SHADED AREAS FOR LABORATORY USE ONLY!



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

4/8/2010

Tri-State Testing  
Mr. David McCray  
6756 Buckles Cove  
Memphis, TN, 38133

Ref: Analytical Testing  
Report Number: 10-085-0222  
Project Description: Memphis International Airport  
Project #E-9-429

Dear Mr. David McCray:

GTW Analytical Services received 2 sample(s) on 3/26/2010 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA and NELAP.

The results are shown on the attached analysis sheet(s).

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,

*Randell H. Thomas*

Randy Thomas  
Project Manager

RECEIVED  
APR 12 2010  
BY:.....



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

**CLIENT:** Tri-State Testing  
**Project:** Memphis International Airport  
**Lab Order Number:** 10-085-0222

### CASE NARRATIVE

**Date:** 04/08/10

GTW01

Fingerprint Analysis by Method 8015B  
Jet Fuels

Samples were extracted and analyzed by Method 8015B. Comparisons were made to the chromatographic library, with special attention given to Jet fuels. Results are reported for both Diesel Range Organics (C10-C28) and Oil Range Organics (>C28-C40), with quantitation achieved using Diesel Fuel and Motor Oil.

The following sample indicated contamination in Diesel Range Organics (C10-C28) which may be degraded JP5/8.

1003474-001A (P84)

1003474-002A (P85)



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-085-0222

Lab ID 1003474-001A

Field ID P84

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/26/10

Matrix Soil

Sampled 03/25/10 22:59

### Analytical Method 8015B FIN

|                                 |        |                |                |               |                |                   |                  |
|---------------------------------|--------|----------------|----------------|---------------|----------------|-------------------|------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28833          |               |                | Date/Time Prepped | 03/28/10 7:26    |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.4 g         | Date/Time         |                  |
| Compound                        | Result | Units          | MQL            | DF            | Analyzed       | By                | Analytical Batch |
| Diesel Range Organics (C10-C28) | 37.7   | mg/Kg          | 10.0           | 1             | 04/06/10 15:08 | MJ                | 44151            |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          | 10.0           | 1             | 04/06/10 15:08 | MJ                | 44151            |
| Gasoline/Aviation Jet           | No     |                |                | 1             | 04/06/10 15:08 | MJ                | 44151            |
| JP4                             | No     |                |                | 1             | 04/06/10 15:08 | MJ                | 44151            |
| JP5 / JP8                       | Yes    |                |                | 1             | 04/06/10 15:08 | MJ                | 44151            |
| JP7                             | No     |                |                | 1             | 04/06/10 15:08 | MJ                | 44151            |
| JP10                            | No     |                |                | 1             | 04/06/10 15:08 | MJ                | 44151            |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1             | 04/06/10 15:08 | MJ                | 44151            |
| Surrogate: o-Terphenyl          |        | 57 %           | Limits: 50-150 | 1             | 04/06/10 15:08 | MJ                | 44151            |

#### Qualifiers/ Definitions

\* Surrogate Recovery outside accepted limits  
B Analyte detected in the associated Method Blank  
E Value exceeds method calibration range  
J Estimated Value Analyte below reported detection limit  
MDL Method Detection Limit (unadjusted)  
MRL Method Reporting Limit  
Q RPD >40% between primary and confirmation columns

\* I Recoveries affected by interferences or high background  
DF Dilution Factor  
H Prepped / Analyzed out of holding time.  
M Minimum value  
MQL Method Quantitation Limit (adjusted)  
N Refer to attached Non-Compliance Report  
SQL Sample Quantitation Limit (adjusted MDL)

04/08/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Tri-State Testing

6756 Buckles Cove

Memphis, TN 38133

Lab Order Number 10-085-0222

Lab ID 1003474-002A

Field ID P85

Project Memphis International

Description Airport

Project No. E-9-429

### Report of Analysis

Received 03/26/10

Matrix Soil

Sampled 03/25/10 23:21

### Analytical Method 8015B FIN

|                                 |        |                |                |               |                |                   |                  |
|---------------------------------|--------|----------------|----------------|---------------|----------------|-------------------|------------------|
| Prep Method                     | 3550B  | Prep Batch     | 28833          |               |                | Date/Time Prepped | 03/28/10 7:26    |
|                                 |        | Default Vol/Wt | 30 g           | Sample Vol/Wt | 30.4 g         | Date/Time         |                  |
| Compound                        | Result | Units          | MQL            | DF            | Analyzed       | By                | Analytical Batch |
| Diesel Range Organics (C10-C28) | 39.2   | mg/Kg          | 10.0           | 1             | 04/06/10 15:21 | MJ                | 44151            |
| Oil Range Organics (>C28-C40)   | < 10.0 | mg/Kg          | 10.0           | 1             | 04/06/10 15:21 | MJ                | 44151            |
| Gasoline/Aviation Jet           | No     |                |                | 1             | 04/06/10 15:21 | MJ                | 44151            |
| JP4                             | No     |                |                | 1             | 04/06/10 15:21 | MJ                | 44151            |
| JP5 / JP8                       | Yes    |                |                | 1             | 04/06/10 15:21 | MJ                | 44151            |
| JP7                             | No     |                |                | 1             | 04/06/10 15:21 | MJ                | 44151            |
| JP10                            | No     |                |                | 1             | 04/06/10 15:21 | MJ                | 44151            |
| JP18 / Turbine Jet Fuel         | No     |                |                | 1             | 04/06/10 15:21 | MJ                | 44151            |
| Surrogate: o-Terphenyl          |        | 68 %           | Limits: 50-150 | 1             | 04/06/10 15:21 | MJ                | 44151            |

|             |  |   |
|-------------|--|---|
| Qualifiers/ | * Surrogate Recovery outside accepted limits             | * I Recoveries affected by interferences or high background |
| Definitions | B Analyte detected in the associated Method Blank        | DF Dilution Factor  |
|             | E Value exceeds method calibration range                 | H Prepped / Analyzed out of holding time.                   |
|             | J Estimated Value Analyte below reported detection limit | M Minimum value   |
|             | MDL Method Detection Limit (unadjusted)                  | MQL Method Quantitation Limit (adjusted)                    |
|             | MRL Method Reporting Limit                               | N Refer to attached Non-Compliance Report                   |
|             | Q RPD >40% between primary and confirmation columns      | SQL Sample Quantitation Limit (adjusted MDL)                |

04/08/10 5160 TRISTATE\_GTW



## GTW Analytical Services

2790 Whitten Road Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440

### Cooler Receipt Form

Customer Number: **05160**

Customer Name: **Tri-State Testing**

Report Number: **10-085-0222**

#### Shipping Method

☐ FedEx ☐ UPS ☐ US Postal ☒ Client ☐ LMP ☐ Courier ☐ Other: \_\_\_\_\_

|  |                                      |                                     |   |
|--|--------------------------------------|-------------------------------------|---|
| Shipping container/cooler uncompromised?           | <input checked="" type="radio"/> Yes | <input type="radio"/> No            | <input type="radio"/> Not Present             |
| Custody seals intact on shipping container/cooler? | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Custody seals intact on sample bottles?            | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> Not Required |
| Chain of Custody present?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| COC agrees with sample labels?                     | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Samples in proper containers?                      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sample containers intact?                          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Sufficient sample volume for indicated tests?      | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| All samples received within holding time?          | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Container temperature in compliance?               | <input checked="" type="radio"/> Yes | <input type="radio"/> No            |   |
| Water - VOA vials free of headspace?               | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Water - Preservation acceptable upon receipt?      | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Samples screened for radioactivity (COE only)?     | <input type="radio"/> Yes            | <input type="radio"/> No            | <input checked="" type="radio"/> N/A          |
| Special precautions or instructions included?      | <input type="radio"/> Yes            | <input checked="" type="radio"/> No |   |

Comments:

Any regulatory non-compliance issues will be recorded on non-compliance report.

Signature: Rebekah Ross

Date & Time: 03/26/2010 08:50:01

CHAIN

GTW ANALYTIC

2790 Whitten Rd.

PHONE 901-213-2400

PERMIT/PROJECT NO.: E-9-429

Tri-State Testing (GTW)  
Memphis International Airport

FAX 901-213-2440

1003474

REPORT NO.

 REPORT TO: David D. McCray  
 NY: Tri-State Testing Services, Inc.  
 CT: David McCray • 901-385-1199

PROJECT NAME:

Memphis International Airport

SAMPLER'S SIGNATURE: *William Shaddox*

| LAB NO. | SEQ NO. | SAMPLE NO. | DATE    | TIME     | SAMPLE LOCATION | MATRIX | NO. OF CONTAINERS | REMARKS (ANALYSES, ETC.)         | LAB pH |
|---------|---------|------------|---------|----------|-----------------|--------|-------------------|----------------------------------|--------|
|         |         | P84        | 3/25/10 | 10:59 PM | P84 / 3'        | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         | P85        | 3/25/10 | 11:21 PM | P85 / 6'        | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |
|         |         |            |         |          |                 | S      | 1                 | Method 8015 Jet Fuel FingerPrint |        |

RELINQUISHED BY:

DATE/TIME:

RELINQUISHED BY:

DATE/TIME:

METHOD OF SHIPMENT:

SHIPPED BY:

RECEIVED FOR LAB BY:

DATE/TIME:

CONDITION OF COOLER/SEAL:

COOLER OPENED BY:

DATE/TIME:

SHADED AREAS FOR LABORATORY USE ONLY!

**APPENDIX D.3 – DIRECT PUSH TECHNOLOGY  
EXISTING PAVEMENT DATA**



TRI-STATE TESTING SERVICES, INC.

## Cement-Treated Base Compressive Strength Test Report Drilled Cores

**Project:** Memphis International Airport  
Apron Investigation  
**Client:** Pickering Environmental

**Date of Report:** 04/12/10  
**Date Cored:** 04/09/10  
**Job No.:** E-9-429

### CTB TEST RESULTS

| <u>CORE<br/>NUMBER</u> | <u>LENGTH</u> | <u>DIAMETER</u> | <u>I/D</u> | <u>LOADS<br/>Lbs.</u> | <u>CORRECTED<br/>COMPRESSIVE STRENGTH</u> |
|------------------------|---------------|-----------------|------------|-----------------------|---|
| P69                    | 4.7"          | 3.75"           | 1.25       | 7993                  | 670 psi                                   |
| P4                     | 6.4"          | 3.75"           | 1.70       | 27123                 | 2405 psi                                  |
| P54                    | 7.3"          | 3.75"           | 1.95       | 20379                 | 1845 psi                                  |
| P76                    | 7.0"          | 3.75"           | 1.87       | 14840                 | 1330 psi                                  |
| P82                    | 6.5"          | 3.75"           | 1.73       | 31727                 | 2815 psi                                  |
| P23                    | 4.7"          | 3.75"           | 1.25       | 15279                 | 1285 psi                                  |
| P83                    | 7.1"          | 3.75"           | 1.89       | 3897                  | 650 psi                                   |
| P15                    | 5.1"          | 3.75"           | 1.36       | 14840                 | 1330 psi                                  |
| P52                    | 7.1"          | 3.75"           | 1.89       | 37983                 | 3405 psi                                  |
| P17                    | 5.2"          | 3.75"           | 1.39       | 34641                 | 2980 psi                                  |
| P85                    | 6.3"          | 3.75"           | 1.68       | 23685                 | 2080 psi                                  |
| P7                     | 7.3"          | 3.75"           | 1.95       | 45559                 | 4125 psi                                  |
| P55                    | 4.7"          | 3.75"           | 1.25       | 45971                 | 3870 psi                                  |
| P80                    | 5.8"          | 3.75"           | 1.55       | 21628                 | 1880 psi                                  |
| P14                    | 5.7"          | 3.75"           | 1.52       | 21745                 | 1890 psi                                  |
| P13                    | 4.5"          | 3.75"           | 1.20       | 11394                 | 950 psi                                   |

Test Method: ASTM C-42, Obtaining and Testing Drilled Cores of Concrete.



**MEMPHIS INTERNATIONAL AIRPORT  
MSCAA Project 08-1259-00  
Terminal Apron Geotechnical Investigation**

**Direct Push Technology Concrete and Base Matrix**

| Hole # | Concrete Thickness | Soil Cement/CTB Thickness Recovered |
|--------|--------------------|-------------------------------------|
| P-1    | 15"                | 8"                                  |
| P-2    | 18.5"              |                                     |
| P-3    | 13"                |                                     |
| P-4    | 17"                | 6"                                  |
| P-5    | 11.5"              |                                     |
| P-6    | 11"                |                                     |
| P-7    | 14.5"              | 11"                                 |
| P-8    | 11"                |                                     |
| P-9    | 11.5"              |                                     |
| P-10   | 21"                |                                     |
| P-11   | 14"                | 6"                                  |
| P-12   | 15"                | 14"                                 |
| P-13   | 15"                | 7"                                  |
| P-14   | 14"                | 18"                                 |

|      |       |       |
|------|-------|-------|
| P-15 | 15"   | 13"   |
| P-16 | 15"   |       |
| P-17 | 14"   | 11"   |
| P-18 | 15"   |       |
| P-19 | 15"   |       |
| P-20 | 15"   |       |
| P-21 | 15"   | 5"    |
| P-22 | 16"   | 7"    |
| P-23 | 15.5" | 10.5" |
| P-24 | 16"   |       |
| P-25 | 11"   |       |
| P-26 | 11"   |       |
| P-27 | 11.5" | 2"    |
| P-28 | 11"   |       |
| P-29 | 11"   |       |
| P-30 | 11"   |       |
| P-31 | 11"   |       |
| P-32 | 11"   |       |
| P-33 | 11"   |       |
| P-34 | 11"   |       |
| P-35 | 15.5" |       |
| P-36 | 14.5" | 6.5"  |

|      |       |      |
|------|-------|------|
| P-37 | 15.5" | 8.5" |
| P-38 | 16"   |      |
| P-39 | 14.5" | 8"   |
| P-40 | 11.5" |      |
| P-41 | 10.5" |      |
| P-42 | 15"   |      |
| P-43 | 11"   |      |
| P-44 | 11"   |      |
| P-45 | 11"   |      |
| P-46 | 11"   |      |
| P-47 | 11"   |      |
| P-48 | 11"   |      |
| P-49 | 11.5" |      |
| P-50 | 11"   |      |
| P-51 | 13"   |      |
| P-52 | 15"   | 13"  |
| P-53 | 14"   |      |
| P-54 | 14.5" | 10"  |
| P-55 | 14.5" | 9"   |
| P-56 | 11"   |      |
| P-57 | 11"   |      |
| P-58 | 12"   |      |

|      |       |       |
|------|-------|-------|
| P-59 | 11.5" | 1"    |
| P-60 | 11"   |       |
| P-61 | 11"   |       |
| P-62 | 12"   |       |
| P-63 | 11.5" |       |
| P-64 | 12"   |       |
| P-65 | 11"   |       |
| P-66 | 17"   | 4"    |
| P-67 | 15"   |       |
| P-68 | 14.5" |       |
| P-69 | 14"   | 5"    |
| P-70 | 20"   |       |
| P-71 | 15.5" | 7.5"  |
| P-72 | 15"   |       |
| P-73 | 14"   |       |
| P-74 | 13.5" | 3.5"  |
| P-75 | 15.5" | 13"   |
| P-76 | 14"   | 17"   |
| P-77 | 15"   | 16"   |
| P-78 | 14"   | 12.5" |
| P-79 | 15"   | 5"    |
| P-80 | 14"   | 7     |

|      |       |       |
|------|-------|-------|
| P-81 | 14.5" | 11.5" |
| P-82 | 14"   | 10"   |
| P-83 | 14.5" | 13.5" |
| P-84 | 14"   | 9"    |
| P-85 | 14"   | 15"   |

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-1  
Depth: 15'



TRI - STATE TESTING SERVICES, INC. 6756 Buckles Cove Memphis, T

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-2  
Depth: 15'



TRI - STATE TESTING SERVICES, INC. 6756 Buckles Cove Memphis, T

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-3  
Depth: 15'



TRI - STATE TESTING SERVICES, INC.  
6756 Buckles Cove Me

TRI - STATE TESTING SERVICES, INC.  
6756 Buckles Cove

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-6  
Depth: 15'



MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-5  
Depth: 15'



MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-7  
Depth: 15'



TRI - STATE TESTING SERVICES, INC.  
6756 Buckles Cove Mem

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-8  
Depth: 15'



TRI - STATE TESTING SERVICES, INC.  
6756 Buckles Cove Mem

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-9  
Depth: 15'



TRI - STATE TESTING SERVICES, INC.  
6756 Buckles Cove Memphis, TN 38133

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-10  
Depth: 15'



TRI - STATE TESTING SERVICES, INC.  
6756 Buckles Cove Memphis

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-12  
Depth: 15'



TRI - STATE TESTING SERVICES, INC.  
6756 Buckles Cove M

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-11  
Depth: 15'



TRI - STATE TESTING SERVICES, INC.  
6756 Buckles Cove Mempo

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-14  
Depth: 15'



MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-13  
Depth: 15'



TRI - STATE TESTING SERVICES, INC.  
6756 Buckles Cove Memphis

TRI - STATE TESTING SERVICES, INC.  
6756 Buckles Cove Memphis

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: B-15  
Depth: 15'



TRI - STATE TESTING SERVICES, INC.  
6756 Buckles Cove

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-1

Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756 BUCKLES

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-2

Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756 BUCKLES

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-3

Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756 BUCKLES

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-4

Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756 BUCKLES

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-5  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-6  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-7  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 Buck

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-8  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-9  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-10  
Depth: 16'

TRI-STATE TESTING SERVICES, INC.

6756 Buckles Cove Me

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-11  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-12  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756 BU

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-13  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 BUCK

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-15  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 BUCK

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-14  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 BUCK

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-16  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 BUCK

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-17

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

675

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-18

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

6756 B

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-19

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

6756 B

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-20

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-21  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 BU

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-23  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 BU

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-22  
Depth: 16'

TRI-STATE TESTING SERVICES, INC. 6756 BU

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-24  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 BU

MEMPHIS  
INTL.

AIRPORT

E-9-429

Hole: P-25

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

675

MEMPHIS  
INTL.

AIRPORT

E-9-429

Hole: P-26

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

675

MEMPHIS  
INTL.

AIRPORT

E-9-429

Hole: P-27

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

675

MEMPHIS  
INTL.

AIRPORT

E-9-429

Hole: P-28

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

6

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-29

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

67

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-30

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

6756

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-31

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

675

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-32

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

675

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-33  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-35  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 BU

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-34  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 675

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-36  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 BU

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-37  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-38  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-39  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-40  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 675

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-41  
Depth: 12'



TRI-STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-43  
Depth: 12'



TRI-STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-42  
Depth: 12'



TRI-STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-44  
Depth: 12'



TRI-STATE TESTING SERVICES, INC. 67

MEMPHIS  
INTL.  
AIRPORT

E-9-429

Hole: P-45

Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT

E-9-429

Hole: P-46

Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT

E-9-429

Hole: P-47

Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT

E-9-429

Hole: P-48

Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-49  
Depth: 12'



TRI -STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-51  
Depth: 12'



TRI -STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-50  
Depth: 12'



TRI -STATE TESTING SERVICES, INC. 675

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-52  
Depth: 12'



TRI -STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-53  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-54  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-55  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-56  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-57  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

67

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-58  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-59  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

675

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-60  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-61  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-63  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-62  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-64  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 67

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-65  
Depth: 12'

TRI -STATE TESTING SERVICES, INC.

6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-66  
Depth: 12'

TRI -STATE TESTING SERVICES, INC.

6756 Buckles Cov

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-67  
Depth: 12'

TRI -STATE TESTING SERVICES, INC.

6756 BU

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-68  
Depth: 12'

TRI -STATE TESTING SERVICES, INC.

6756 Buck

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-69

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

675

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-70

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

6756 Buckles Cove ME

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-71

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

6756 Bu

MEMPHIS

INTL.

AIRPORT

E-9-429

Hole: P-72

Depth: 12'



TRI-STATE TESTING SERVICES, INC.

6756 Bu

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-73  
Depth: 12'

TRI -STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-74  
Depth: 12'

TRI -STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-75  
Depth: 12'

TRI -STATE TESTING SERVICES, INC.

6756 BU

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-76  
Depth: 12'

TRI -STATE TESTING SERVICES, INC.

6756

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-77  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-78  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-79  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-80  
Depth: 12'

TRI-STATE TESTING SERVICES, INC. 6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-81  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-83  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-82  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-84  
Depth: 12'

TRI-STATE TESTING SERVICES, INC.

6756 B

MEMPHIS  
INTL.  
AIRPORT  
E-9-429  
Hole: P-85  
Depth: 12'

TRI -STATE TESTING SERVICES, INC. 6756

## **DOCUMENT 3: ASR INVESTIGATION**



## **REPORT OF CONCRETE TESTING**

### **PROJECT:**

MEMPHIS TERMINAL  
APRON RECONSTRUCTION

### **REPORTED TO:**

THY, INC.  
1760 MORIAH WOODS BLVD., STE. 1  
MEMPHIS, TN 38117

**ATTN:** TECK TANG

**APS JOB NO:** 10-06903

**DATE:** FEBRUARY 28, 2011

---

## **INTRODUCTION**

This report presents the results of laboratory work performed by our firm on twelve concrete core samples submitted to us by Mr. Teck Tang of Thy, Inc. on February 15, 2011. We understand the concrete cores were obtained from an exterior concrete airfield terminal apron that is currently under evaluation. The concrete was reportedly placed in 1972 and 1964. The scope of our work was limited to performing petrographic analysis testing to document the overall quality of the concrete.

## **CONCLUSIONS**

Based on our observations, test results, and past experience, our conclusions are as follows:

1. The overall quality of the concrete ranged from fair to good to poor. The cement paste was moderately dense and hard with carbonation up to 5/8" from the top surface and up to 1" from the bottom surface. The crushed carbonate aggregate was relatively hard, but somewhat reactive. The concrete was placed with a moderate slump.
2. The concrete in cores #B4, B7, B8, B14, P14, P20, P35, P54, P69 and P77 has poor durability. The concrete contained an air void system that is not consistent with current technology for resistance to freeze-thaw deterioration. We expect deterioration to occur if exposed to freezing conditions when saturated.
3. The concrete exhibited evidence of active alkali silica reactivity (ASR) in all but two cores (B12 and P35). In general, we consider the level of reactivity to be minor.
4. The concrete also exhibited evidence of ettringite distress. We observed extensive secondary ettringite filling of air voids and some filling of microcracks. We consider the level of distress to be minor to moderate and expect it to continue if the concrete is exposed to moisture.

The table below lists the level of ASR reactivity and ettringite distress we observed:

| <u>Sample Number</u> | <u>Level of ASR Reactivity</u> | <u>Level of Ettringite Distress</u> |
|----------------------|--------------------------------|-------------------------------------|
| B1                   | Minor                          | Minor                               |
| B4                   | Minor                          | Minor                               |
| B7                   | Minor                          | Minor to moderate                   |
| B8                   | Minor                          | Minor to moderate                   |
| B12                  | None Observed                  | Minor                               |
| B14                  | Minor                          | Minor to moderate                   |
| P14                  | Minor                          | Moderate                            |
| P20                  | Minor                          | Moderate                            |
| P35                  | None Observed                  | Moderate                            |
| P54                  | Minor                          | Moderate                            |
| P69                  | Minor                          | Minor                               |
| P77                  | Minor                          | Minor                               |

### **SAMPLE IDENTIFICATION**

| <u>Sample Number</u> | <u>Original Sample Dimensions, in.</u>           |
|----------------------|--|
| B1                   | 197 mm (7-3/4") diameter x 369 mm (14-1/2") long |
| B4                   | 197 mm (7-3/4") diameter x 305 mm (12") long     |
| B7                   | 197 mm (7-3/4") diameter x 280 mm (11") long     |
| B8                   | 197 mm (7-3/4") diameter x 318 mm (12-1/2") long |
| B12                  | 223 mm (8-3/4") diameter x 299 mm (11-3/4") long |
| B14                  | 197 mm (7-3/4") diameter x 363 mm (14-1/4") long |
| P14                  | 96 mm (3-3/4") diameter x 356 mm (14") long      |
| P20                  | 96 mm (3-3/4") diameter x 375 mm (14-3/4") long  |
| P35                  | 96 mm (3-3/4") diameter x 394 mm (15-1/2") long  |
| P54                  | 96 mm (3-3/4") diameter x 243 mm (9-9/16") long  |
| P69                  | 96 mm (3-3/4") diameter x 349 mm (13-3/4") long  |
| P77                  | 96 mm (3-3/4") diameter x 286 mm (11-1/4") long  |

### **TEST RESULTS**

Our complete petrographic analysis test results appear on the attached sheets entitled 00 LAB 001 "Petrographic Examination of Hardened Concrete, ASTM:C856." A brief summary of the general concrete properties is as follows:

1. The coarse aggregate in the cores was comprised of 1" to 1-1/2" maximum sized crushed carbonate that was fairly well graded with fair to good overall distribution.
2. Pozzolanic admixtures were not observed in any of the concrete samples.
3. The paste color of the cores was tannish gray with the slump estimated to be medium (2 to 5").
4. The paste hardness of the cores was judged to be medium to hard with the paste/aggregate bond considered good.
5. The depth of carbonation was up to 5/8" from the top surface.
6. The water/cement ratio of the cores was estimated at between 0.42 to 0.49 with approximately 2-6% unhydrated cement particles.

**Air Content Testing** – See attached data sheets.

### **TEST PROCEDURES**

Laboratory testing was performed on February 15, 2011 and subsequent dates. Our procedures were as follows:

#### **Petrographic Analysis**

A petrographic analysis was performed in accordance with APS Standard Operating Procedure 00 LAB 001, "Petrographic Examination of Hardened Concrete," ASTM:C856-latest revision. The petrographic analysis consisted of reviewing cement paste and aggregate qualities on a whole basis as well as on a cut/polished section. The depth of carbonation was documented using a phenolphthalein indicator solution applied on a freshly cut and polished surface of the concrete sample. The water/cement ratio of the concrete was estimated by viewing a thin section of the concrete under an Olympus BH-2 polarizing microscope at magnification up to 1000x. Thin section analysis was performed in accordance with APS Standard Operating Procedure 00 LAB 013, "Determining the Water/Cement of Portland Cement Concrete, APS Method." The samples are first highly polished, then epoxied to a glass slide. The excess sample is cut from the glass and the slide is polished until the concrete reaches 25 microns or less in thickness.

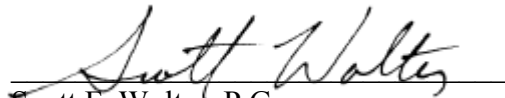
**Air Content Testing**

Air content testing was performed using APS Standard Operating Procedure 00 LAB 003, "Microscopical Determination of Air Void Content and Parameters of the Air Void System in Hardened Concrete, ASTM:C457-latest revision." The linear traverse method was used. The concrete cores were cut perpendicular with respect to the horizontal plane of the concrete as placed and then polished prior to testing.

**REMARKS**

The test samples will be retained for a period of at least thirty days from the date of this report. Unless further instructions are received by that time, the samples may be discarded. Test results relate only to the items tested. No warranty, express or implied, is made.

Report Prepared By:  
American Petrographic Services, Inc.

A handwritten signature in black ink, appearing to read "Scott Wolter", is written over a horizontal line.

Scott F. Wolter, P.G.

President

MN License No. 30024

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: B1

Date: 2-22-2011 / 3-3-2011  
Performed by: M. Koch / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 358 mm (14-1/8") x 162 mm (6-3/8") x 44 mm (1-3/4") thick polished section that was cut from the original 197 mm (7-3/4") diameter x 369 mm (14-1/2") long core.
2. Surface Conditions:  
Top: Rough, mortar eroded surface with marker paint  
Bottom: Rough, irregular, formed surface; placed on grade with approximately 50% fractured
3. Reinforcement: None observed
4. General Physical Conditions: The entire top surface has undergone mortar erosion, exposing numerous fine aggregate particles. Approximately 40% of the top surface was covered with white marker paint. An approximately 17 mm (11/16") diameter hole was observed on the present top surface. A few microcracks were present. Carbonation proceeds up to 3 mm (1/8") depth. The concrete was air entrained with a fairly well distributed air void system. White ettringite was observed. Evidence of active alkali silica reaction was observed. Fair to good overall condition.

II. Aggregate

1. Coarse: 38 mm (1-1/2") maximum sized crushed carbonate consisting of fossiliferous, micritic, oolitic and sandy limestone. The coarse aggregate was mostly sub-angular with several angular particles. Fairly well graded with good overall uniform distribution.
2. Fine: Quartz and lithic sand with many carbonate and chert particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 4.3% total
2. Paste proportions: 20% to 22%
3. Depth of carbonation: Ranged from negligible up to approximately 3 mm (1/8") depth from the present top surface and ranged from negligible up to approximately 3 mm (1/8") depth from the bottom surface. Carbonation was observed intermittently around the perimeters of a few coarse carbonate aggregate particles scattered throughout the sample.
4. Paste/aggregate bond: Good
5. Paste color: Medium gray becoming dark tan within the bottom approximately 3 mm (1/8") of the sample and dark gray between negligible and 9 mm (3/8") depth from the bottom surface
6. Paste hardness: Medium
7. Microcracking: A few sub-vertical drying shrinkage microcracks proceed from the present top surface up to approximately 30 mm (1-3/16") depth. A few microcracks were observed scattered throughout the sample at various depths and orientations.
8. Secondary deposits: White ettringite was observed partially lining many to filling a few air voids scattered throughout the sample. White alkali silica gel was observed partially lining to filling a few air voids scattered throughout the sample.
9. Slump: Estimated, medium (2 to 4").
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.42 to 0.47 with approximately 3-5% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-moderate to mostly well

IV. Conclusions

The general overall quality of the concrete was fair to good.

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: B4

Date: 2-16-2011 / 3-4-2011  
Performed by: M. Koch / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 295 mm (11-5/8") x 180 mm (7-1/6") x 62 mm (2-7/16") thick polished section that was cut from the original 197 mm (7-3/4") diameter x 305 mm (12") long core.
2. Surface Conditions:  
Top: Rough, mortar eroded and traffic worn surface with marker paint  
Bottom: Rough, irregular, formed surface; placed on grade
3. Reinforcement: None observed
4. General Physical Conditions: The entire top surface has undergone mortar erosion, exposing a few coarse and numerous fine aggregate particles. The top surface has undergone moderate traffic wear with the topographic highs worn smooth. Approximately 30% of the top surface was covered with white marker paint. An approximately 16 mm (5/8") concrete anchor was observed protruding from the top surface of the core. A few microcracks were present. Carbonation proceeds up to 26 mm (1") depth. The concrete was not air entrained. White ettringite was observed. Evidence of active alkali silica reaction was observed. Fair overall condition.

II. Aggregate

1. Coarse: 38 mm (1-1/2") maximum sized crushed carbonate consisting of fossiliferous, micritic, oolitic and sandy limestone. The coarse aggregate was mostly sub-angular with many angular particles. Fairly well graded with good overall uniform distribution.
2. Fine: Quartz and lithic sand with many carbonate and chert particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 1.8% total
2. Paste proportions: 24% to 26%
3. Depth of carbonation: Ranged from approximately 1 mm (1/32") up to 9 mm (3/8") depth from the present top surface and negligible up to approximately 26 mm (1") depth from the bottom surface
4. Paste/aggregate bond: Good
5. Paste color: Mottled light to medium gray becoming medium tan within the carbonated areas
6. Paste hardness: Medium
7. Microcracking: A few subvertical drying shrinkage microcracks proceed from the present top surface up to approximately 9 mm (3/8") depth.
8. Secondary deposits: White ettringite was observed partially lining many to filling a few air voids below approximately 2 mm (1/16") depth from the present top surface. White alkali silica gel was observed lining a few air voids proximate to a reactive coarse aggregate particle approximately 73 mm (2-7/8") depth from the present top surface.
9. Slump: Estimated, medium (3 to 5").
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.43 to 0.48 with approximately 4-6% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-moderate to mostly well

IV. Conclusions

The general overall quality of the concrete was fair to poor.

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: B7

Date: 2-16-2011 / 3-4-2011  
Performed by: S. Malecha / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 276 mm (10-7/8") x 178 mm (7") x 60 mm (2-3/8") thick polished section that was cut from the original 197 mm (7-3/4") diameter x 280 mm (11") long core.
2. Surface Conditions:  
Top: Rough, mortar eroded surface  
Bottom: Rough, irregular, formed surface; placed on grade
3. Reinforcement: None observed
4. General Physical Conditions: The entire top surface of the core has undergone mortar erosion, exposing many coarse and numerous fine aggregate particles. Remnants of white marker paint were observed on the present top surface of the core. An approximately 18 mm (11/16") diameter concrete anchor was observed protruding from the top surface of the core. Few microcracks were present. Carbonation proceeds up to 11 mm (7/16") depth from the present top surface. The concrete contains air entrainment with a fairly well distributed air void system, but compromised by ettringite. Minor evidence of active alkali silica reaction observed. Fair overall condition.

II. Aggregate

1. Coarse: 38 mm (1-1/2") maximum sized crushed carbonate consisting of fossiliferous, micritic, oolitic, and sandy limestone with a few chert and partially silicified limestone particles. The coarse aggregate was mostly angular with many sub-angular particles. Fairly well graded with good overall uniform distribution. Reactive particles consist of chert and partially silicified limestone.
2. Fine: Quartz and lithic sand with many carbonate and chert particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 4.0% total
2. Paste proportions: 25% to 27%
3. Depth of carbonation: Ranged from approximately 7 mm (1/4") up to 11 mm (7/16") depth from the present top surface and ranged from approximately 14 mm (9/16") up to 24 mm (15/16") depth from the bottom surface
4. Paste/aggregate bond: Good
5. Paste color: Mottled light to medium gray becoming tan in the carbonated top up to 11 mm (7/16") and light tannish gray in the carbonated bottom approximately 24 mm (15/16") of the sample.
6. Paste hardness: Moderate
7. Microcracking: Few subvertical microcracks proceed up to approximately 7 mm (1/4") depth from the present top surface.
8. Secondary deposits: White ettringite was observed lining to filling numerous entrained air voids scattered throughout the sample below the carbonated top approximately 24 mm (15/16") of the sample. White alkali silica gel was observed lining a void space proximate to a reactive coarse aggregate particle approximately 152 mm (6") depth from the present top surface.
9. Slump: Estimated, medium (2 to 4")
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.42 to 0.47 with approximately 3-5% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-moderate to mostly well

IV. Conclusions

The general overall quality of the concrete was fair to poor.

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: B8

Date: 2-17-2011 / 3-4-2011  
Performed by: S. Malecha / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 286 mm (11-1/4") x 176 mm (6-15/16") x 57 mm (2-1/4") thick polished section that was cut from the original 197 mm (7-3/4") diameter x 318 mm (12-1/2") long core.
2. Surface Conditions:  
Top: Rough, mortar eroded and traffic worn surface  
Bottom: Rough, irregular, formed surface; placed on grade
3. Reinforcement: None observed
4. General Physical Conditions: The entire top surface of the core has undergone mortar erosion, exposing several coarse and many fine aggregate particles. The top surface appears to have been traffic worn with topographic highs worn smooth. Remnants of white marker paint were observed on the present top surface of the core. An approximately 18 mm (11/16") diameter concrete anchor was observed protruding from the top surface of the core. Few microcracks were present. Carbonation proceeds up to 8 mm (5/16") depth from the present top surface. The concrete contains air entrainment with a fairly well distributed air void system, but compromised by ettringite. Minor evidence of active alkali silica reaction observed. Fair to good overall condition.

II. Aggregate

1. Coarse: 38 mm (1-1/2") maximum sized crushed carbonate consisting of fossiliferous, micritic, and oolitic limestone with a few chert and partially silicified limestone particles. The coarse aggregate was mostly sub-angular with several sub-angular particles. Fairly well graded with good overall uniform distribution.
2. Fine: Quartz and lithic sand with many carbonate and chert particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 4.3% total
2. Paste proportions: 23% to 25%
3. Depth of carbonation: Ranged from negligible up to approximately 8 mm (5/16") depth from the present top surface and ranged from approximately 1 mm (1/32") up to 8 mm (5/16") depth from the bottom surface
4. Paste/aggregate bond: Good
5. Paste color: Tannish gray becoming light tan in the carbonated top up to 8 mm (5/16") and medium tan in the carbonated bottom up to 8 mm (5/16") of the sample.
6. Paste hardness: Medium
7. Microcracking: Few sub-vertical microcracks proceed up to approximately 13 mm (1/2") depth from the present top surface.
8. Secondary deposits: White ettringite was observed lining to filling many entrained air voids scattered throughout the sample below the carbonated top approximately 8 mm (5/16") of the sample. White alkali silica gel was observed lining a void space proximate to a reactive coarse aggregate particle at approximately 183 mm (7-3/16") depth from the present top surface.
9. Slump: Estimated, medium (2 to 4")
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.42 to 0.47 with approximately 3-5% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-moderate to mostly well

IV. Conclusions

The general overall quality of the concrete was fair to poor.

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: B12

Date: 2-17-11 / 3-4-2011  
Performed by: M. Koch / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 286 mm (11-1/4") x 188 mm (7-3/8") x 52 mm (2-1/16") thick polished section that was cut from the original 223 mm (8-3/4") diameter x 299 mm (11-3/4") long core.
2. Surface Conditions:  
Top: Rough, mortar eroded surface  
Bottom: Rough, irregular, formed surface; placed on grade
3. Reinforcement: None observed
4. General Physical Conditions: The entire top surface has undergone mortar erosion, exposing several coarse and numerous fine aggregate particles. An approximately 16 mm (5/8") concrete anchor was observed protruding from the top surface of the core. A few microcracks were present. Carbonation proceeds up to 16 mm (5/8") depth. The concrete was air entrained with a fairly well distributed air void system. White ettringite was observed. No evidence of active alkali silica reaction was observed. Fair overall condition.

II. Aggregate

1. Coarse: 38 mm (1-1/2") maximum sized crushed carbonate consisting of fossiliferous, micritic, oolitic and sandy limestone with a few chert and partially silicified limestone particles. The coarse aggregate was mostly sub-angular with many angular particles. Fairly well graded with good overall uniform distribution.
2. Fine: Quartz and lithic sand with many carbonate and chert particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 5.0% total
2. Paste proportions: 22% to 24%
3. Depth of carbonation: Ranged from approximately 5 mm (3/16") up to 16 mm (5/8") depth from the present top surface and ranged from negligible up to approximately 10 mm (3/8") depth from the bottom surface
4. Paste/aggregate bond: Good
5. Paste color: Mottled light to medium gray becoming medium tan within the bottom approximately 1 mm (1/32") of the sample
6. Paste hardness: Moderately hard
7. Microcracking: A few sub-vertical drying shrinkage microcracks proceed from the present top surface up to approximately 19 mm (3/4") depth. A few sub-horizontal microcracks were observed within the present top approximately 1 mm (1/32") of the sample.
8. Secondary deposits: White ettringite was observed partially lining many to filling several air voids below approximately 123 mm (4-13/16") depth from the present top surface.
9. Slump: Estimated, medium (2 to 4")
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.42 to 0.47 with approximately 3-5% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-moderate to mostly well

IV. Conclusions

The general overall quality of the concrete was fair to good.

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: B14

Date: 2-22-2011 / 3-4-2011  
Performed by: S. Malecha / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 354 mm (13-15/16") x 164 mm (6-7/16") x 48 mm (1-7/8") thick polished section that was cut from the original 197 mm (7-3/4") diameter x 363 mm (14-1/4") long core.
2. Surface Conditions:  
Top: Rough, mortar eroded surface  
Bottom: Approximately 20% rough, formed surface; placed on grade and approximately 80% rough, irregular, fractured surface
3. Reinforcement: None observed
4. General Physical Conditions: The entire top surface of the sample has undergone light to medium scaling exposing many coarse and fine aggregate particles. An approximately 17 mm (11/16") diameter concrete anchor was observed protruding from the top surface of the core. Few microcracks were present. Intermittent carbonation proceeds up to 15 mm (9/16") depth from the present top surface. The concrete contains air entrainment with a fairly well distributed air void system, but compromised by ettringite. Minor evidence of active alkali silica reaction observed. Good overall condition.

II. Aggregate

1. Coarse: 38 mm (1-1/2") maximum sized crushed carbonate consisting of fossiliferous, micritic, and oolitic limestone with a few chert and partially silicified limestone. The coarse aggregate was mostly angular with many sub-angular particles. Fairly well graded with good overall uniform distribution.
2. Fine: Quartz and lithic sand with many carbonate and chert particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded and few rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 3.5% total
2. Paste proportions: 23% to 25%
3. Depth of carbonation: Ranged from negligible up to approximately 3 mm (1/8") depth and occurred intermittently up to 15 mm (9/16") depth from the present top surface along subvertical microcracks. Carbonation was negligible from the bottom surface. Intermittent carbonation was observed along the perimeter of few coarse aggregate particles scattered throughout the sample.
4. Paste/aggregate bond: Good
5. Paste color: Tannish gray becoming tan in the carbonated zones
6. Paste hardness: Medium
7. Microcracking: Few subvertical microcracks proceed up to approximately 48 mm (1-7/8") depth from the present top surface.
8. Secondary deposits: White ettringite was observed lining to filling numerous entrained air voids scattered throughout the sample. White alkali silica gel was observed lining few voids proximate to few coarse aggregate particles.
9. Slump: Estimated, medium (3 to 5")
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.43 to 0.48 with approximately 3-5% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-moderate to mostly well

IV. Conclusions

The general overall quality of the concrete was fair to poor.

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: P14

Date: 2-17-2011 / 3-3-2011  
Performed by: S. Malecha / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 352 mm (13-7/8") x 96 mm (3-3/4") x 48 mm (1-7/8") thick polished section that was cut from the original 96 mm (3-3/4") diameter x 356 mm (14") long core.
2. Surface Conditions:  
Top: Rough, mortar eroded surface  
Bottom: Rough, irregular, formed surface; placed on grade
3. Reinforcement: None observed
4. General Physical Conditions: The entire top surface of the core has undergone mortar erosion, exposing many fine and a few coarse aggregate particles. Few microcracks were present. Carbonation proceeds up to 6 mm (1/4") depth from the top surface. The sample was fractured, in an orientation sub-parallel to the top surface, was observed between approximately 54 mm (2-1/8") and 76 mm (3") depth and between approximately 251 mm (9-7/8") and 273 mm (10-3/4") depth from the present top surface. The concrete contains air entrainment with a fairly well distributed air void system, but compromised by ettringite. Minor evidence of active alkali silica reaction observed. Fair to poor overall condition.

II. Aggregate

1. Coarse: 38 mm (1-1/2") maximum sized crushed carbonate consisting of fossiliferous, micritic, and oolitic limestone. The coarse aggregate was mostly angular with many sub-angular particles. Fairly well graded with good overall uniform distribution.
2. Fine: Quartz and lithic sand with many carbonate and chert particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 4.6% total
2. Paste proportions: 24% to 26%
3. Depth of carbonation: Ranged from negligible up to approximately 6 mm (1/4") depth from the present top surface along sub-vertical microcrack. Ranged from approximately 6 mm (1/4") up to 20 mm (13/16") depth from the bottom surface. Proceeds up to approximately 6 mm (1/4") depth from the cored edge of the sample.
4. Paste/aggregate bond: Good
5. Paste color: Light gray becoming light tannish gray in the carbonated bottom up to 20 mm (13/16") of the sample.
6. Paste hardness: Moderately hard
7. Microcracking: Few sub-vertical microcracks proceed up to approximately 25 mm (1") depth from the present top surface. Few microcracks, mostly sub-horizontal, were observed between approximately 70 mm (2-3/4") and 229 mm (9") depth from the present top surface.
8. Secondary deposits: White to clear ettringite was observed lining to filling numerous entrained air voids throughout the sample. White silica gel was observed partially lining two void spaces along microcracks and proximate to coarse aggregate particles.
9. Slump: Estimated, medium (2 to 4")
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.42 to 0.47 with approximately 4-6% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-low to moderate

IV. Conclusions

The general overall quality of the concrete was poor.

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: P20

Date: 2-23-2011/ 3-3-2011  
Performed by: M. Koch / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 369 mm (14-1/2") x 94 mm (3-11/16") x 43 mm (1-11/16") thick polished section that was cut from the original 96 mm (3-3/4") diameter x 375 mm (14-3/4") long core.
2. Surface Conditions:  
Top: Rough, mortar eroded surface with marker paint  
Bottom: Rough, irregular, formed surface; placed on grade
3. Reinforcement: None observed
4. General Physical Conditions: The entire top surface has undergone mortar erosion, exposing a few coarse and many fine aggregate particles. Approximately 70% of the top surface was covered with white marker paint. A few sub-horizontal fractures were observed between approximately 109 mm (4-5/16") and 207 mm (8-1/8") depth from the present top surface proceeding around coarse aggregate particles. Several microcracks were present. Carbonation proceeds up to 24 mm (15/16") depth. The concrete was air entrained with a fairly well distributed air void system, but compromised by ettringite. Evidence of active alkali silica reaction was observed. Poor overall condition.

II. Aggregate

1. Coarse: 38 mm (1-1/2") maximum sized crushed carbonate consisting of fossiliferous, micritic, oolitic, partially silicified and sandy limestone. The coarse aggregate was mostly sub-angular with several angular particles. Fairly well graded with good overall uniform distribution.
2. Fine: Quartz and lithic sand with many carbonate and chert particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 2.9% total
2. Paste proportions: 19% to 21%
3. Depth of carbonation: Ranged from negligible up to approximately 6 mm (1/4") from the present top surface, along sub-vertical microcracking and ranged from negligible up to approximately 6 mm (1/4") depth from the bottom surface
4. Paste/aggregate bond: Good
5. Paste color: Light gray becoming medium tan within the carbonated area
6. Paste hardness: Medium hard
7. Microcracking: Several sub-vertical drying shrinkage microcracks proceed from the present top surface up to approximately 17 mm (11/16") depth. Several, predominately sub-horizontal, microcracks were observed scattered throughout the sample.
8. Secondary deposits: White ettringite was observed partially lining to filling numerous air voids scattered throughout the sample. White alkali silica gel was observed lining a few air voids proximate to a reactive coarse aggregate particles scattered throughout the sample.
9. Slump: Estimated, medium (2 to 4")
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.42 to 0.47 with approximately 3-5% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-low to moderate

IV. Conclusions

The general overall quality of the concrete was poor.

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: P35

Date: 2-28-2011 / 3-3-2011  
Performed by: S. Malecha / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 394 mm (15-1/2") x 94 mm (3-11/16") x 48 mm (1-7/8") thick polished section that was cut from the original 96 mm (3-3/4") diameter x 394 mm (15-1/2") long core.
2. Surface Conditions:  
Top: Rough, mortar eroded, and traffic worn surface  
Bottom: Rough, irregular, formed surface; placed on grade
3. Reinforcement: None observed
4. General Physical Conditions: The entire top surface has undergone mortar erosion, exposing many coarse and fine aggregate particles. The top surface appears to have been traffic worn with topographic highs worn smooth. Few microcracks were present. Carbonation proceeds up to 11 mm (7/16") depth from the present top surface. The sample was fractured, oriented sub-parallel to the top surface, between approximately 114 mm (4-1/2") and 133 mm (5-1/4") depth from the present top surface. The concrete contains air entrainment with a fairly well distributed air void system, but compromised by ettringite. No evidence of active alkali silica reaction observed. Fair overall condition.

II. Aggregate

1. Coarse: 38 mm (1-1/2") maximum sized crushed carbonate consisting of fossiliferous, micritic, and oolitic limestone. The coarse aggregate was mostly angular with many sub-angular particles. Fairly well graded with good overall uniform distribution.
2. Fine: Quartz and lithic sand with many carbonate and chert particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 3.8% total
2. Paste proportions: 19% to 21%
3. Depth of carbonation: Ranged from negligible up to approximately 14 mm (9/16") depth from the present top surface. Ranged from negligible up to approximately 3 mm (1/8") depth from the bottom surface. Carbonation occurs intermittently between approximately 3 mm (1/8") and 23 mm (7/8") depth from the present top surface along a sub-vertical microcrack.
4. Paste/aggregate bond: Good
5. Paste color: Grayish tan becoming medium tan in the carbonated bottom up to 3 mm (1/8") of the sample
6. Paste hardness: Moderately hard
7. Microcracking: Few sub-vertical microcracks proceed up to approximately 60 mm (2-3/8") depth from the present top surface. Few other microcracks, mostly sub-horizontal, proceed across most of the core's diameter at various depths throughout the length of the core. Microcracking proceeds through a few coarse aggregate particles.
8. Secondary deposits: White ettringite was observed lining to filling many entrained voids scattered throughout the sample.
9. Slump: Estimated, medium (3 to 5")
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.44 to 0.49 with approximately 2-4% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-low to moderate

IV. Conclusions

The general overall quality of the concrete was fair to poor.

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: P54

Date: 2-24-2011 / 3-3-2011  
Performed by: M. Koch / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 243 mm (9-9/16") x 93 mm (3-11/16") x 48 mm (1-7/8") thick polished section that was cut from the original 96 mm (3-3/4") diameter x 243 mm (9-9/16") long core.
2. Surface Conditions:  
Top: Rough, irregular, fractured surface  
Bottom: Fairly smooth, irregular, formed surface; placed on grade with worn surface
3. Reinforcement: None observed
4. General Physical Conditions: A sub-horizontal fracture was observed between approximately 83 mm (3-1/4") and 103 mm (4-1/16") depth from the present top surface proceeding through coarse aggregate particles. A few microcracks were present. Carbonation proceeds up to 5 mm (3/16") depth from the bottom surface. The concrete was air entrained with a fairly well distributed air void system, but compromised by ettringite. Evidence of active alkali silica reaction was observed. The entire bottom surface was worn away during coring of the sample. Poor overall condition.

II. Aggregate

1. Coarse: 38 mm (1-1/2") maximum sized crushed carbonate consisting of fossiliferous, micritic, oolitic and sandy limestone. The coarse aggregate was mostly sub-angular with many angular particles. Fairly well graded with fair overall distribution.
2. Fine: Quartz and lithic sand with many carbonate and chert particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 2.5% total
2. Paste proportions: 17% to 19%
3. Depth of carbonation: Negligible from the present top surface and ranged from approximately 2 mm (1/16") up to 5 mm (3/16") depth from the bottom surface
4. Paste/aggregate bond: Good
5. Paste color: Tannish gray becoming medium tan within the carbonated area
6. Paste hardness: Moderately hard
7. Microcracking: A sub-vertical drying shrinkage microcrack was observed proceeding from the present top surface up to approximately 8 mm (5/16") depth. A few sub-horizontal microcracks were observed within the present top approximately 2 mm (1/16") of the sample. A few microcracks were observed scattered throughout the sample at various depths and orientations.
8. Secondary deposits: White ettringite was observed partially lining to filling many air voids scattered throughout the sample. White alkali silica gel was observed lining a few air voids proximate to a reactive coarse aggregate particles scattered throughout the sample.
9. Slump: Estimated, medium (3 to 5")
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.43 to 0.48 with approximately 3-5% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-low to moderate

IV. Conclusions

The general overall quality of the concrete was poor.

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: P69

Date: 2-23-2011 / 3-3-2011  
Performed by: S. Malecha / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 349 mm (13-3/4") x 94 mm (3-11/16") x 44 mm (1-3/4") thick polished section that was cut from the original 96 mm (3-3/4") diameter x 349 mm (13-3/4") long core.
2. Surface Conditions:  
Top: Rough, mortar eroded surface  
Bottom: Rough, irregular formed surface; placed on grade
3. Reinforcement: None observed
4. General Physical Conditions: The entire top surface has undergone mortar erosion, exposing many coarse and fine aggregate particles. Remnants of white marker paint were observed on the present top surface. The sample was fractured, oriented sub-parallel to the top surface, between approximately 152 mm (6") and 165 mm (6-1/2") depths from the present top surface. Few microcracks were present. Carbonation proceeds up to 7 mm (1/4") depth. The concrete appears to contain a small amount of air entrainment. Ettringite was observed. Minor evidence of active alkali silica reaction observed. Fair to poor overall condition.

II. Aggregate

1. Coarse: 25 mm (1") maximum sized crushed carbonate consisting of fossiliferous, micritic, and oolitic limestone. The coarse aggregate was mostly angular with many sub-angular particles. Fairly well graded with good overall uniform distribution.
2. Fine: Quartz and lithic sand with many chert and carbonate particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded and few rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 1.3% total
2. Paste proportions: 22% to 24%
3. Depth of carbonation: Ranged from negligible up to approximately 7 mm (1/4") depth from the present top surface. Ranged from negligible up to approximately 3 mm (1/8") depth from the bottom surface. Carbonation occurred intermittently along the perimeter of few coarse aggregate particles scattered throughout the sample.
4. Paste/aggregate bond: Good
5. Paste color: Gray becoming medium tan in the carbonated zones
6. Paste hardness: Moderately hard
7. Microcracking: Few sub-vertical microcracks proceed up to approximately 20 mm (13/16") depth from the present top surface. Few microcracks were observed proximate and sub-parallel to the fracture.
8. Secondary deposits: White to clear ettringite was observed lining to filling most entrained air voids throughout the sample. White alkali silica gel was observed lining a void space proximate to coarse aggregate particles at approximately 46 mm (1-13/16") depth and white alkali silica gel appears to be filling an entrained air void at approximately 289 mm (11-3/8") depth from the top surface.
9. Slump: Estimated, medium (3 to 5")
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.43 to 0.48 with approximately 3-5% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-low to moderate

IV. Conclusions

The general overall quality of the concrete was poor.

00 LAB 001 Petrographic Examination of Hardened Concrete  
ASTM: C-856

Job No. 10-06903  
Sample Identification: P77

Date: 2-24-2011 / 3-3-2011  
Performed by: S. Malecha / D. Hunt

I. General Observations

1. Sample Dimensions: Our analysis was performed on a 276 mm (10-7/8") x 96 mm (3-3/4") x 44 mm (1-3/4") thick polished section that was cut from the original 96 mm (3-3/4") diameter x 286 mm (11-1/4") long core.
2. Surface Conditions:  
Top: Rough, irregular, fractured surface  
Bottom: Rough, irregular, formed surface; placed on grade
3. Reinforcement: None observed
4. General Physical Conditions: Few microcracks were present. Carbonation proceeds up to 14 mm (9/16") depth from the fractured surface. The concrete contains air entrainment with a fairly well distributed air void system, but compromised by ettringite. Minor evidence of active alkali silica reaction observed. Poor overall condition.

II. Aggregate

1. Coarse: 25mm (1") maximum sized crushed carbonate consisting of fossiliferous, micritic, and oolitic limestone. The coarse aggregate was mostly angular with many sub-angular particles. Fairly well graded with good overall uniform distribution.
2. Fine: Quartz and lithic sand with many carbonate and chert particles that was fairly well graded. The grains were mostly sub-angular with many sub-rounded particles. Good overall uniform distribution.

III. Paste

1. Air Content: 3.4% total
2. Paste proportions: 26% to 28%
3. Depth of carbonation: Ranged from negligible up to approximately 14 mm (9/16") depth from the fractured surface. Ranged from approximately 3 mm (1/8") up to 5 mm (3/16") depth from the bottom surface. Ranged from negligible up to approximately 9 mm (3/8") depth from the cored sides of the sample.
4. Paste/aggregate bond: Good
5. Paste color: Light gray becoming medium tan in the bottom approximately 1 mm (1/32") of the sample
6. Paste hardness: Moderately hard
7. Microcracking: Few microcracks were observed at various depths and orientations scattered throughout the sample. One sub-horizontal microcrack proceeds across the core's diameter approximately 102 mm (4") depth from the bottom surface. Microcracking proceeds through a few coarse aggregate particles.
8. Secondary deposits: White to clear ettringite was observed lining to filling numerous entrained air voids scattered throughout the sample. White alkali silica gel appears to be filling few entrained air voids proximate to a coarse aggregate particle approximately 171 mm (6-3/4") depth from the fractured surface.
9. Slump: Estimated, medium (3 to 5")
10. Pozzolan/Slag presence: None observed
11. Water/cement ratio: Estimated at between 0.43 to 0.48 with approximately 3-5% unhydrated or residual portland cement clinker particles.
12. Cement hydration: Alites-mostly fully; Belites-low to moderate

IV. Conclusions

The general overall quality of the concrete was poor.



## AIR VOID ANALYSIS

**PROJECT:**  
MEMPHIS TERMINAL APRON  
RECONSTRUCTION

**REPORTED TO:**  
THY INC.  
1760 MORIAH WOODS BLVD, STE 1  
MEMPHIS, TN 38117

**APS JOB NO:** 10-06903

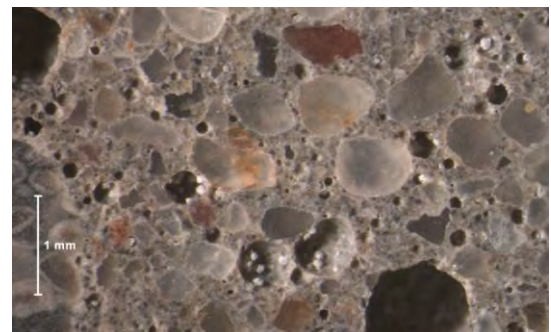
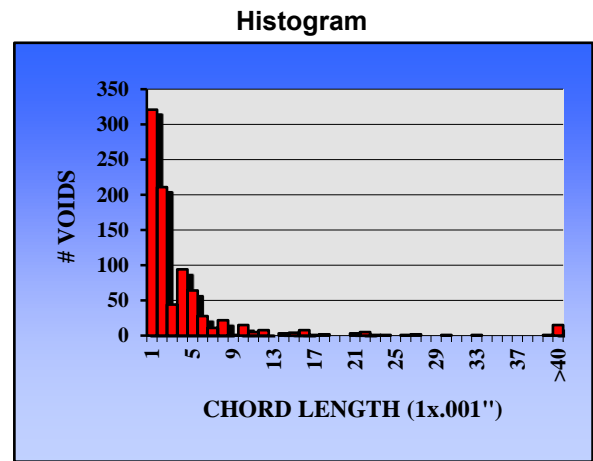
**ATTN:** TECK TANG  
**DATE:** FEBRUARY 22, 2011

**Sample ID:** B1  
**Conformance:** The sample contains an air void system which is consistent with current technology for freeze-thaw resistance.

**Sample Data:**  
Description: Hardened Concrete Core  
Dimensions: 197 mm (7-3/4") diameter x 369 mm (14-1/2") long

**Test Data:** ASTM: C457 Linear Traverse Method, APS SOP 00LAB003 and ACI 116R

|  |           |
|--|-----------|
| Air Void Content %                                 | 4.3       |
| Entrained %  | 3.0       |
| Entrapped %  | 1.3       |
| Air Voids/inch                                     | 8.73      |
| Specific Surface, in <sup>2</sup> /in <sup>3</sup> | 820       |
| Spacing Factor, inches                             | 0.006     |
| Paste Content, % estimated                         | 22        |
| Magnification                                      | 50x       |
| Traverse Length, inches                            | 100       |
| Test Date  | 2/22/2011 |



Magnification: 30x

Description: Overall hardened air content

*This document shall not be reproduced, except in full, without written approval of American Petrographic Services, Inc.*

550 Cleveland Avenue North • Saint Paul, MN 55114 • 651-659-9001 • Fax 651-647-2744 • [www.ampetrographic.com](http://www.ampetrographic.com)

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

# AIR VOID ANALYSIS

**PROJECT:**  
MEMPHIS TERMINAL APRON  
RECONSTRUCTION

**REPORTED TO:**  
THY INC.  
1760 MORIAH WOODS BLVD, STE 1  
MEMPHIS, TN 38117

**APS JOB NO:** 10-06903

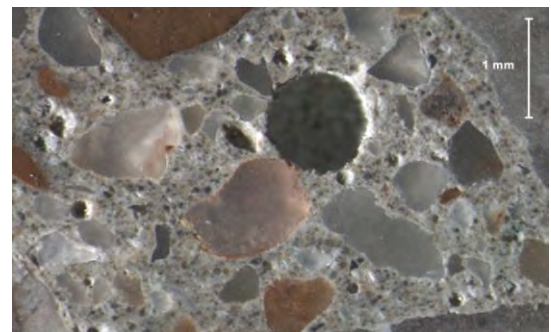
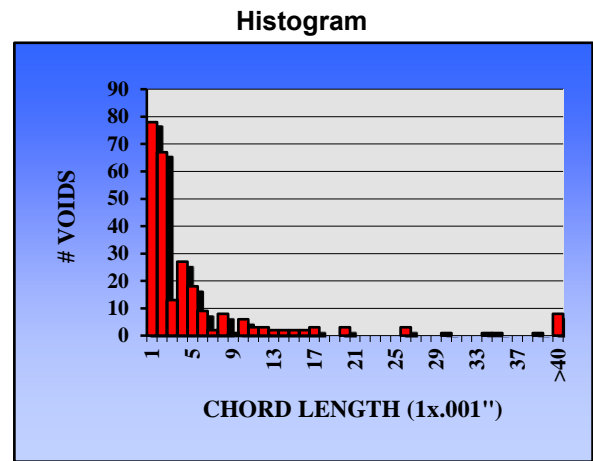
**ATTN:** TECK TANG  
**DATE:** FEBRUARY 17, 2011

**Sample ID:** B4  
**Conformance:** The sample contains an air void system which is not consistent with current technology for freeze-thaw resistance.

**Sample Data:**  
Description: Hardened Concrete Core  
Dimensions: 197 mm (7-3/4") diameter x 305 mm (12") long

**Test Data:** ASTM: C457 Linear Traverse Method, APS SOP 00LAB003 and ACI 116R

|  |           |
|--|-----------|
| Air Void Content %                                 | 1.8       |
| Entrained %  | 1.2       |
| Entrapped %  | 0.6       |
| Air Voids/inch                                     | 2.64      |
| Specific Surface, in <sup>2</sup> /in <sup>3</sup> | 620       |
| Spacing Factor, inches                             | 0.012     |
| Paste Content, % estimated                         | 26        |
| Magnification                                      | 50x       |
| Traverse Length, inches                            | 100       |
| Test Date  | 2/16/2011 |



Magnification: 30x

Description: Overall hardened air content

# AIR VOID ANALYSIS

**PROJECT:**  
MEMPHIS TERMINAL APRON  
RECONSTRUCTION

**REPORTED TO:**  
THY INC.  
1760 MORIAH WOODS BLVD, STE 1  
MEMPHIS, TN 38117

**APS JOB NO:** 10-06903

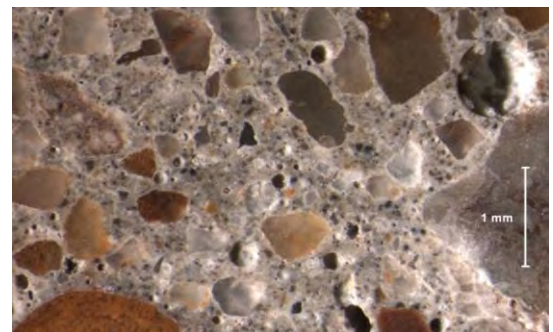
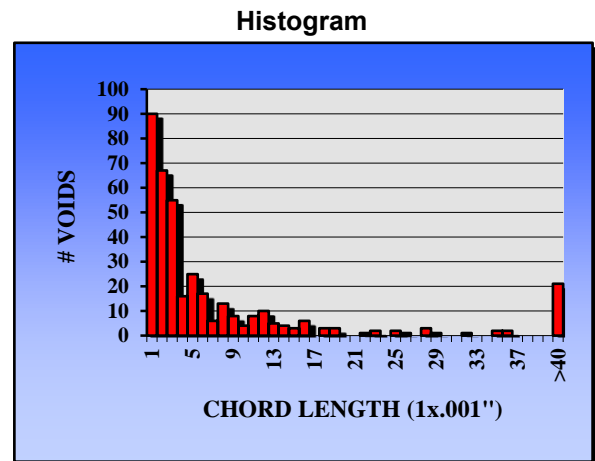
**ATTN:** TECK TANG  
**DATE:** FEBRUARY 17, 2011

**Sample ID:** B7  
**Conformance:** The sample contains an air void system which is not consistent with current technology for freeze-thaw resistance.

**Sample Data:**  
Description: Hardened Concrete Core  
Dimensions: 197 mm (7-3/4") diameter x 280 mm (11") long

**Test Data:** ASTM: C457 Linear Traverse Method, APS SOP 00LAB003 and ACI 116R

|  |           |
|--|-----------|
| Air Void Content %                                 | 4.0       |
| Entrained %  | 2.0       |
| Entrapped %  | 2.0       |
| Air Voids/inch                                     | 3.79      |
| Specific Surface, in <sup>2</sup> /in <sup>3</sup> | 380       |
| Spacing Factor, inches                             | 0.014     |
| Paste Content, % estimated                         | 26        |
| Magnification                                      | 50x       |
| Traverse Length, inches                            | 100       |
| Test Date  | 2/16/2011 |



Magnification: 30x

Description: Overall hardened air content



## AIR VOID ANALYSIS

**PROJECT:**  
MEMPHIS TERMINAL APRON  
RECONSTRUCTION

**REPORTED TO:**  
THY INC.  
1760 MORIAH WOODS BLVD, STE 1  
MEMPHIS, TN 38117

**APS JOB NO:** 10-06903

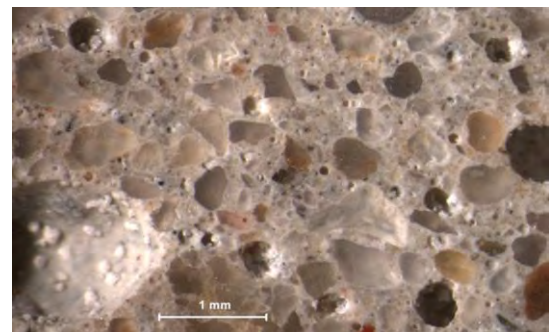
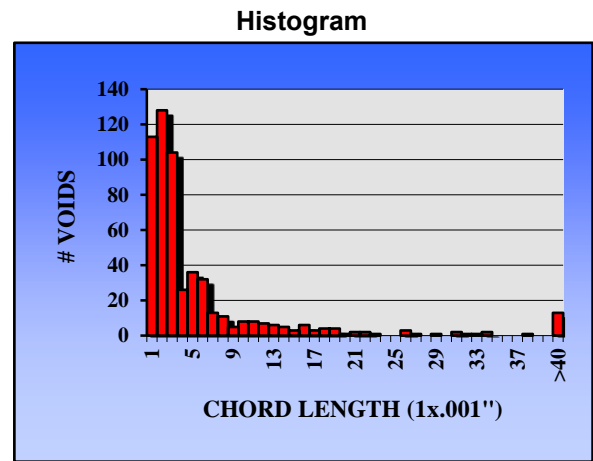
**ATTN:** TECK TANG  
**DATE:** FEBRUARY 17, 2011

**Sample ID:** B8  
**Conformance:** The sample contains an air void system which is not consistent with current technology for freeze-thaw resistance.

**Sample Data:**  
Description: Hardened Concrete Core  
Dimensions: 197 mm (7-3/4") diameter x 318 mm (12-1/2") long

**Test Data:** ASTM: C457 Linear Traverse Method, APS SOP 00LAB003 and ACI 116R

|  |           |
|--|-----------|
| Air Void Content %                                 | 4.3       |
| Entrained %  | 2.6       |
| Entrapped %  | 1.7       |
| Air Voids/inch                                     | 5.53      |
| Specific Surface, in <sup>2</sup> /in <sup>3</sup> | 510       |
| Spacing Factor, inches                             | 0.010     |
| Paste Content, % estimated                         | 25        |
| Magnification                                      | 50x       |
| Traverse Length, inches                            | 100       |
| Test Date  | 2/17/2011 |



Magnification: 30x

Description: Overall hardened air content

*This document shall not be reproduced, except in full, without written approval of American Petrographic Services, Inc.*

550 Cleveland Avenue North • Saint Paul, MN 55114 • 651-659-9001 • Fax 651-647-2744 • [www.ampetrographic.com](http://www.ampetrographic.com)

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

# AIR VOID ANALYSIS

**PROJECT:**  
MEMPHIS TERMINAL APRON  
RECONSTRUCTION

**REPORTED TO:**  
THY INC.  
1760 MORIAH WOODS BLVD, STE1  
MEMPHIS, TN 38117

**APS JOB NO:** 10-06903

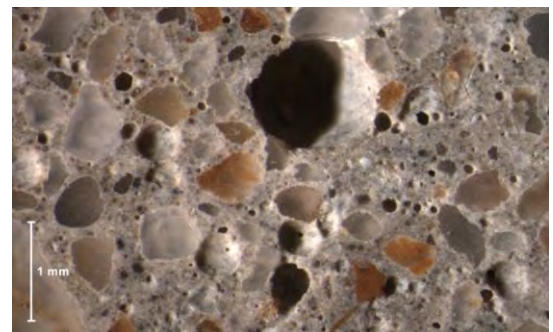
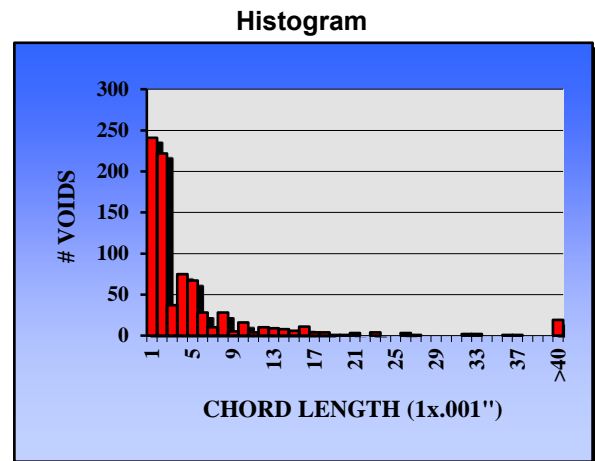
**ATTN:** TECK TANG  
**DATE:** FEBRUARY 17, 2011

**Sample ID:** B12  
**Conformance:** The sample contains an air void system which **is** consistent with current technology for freeze-thaw resistance.

**Sample Data:**  
Description: Hardened Concrete Core  
Dimensions: 223 mm (8-3/4") diameter x 299 mm (11-3/4") long

**Test Data:** ASTM: C457 Linear Traverse Method, APS SOP 00LAB003 and ACI 116R

|  |           |
|--|-----------|
| Air Void Content %                                 | 5.0       |
| Entrained %  | 3.4       |
| Entrapped %  | 1.6       |
| Air Voids/inch                                     | 8.23      |
| Specific Surface, in <sup>2</sup> /in <sup>3</sup> | 660       |
| Spacing Factor, inches                             | 0.007     |
| Paste Content, % estimated                         | 24        |
| Magnification                                      | 50x       |
| Traverse Length, inches                            | 100       |
| Test Date  | 2/17/2011 |



Magnification: 30x

Description: Overall hardened air content



## AIR VOID ANALYSIS

**PROJECT:**  
MEMPHIS TERMINAL APRON  
RECONSTRUCTION

**REPORTED TO:**  
THY INC.  
1760 MORIAH WOODS BLVD, STE 1  
MEMPHIS, TN 38117

**APS JOB NO:** 10-06903

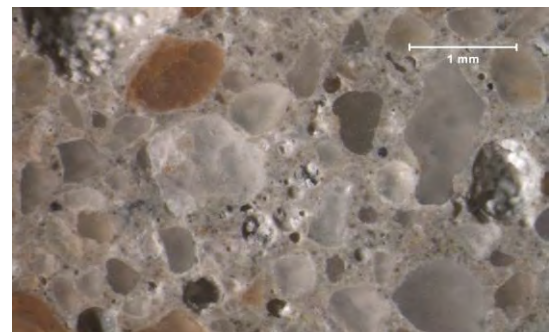
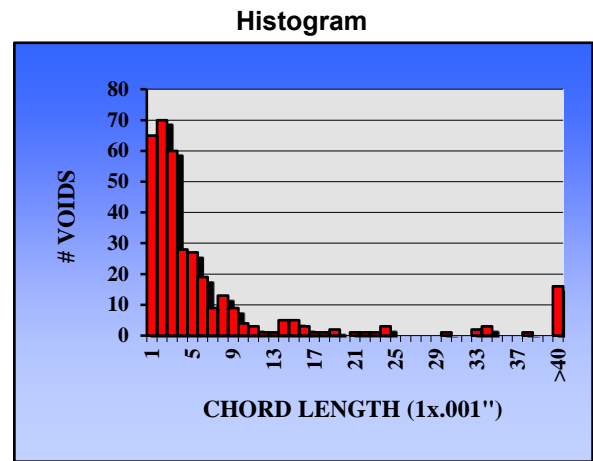
**ATTN:** TECK TANG  
**DATE:** FEBRUARY 23, 2011

**Sample ID:** B14  
**Conformance:** The sample contains an air void system which is not consistent with current technology for freeze-thaw resistance.

**Sample Data:**  
Description: Hardened Concrete Core  
Dimensions: 197 mm (7-3/4") diameter x 363 mm (14-1/4") long

**Test Data:** ASTM: C457 Linear Traverse Method, APS SOP 00LAB003 and ACI 116R

|  |           |
|--|-----------|
| Air Void Content %                                 | 3.5       |
| Entrained %  | 1.7       |
| Entrapped %  | 1.8       |
| Air Voids/inch                                     | 3.55      |
| Specific Surface, in <sup>2</sup> /in <sup>3</sup> | 400       |
| Spacing Factor, inches                             | 0.013     |
| Paste Content, % estimated                         | 25        |
| Magnification                                      | 50x       |
| Traverse Length, inches                            | 100       |
| Test Date  | 2/23/2011 |



Magnification: 30x

Description: Overall hardened air content

*This document shall not be reproduced, except in full, without written approval of American Petrographic Services, Inc.*

550 Cleveland Avenue North • Saint Paul, MN 55114 • 651-659-9001 • Fax 651-647-2744 • [www.ampetrographic.com](http://www.ampetrographic.com)

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

## AIR VOID ANALYSIS

**PROJECT:**  
MEMPHIS TERMINAL APRON  
RECONSTRUCTION

**REPORTED TO:**  
THY INC.  
1760 MORIAH WOODS BLVD, STE 1  
MEMPHIS, TN 38117

**APS JOB NO:** 10-06903

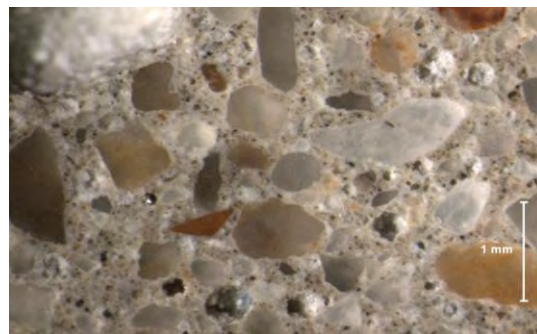
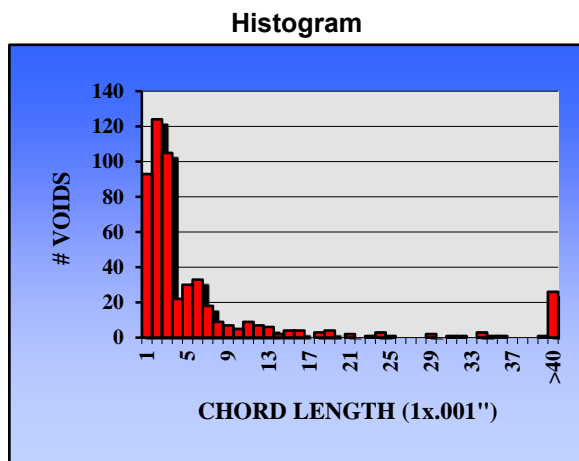
**ATTN:** TECK TANG  
**DATE:** FEBRUARY 17, 2011

**Sample ID:** P14  
**Conformance:** The sample contains an air void system which is not consistent with current technology for freeze-thaw resistance.

**Sample Data:**  
Description: Hardened Concrete Core  
Dimensions: 96 mm (3-3/4") diameter x 356 mm (14") long

**Test Data:** ASTM: C457 Linear Traverse Method, APS SOP 00LAB003 and ACI 116R

|  |           |
|--|-----------|
| Air Void Content %                                 | 4.6       |
| Entrained %  | 2.4       |
| Entrapped %  | 2.2       |
| Air Voids/inch                                     | 5.28      |
| Specific Surface, in <sup>2</sup> /in <sup>3</sup> | 460       |
| Spacing Factor, inches                             | 0.011     |
| Paste Content, % estimated                         | 26        |
| Magnification                                      | 50x       |
| Traverse Length, inches                            | 100       |
| Test Date  | 2/17/2011 |



Magnification: 30x

Description: Overall hardened air content



## AIR VOID ANALYSIS

**PROJECT:**  
MEMPHIS TERMINAL APRON  
RECONSTRUCTION

**REPORTED TO:**  
THY INC.  
1760 MORIAH WOODS BLVD, STE 1  
MEMPHIS, TN 38117

**APS JOB NO:** 10-06903

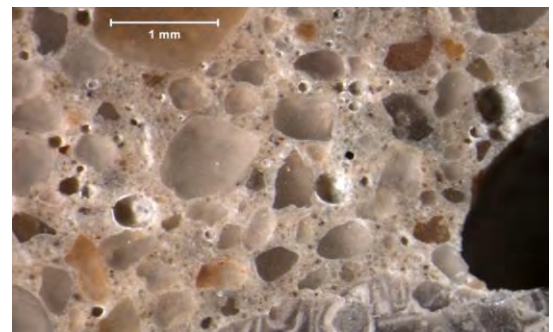
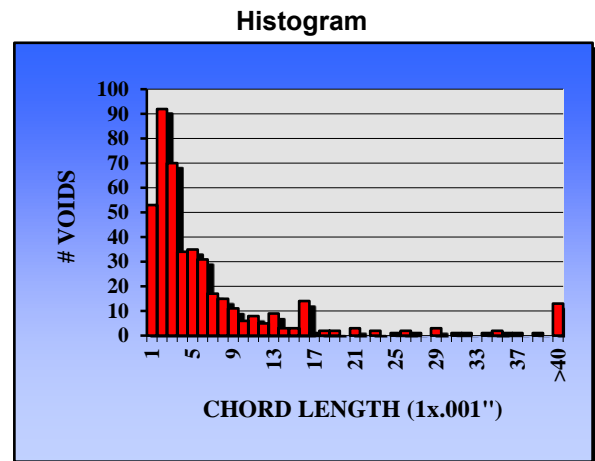
**ATTN:** TECK TANG  
**DATE:** FEBRUARY 28, 2011

**Sample ID:** P35  
**Conformance:** The sample contains an air void system which is not consistent with current technology for freeze-thaw resistance.

**Sample Data:**  
Description: Hardened Concrete Core  
Dimensions: 96 mm (3-3/4") diameter x 394 mm (15-1/2") long

**Test Data:** ASTM: C457 Linear Traverse  
Method, APS SOP 00LAB003 and  
ACI 116R

|  |           |
|--|-----------|
| Air Void Content %                                 | 3.8       |
| Entrained %  | 2.6       |
| Entrapped %  | 1.2       |
| Air Voids/inch                                     | 4.44      |
| Specific Surface, in <sup>2</sup> /in <sup>3</sup> | 470       |
| Spacing Factor, inches                             | 0.010     |
| Paste Content, % estimated                         | 21        |
| Magnification                                      | 50x       |
| Traverse Length, inches                            | 100       |
| Test Date  | 2/28/2011 |



Magnification: 30x

Description: Overall hardened air content

*This document shall not be reproduced, except in full, without written approval of American Petrographic Services, Inc.*

550 Cleveland Avenue North • Saint Paul, MN 55114 • 651-659-9001 • Fax 651-647-2744 • [www.ampetrographic.com](http://www.ampetrographic.com)

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

## AIR VOID ANALYSIS

**PROJECT:**  
MEMPHIS TERMINAL APRON  
RECONSTRUCTION

**REPORTED TO:**  
THY INC.  
1760 MORIAH WOODS BLVD, STE 1  
MEMPHIS, TN 38117

**APS JOB NO:** 10-06903

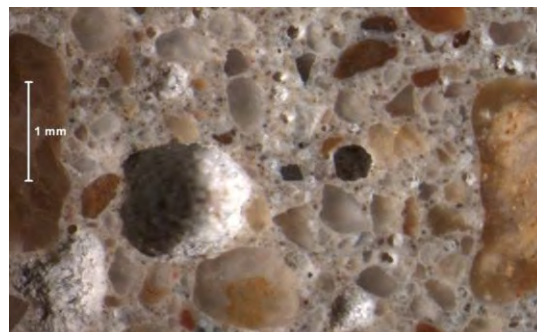
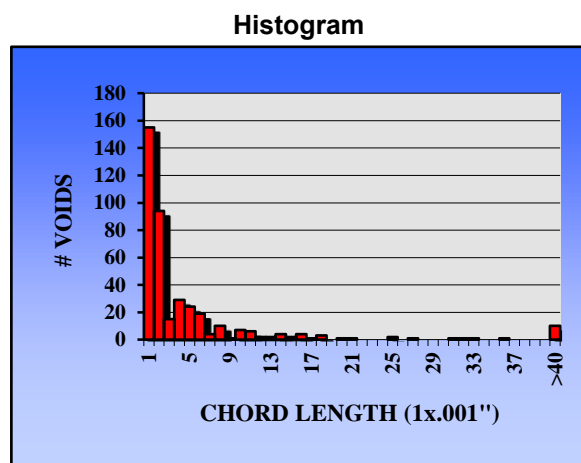
**ATTN:** TECK TANG  
**DATE:** FEBRUARY 24, 2011

**Sample ID:** P54  
**Conformance:** The sample contains an air void system which is not consistent with current technology for freeze-thaw resistance.

**Sample Data:**  
Description: Hardened Concrete Core  
Dimensions: 96 mm (3-3/4") diameter x 243 mm (9-9/16") long

**Test Data:** ASTM: C457 Linear Traverse Method, APS SOP 00LAB003 and ACI 116R

|  |           |
|--|-----------|
| Air Void Content %                                 | 2.5       |
| Entrained %  | 1.5       |
| Entrapped %  | 1.0       |
| Air Voids/inch                                     | 4.01      |
| Specific Surface, in <sup>2</sup> /in <sup>3</sup> | 650       |
| Spacing Factor, inches                             | 0.009     |
| Paste Content, % estimated                         | 19        |
| Magnification                                      | 50x       |
| Traverse Length, inches                            | 100       |
| Test Date  | 2/24/2011 |



Magnification: 30x

Description: Overall hardened air content

*This document shall not be reproduced, except in full, without written approval of American Petrographic Services, Inc.*

550 Cleveland Avenue North • Saint Paul, MN 55114 • 651-659-9001 • Fax 651-647-2744 • [www.ampetrographic.com](http://www.ampetrographic.com)

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

## AIR VOID ANALYSIS

**PROJECT:**  
MEMPHIS TERMINAL APRON  
RECONSTRUCTION

**REPORTED TO:**  
THY INC.  
1760 MORIAH WOODS BLVD, STE 1  
MEMPHIS, TN 38117

**APS JOB NO:** 10-06903

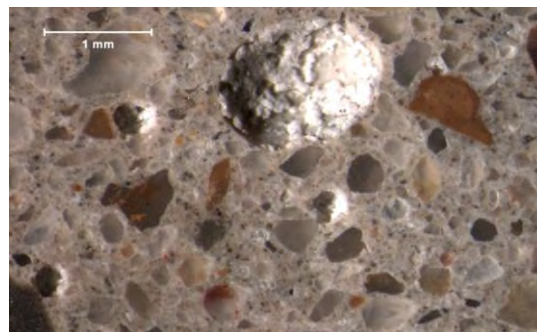
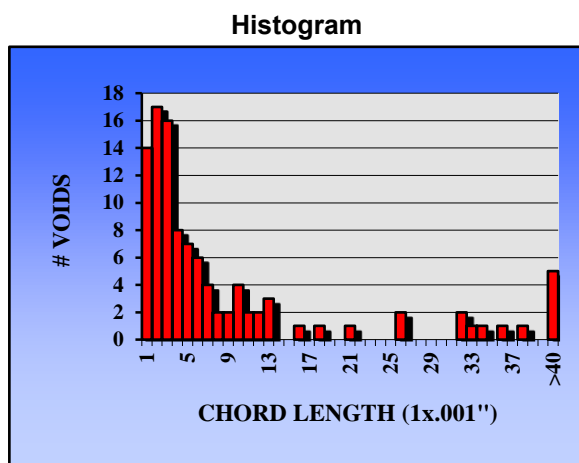
**ATTN:** TECK TANG  
**DATE:** FEBRUARY 23, 2011

**Sample ID:** P69  
**Conformance:** The sample contains an air void system which is not consistent with current technology for freeze-thaw resistance.

**Sample Data:**  
Description: Hardened Concrete Core  
Dimensions: 96 mm (3-3/4") diameter x 349 mm (13-3/4") long

**Test Data:** ASTM: C457 Linear Traverse  
Method, APS SOP 00LAB003 and  
ACI 116R

|  |           |
|--|-----------|
| Air Void Content %                                 | 1.3       |
| Entrained %  | 0.7       |
| Entrapped %  | 0.6       |
| Air Voids/inch                                     | 1.03      |
| Specific Surface, in <sup>2</sup> /in <sup>3</sup> | 330       |
| Spacing Factor, inches                             | 0.025     |
| Paste Content, % estimated                         | 24        |
| Magnification                                      | 50x       |
| Traverse Length, inches                            | 100       |
| Test Date  | 2/23/2011 |



Magnification: 30x

Description: Overall hardened air content

*This document shall not be reproduced, except in full, without written approval of American Petrographic Services, Inc.*

550 Cleveland Avenue North • Saint Paul, MN 55114 • 651-659-9001 • Fax 651-647-2744 • [www.ampetrographic.com](http://www.ampetrographic.com)

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER



## AIR VOID ANALYSIS

**PROJECT:**  
MEMPHIS TERMINAL APRON  
RECONSTRUCTION

**REPORTED TO:**  
THY INC.  
1760 MORIAH WOODS BLVD, STE 1  
MEMPHIS, TN 38117

**APS JOB NO:** 10-06903

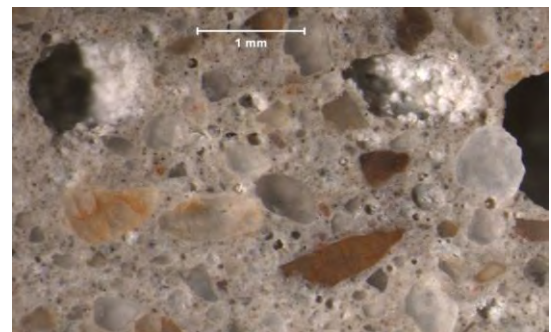
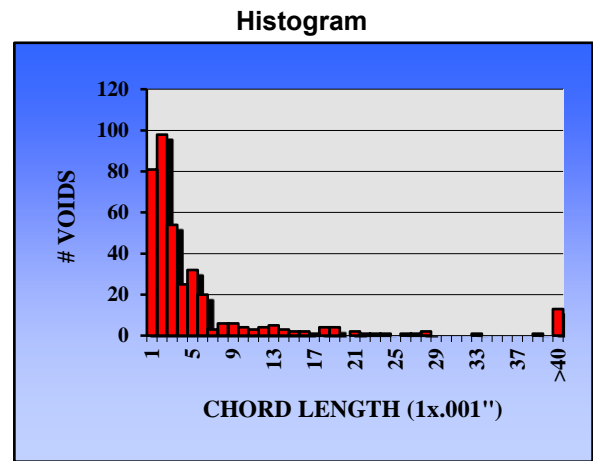
**ATTN:** TECK TANG  
**DATE:** FEBRUARY 24, 2011

**Sample ID:** P77  
**Conformance:** The sample contains an air void system which is not consistent with current technology for freeze-thaw resistance.

**Sample Data:**  
Description: Hardened Concrete Core  
Dimensions: 96 mm (3-3/4") diameter x 286 mm (11-1/4") long

**Test Data:** ASTM: C457 Linear Traverse Method, APS SOP 00LAB003 and ACI 116R

|  |           |
|--|-----------|
| Air Void Content %                                 | 3.4       |
| Entrained %  | 1.7       |
| Entrapped %  | 1.7       |
| Air Voids/inch                                     | 3.81      |
| Specific Surface, in <sup>2</sup> /in <sup>3</sup> | 440       |
| Spacing Factor, inches                             | 0.013     |
| Paste Content, % estimated                         | 26        |
| Magnification                                      | 50x       |
| Traverse Length, inches                            | 100       |
| Test Date  | 2/24/2011 |



Magnification: 30x  
Description: Overall hardened air content

*This document shall not be reproduced, except in full, without written approval of American Petrographic Services, Inc.*

550 Cleveland Avenue North • Saint Paul, MN 55114 • 651-659-9001 • Fax 651-647-2744 • [www.ampetrographic.com](http://www.ampetrographic.com)

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

APS #: 10-06903  
PROJECT: MEMPHIS TERMINAL APRON RECONSTRUCTION

DATE: MARCH 7, 2010



**DESCRIPTION:** Overall view of the samples as received.



**DESCRIPTION:** Overall view of the samples as received.

APS #: 10-06903  
PROJECT: MEMPHIS TERMINAL APRON RECONSTRUCTION

DATE: MARCH 7, 2010



DESCRIPTION: Overall view of the samples as received.



SAMPLE ID: B14 DESCRIPTION: Top surface of the sample as received. Note the mortar eroded surface.

**APS #:** 10-06903  
**PROJECT:** MEMPHIS TERMINAL APRON RECONSTRUCTION

**DATE:** MARCH 7, 2010



**SAMPLE ID:** B7      **DESCRIPTION:** Top surface of the sample as received. Note the mortar eroded surface.



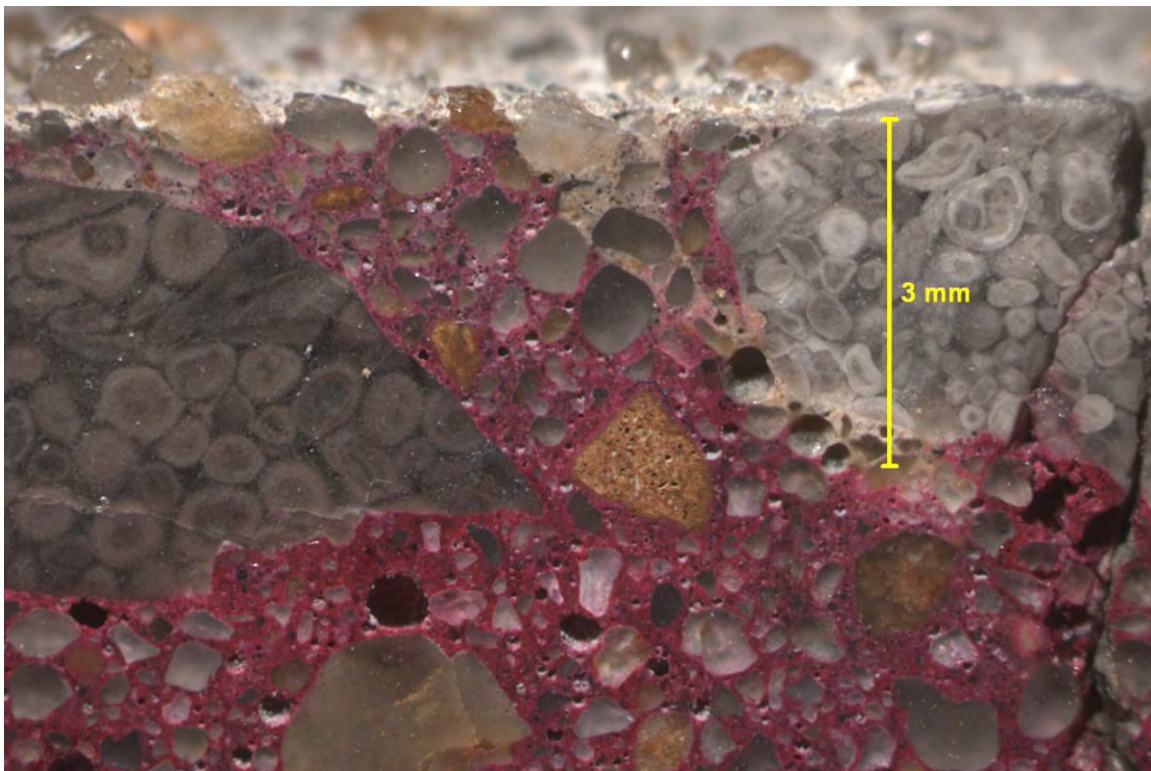
**SAMPLE ID:** P14      **DESCRIPTION:** Top surface of the sample as received. Note the mortar eroded surface.

APS #: 10-06903  
PROJECT: MEMPHIS TERMINAL APRON RECONSTRUCTION

DATE: MARCH 7, 2010



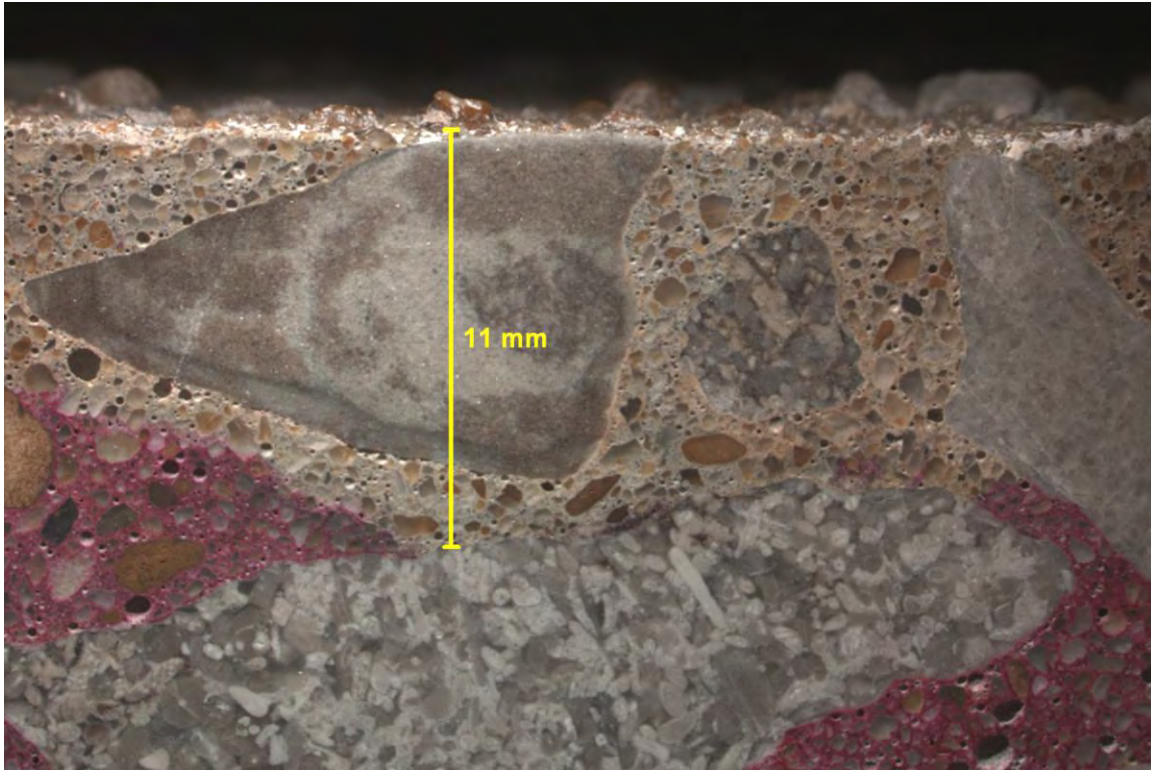
SAMPLE ID: P35 DESCRIPTION: Top surface of the sample as received. Note the mortar eroded surface.



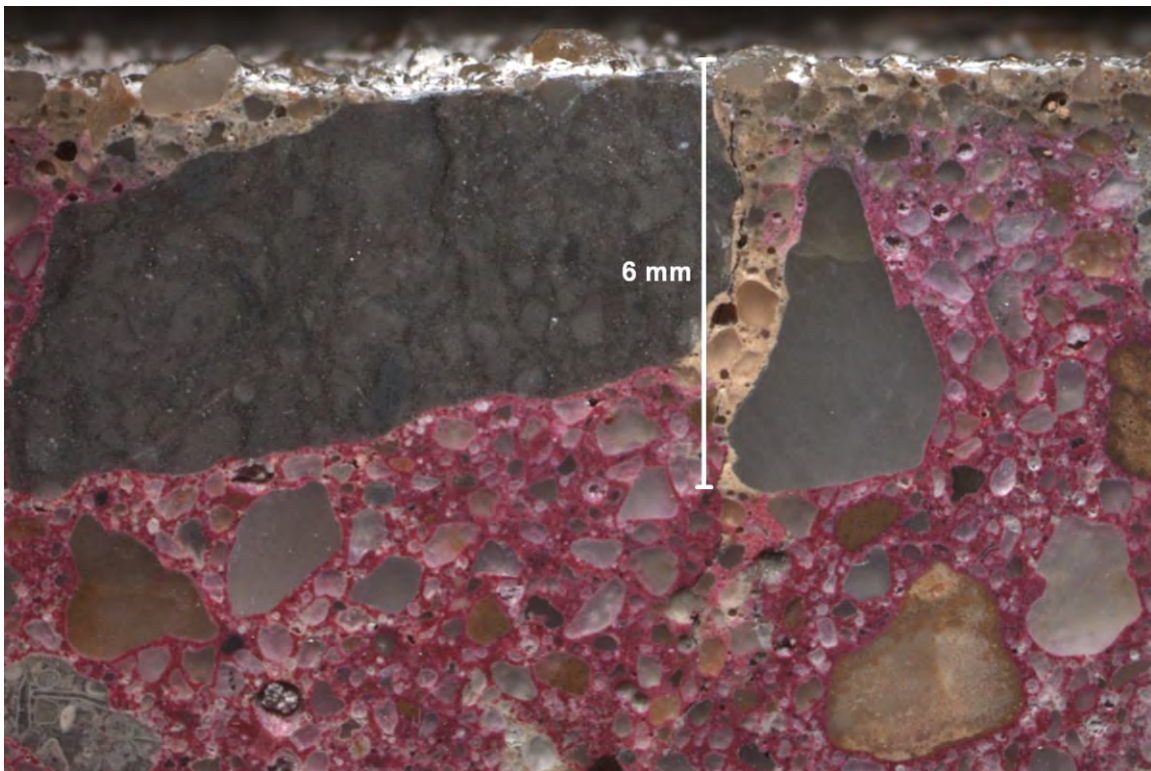
SAMPLE ID: B1 DESCRIPTION: Carbonation proceeds to approximately 3 mm (1/8") from the top surface  
MAG: 15x of the core.

APS #: 10-06903  
PROJECT: MEMPHIS TERMINAL APRON RECONSTRUCTION

DATE: MARCH 7, 2010



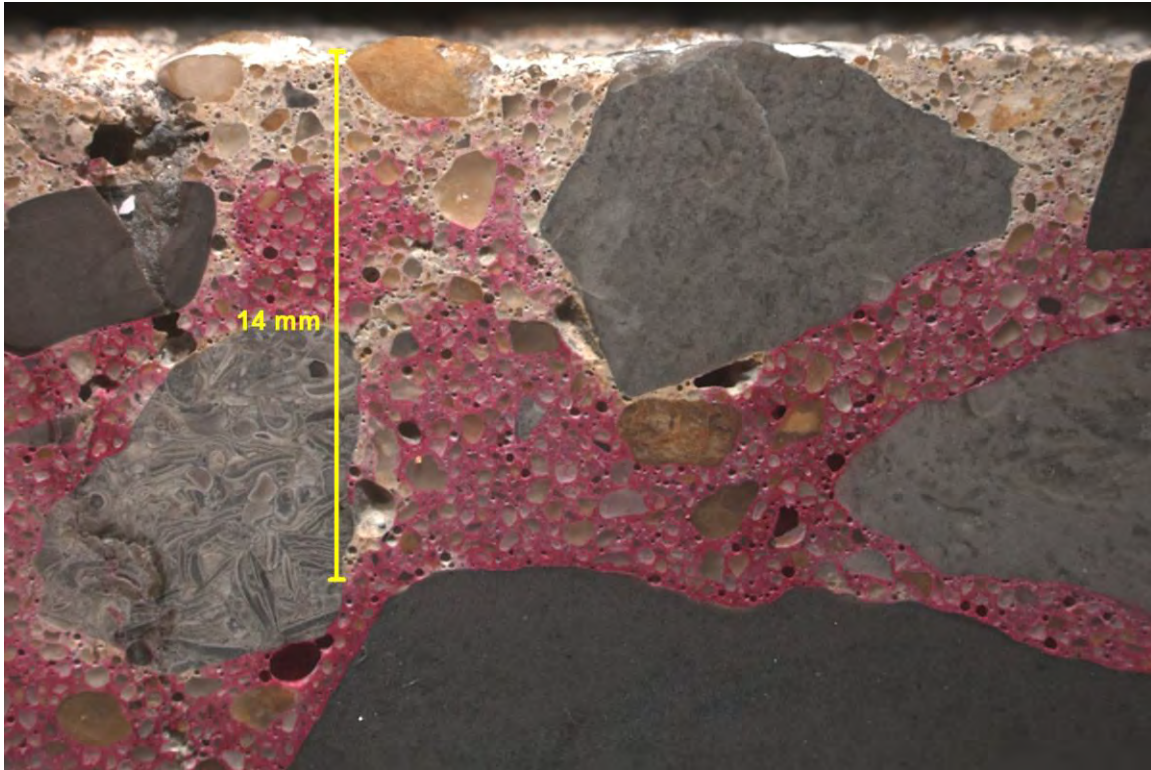
SAMPLE ID: B7 DESCRIPTION: Carbonation proceeds to approximately 11 mm (7/16") depth from the top  
MAG: 5x surface of the core.



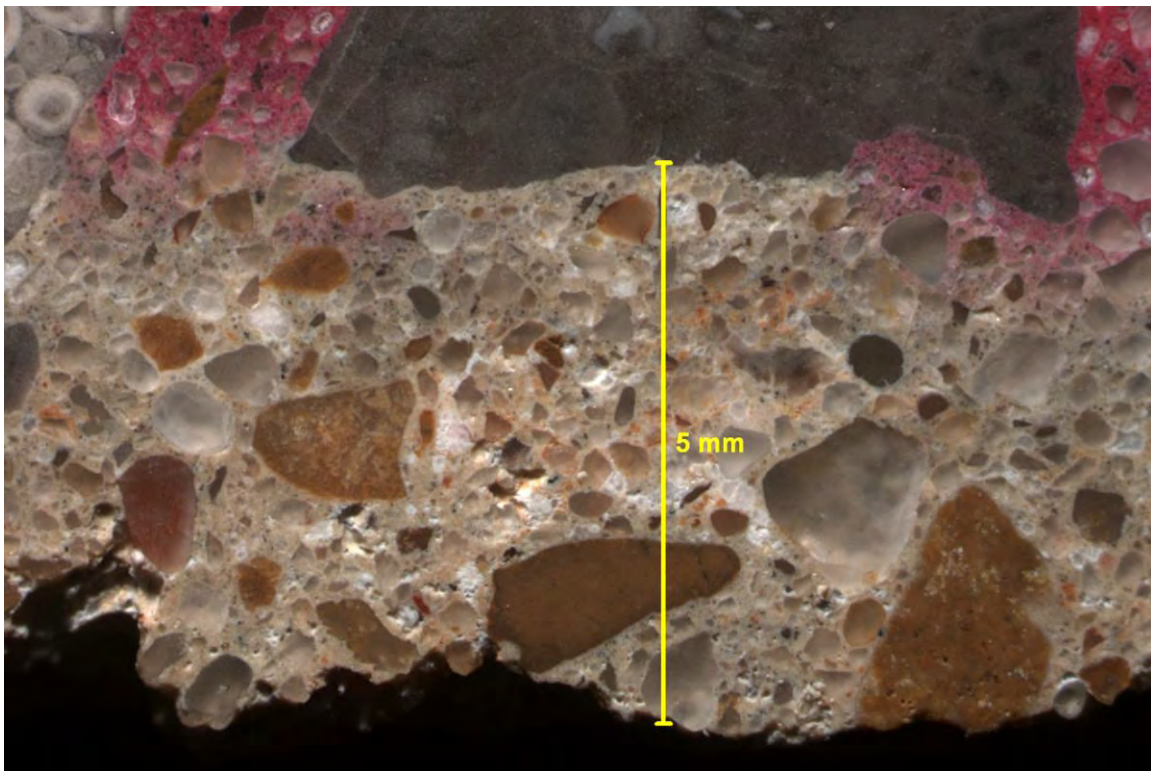
SAMPLE ID: P14 DESCRIPTION: Carbonation proceeds to approximately 6 mm (1/4") depth from the top  
MAG: 10x surface of the core.

APS #: 10-06903  
PROJECT: MEMPHIS TERMINAL APRON RECONSTRUCTION

DATE: MARCH 7, 2010



SAMPLE ID: P35  
MAG: 15x  
DESCRIPTION: Carbonation proceeds to approximately 6 mm (1/4") depth from the top surface of the core.



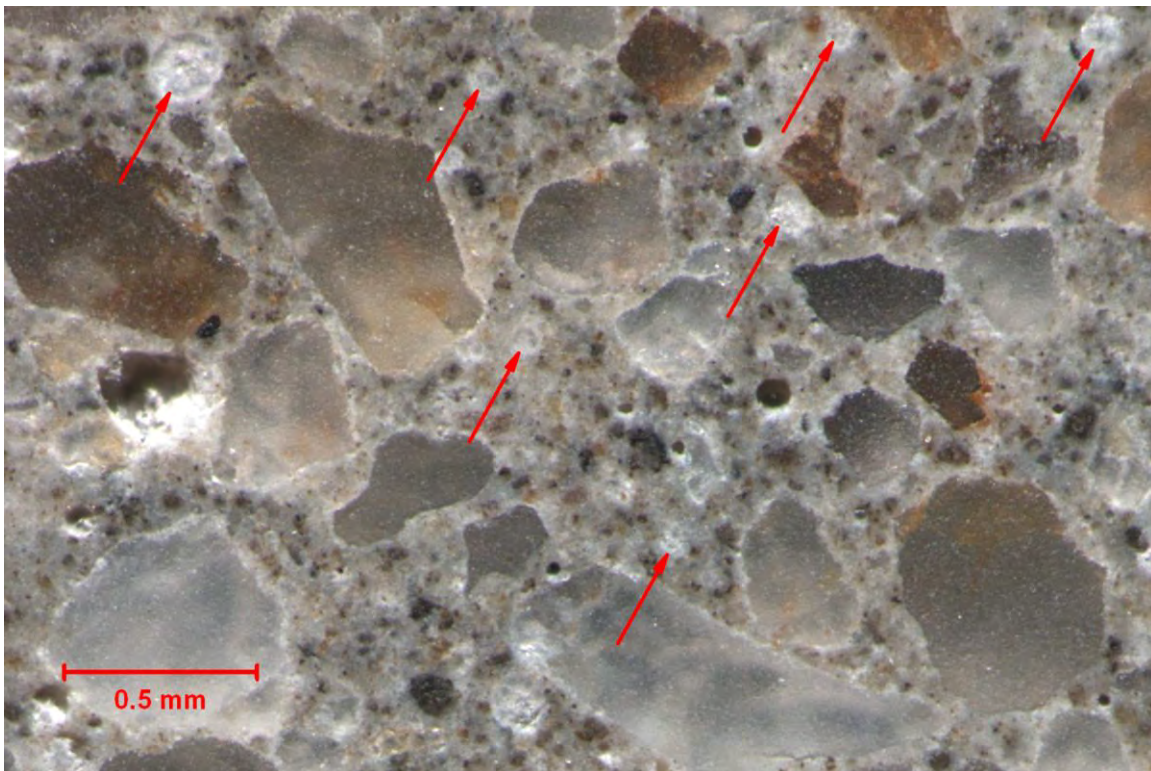
SAMPLE ID: P54  
MAG: 30x  
DESCRIPTION: Carbonation proceeds to approximately 5 mm (3/16") depth from the bottom surface of the core.

APS #: 10-06903  
PROJECT: MEMPHIS TERMINAL APRON RECONSTRUCTION

DATE: MARCH 7, 2010



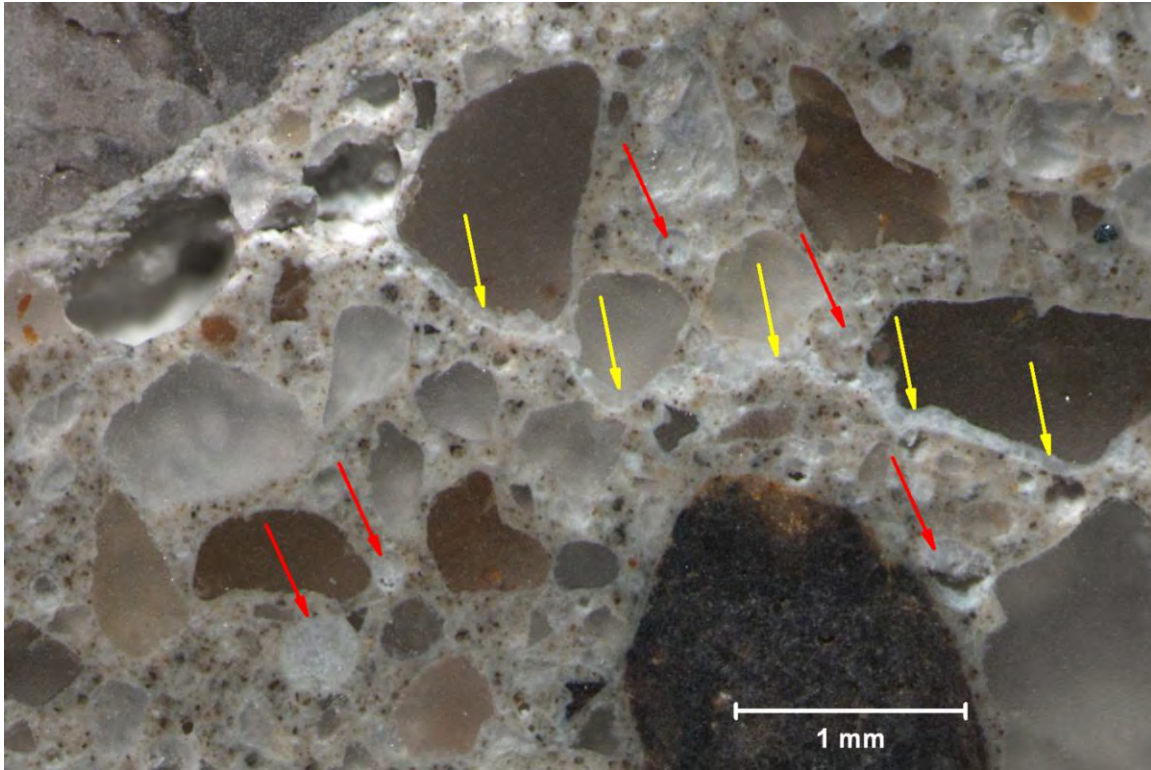
**SAMPLE ID:** P20      **DESCRIPTION:** Predominately sub-horizontal microcracks (mapped with red ink on the left side of the core) in a cut and polished cross section of the core.



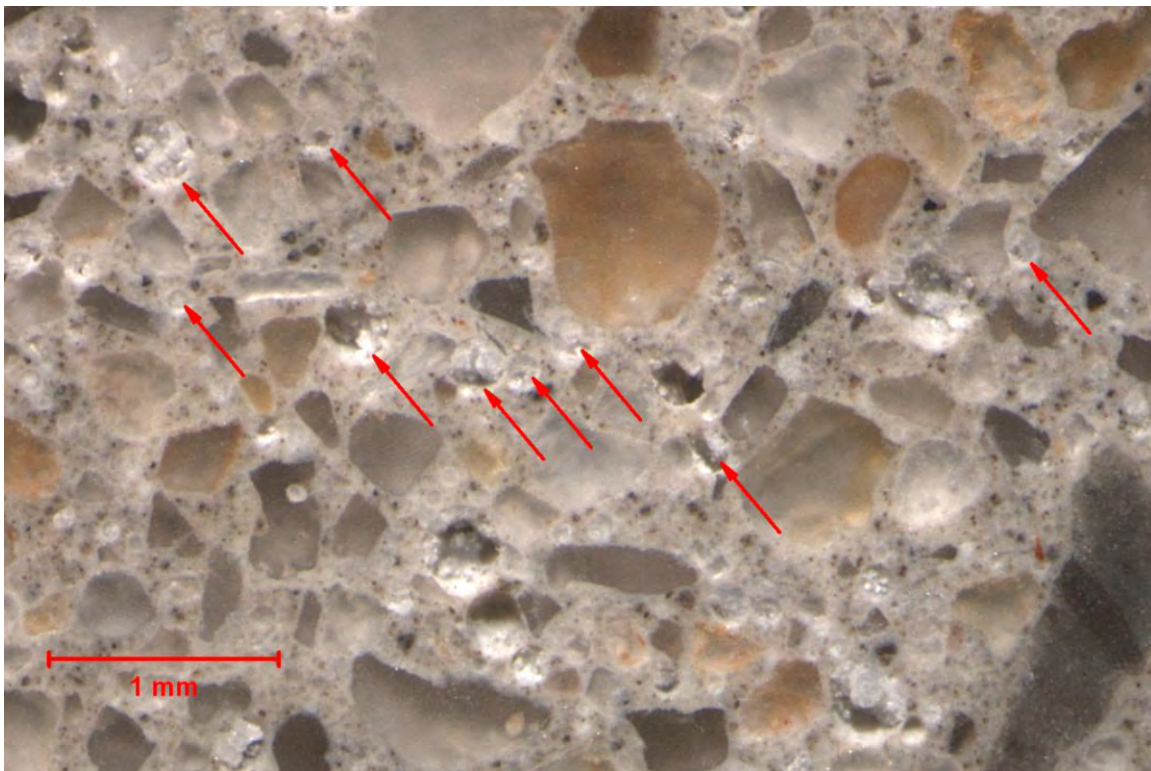
**SAMPLE ID:** B7      **DESCRIPTION:** Ettringite partially filling to filling many entrained sized air voids in a cut and polished cross section of the core.  
**MAG:** 50x

APS #: 10-06903  
PROJECT: MEMPHIS TERMINAL APRON RECONSTRUCTION

DATE: MARCH 7, 2010



**SAMPLE ID:** P14  
**MAG:** 30x  
**DESCRIPTION:** Ettringite filling entrained sized air voids (red arrows) and a microcrack (yellow arrows) in a cut and polished cross section of the core.



**SAMPLE ID:** P20  
**MAG:** 30x  
**DESCRIPTION:** Ettringite partially filling to filling entrained sized air voids in a cut and polished cross section of the core.

**APS #:** 10-06903  
**PROJECT:** MEMPHIS TERMINAL APRON RECONSTRUCTION

**DATE:** MARCH 7, 2010



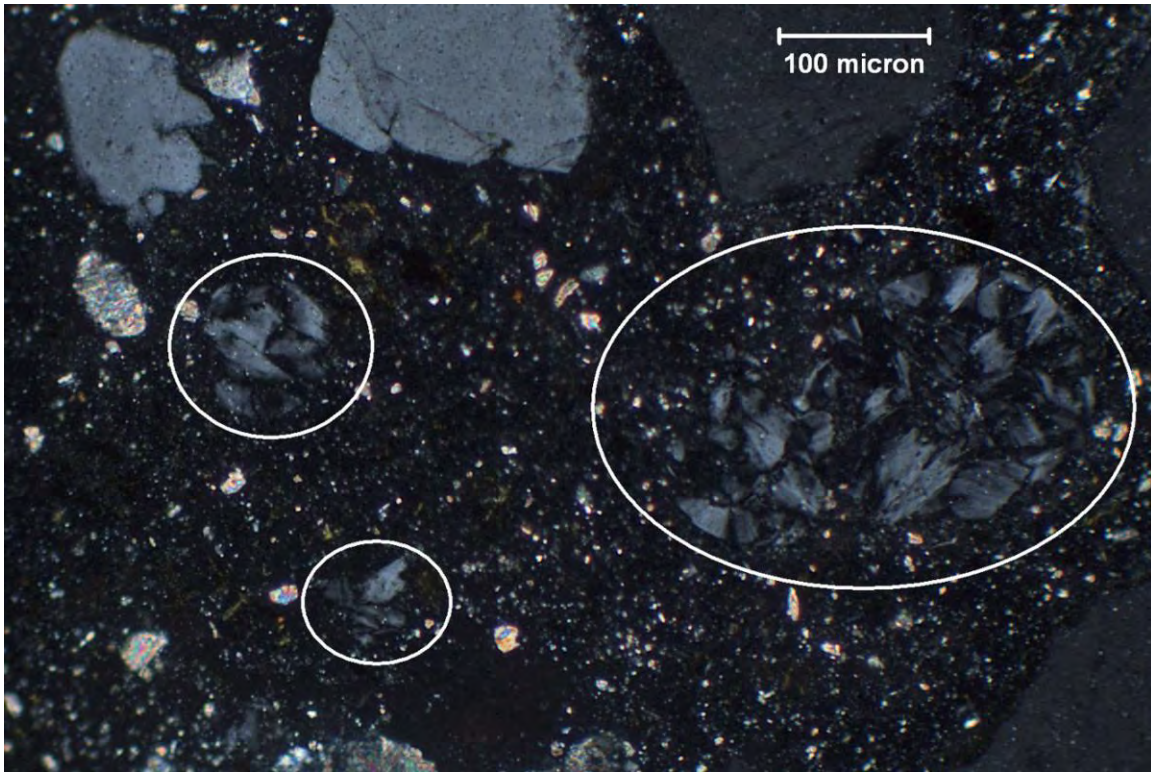
**SAMPLE ID:** B7  
**MAG:** 30x  
**DESCRIPTION:** ASR gel partially filling and filling voids proximate to a reactive chert particle (right side of photo) in a cut and polished cross section of the core.



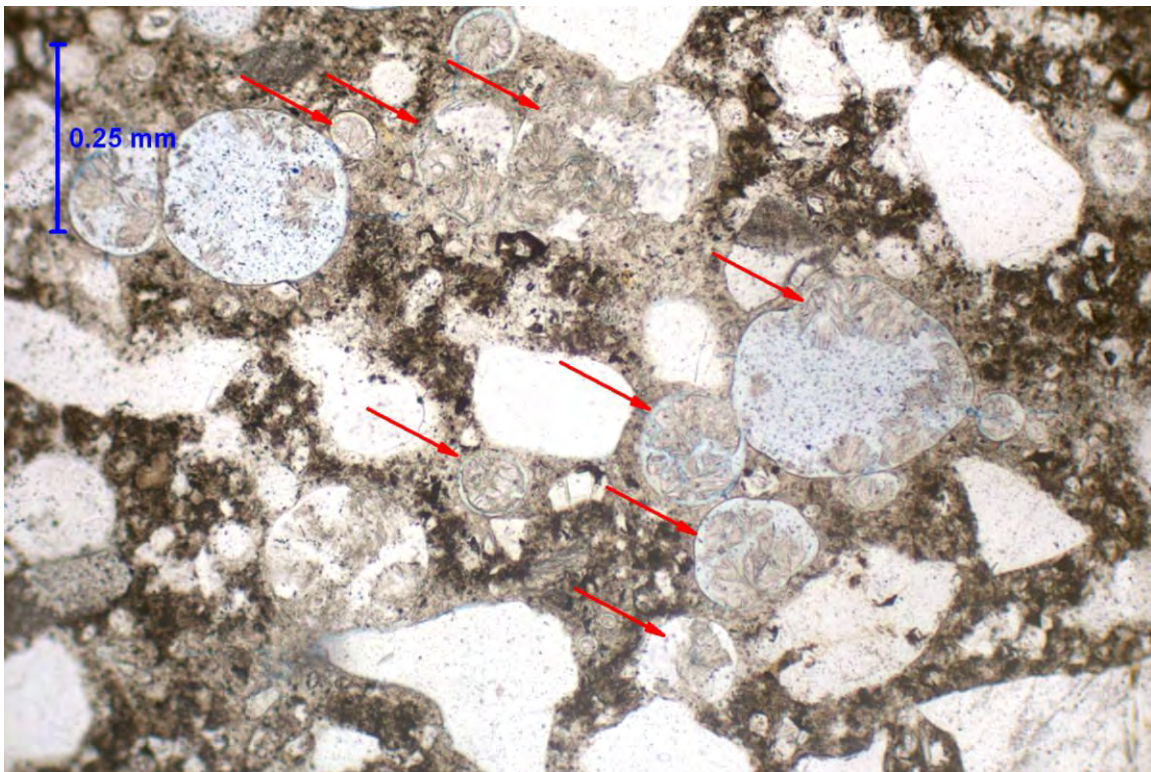
**SAMPLE ID:** P14  
**MAG:** 15x  
**DESCRIPTION:** ASR gel partially filling a void and microcrack proximate to a reactive chert particle (left side of photo) in a cut and polished cross section of the core.

APS #: 10-06903  
PROJECT: MEMPHIS TERMINAL APRON RECONSTRUCTION

DATE: MARCH 7, 2010



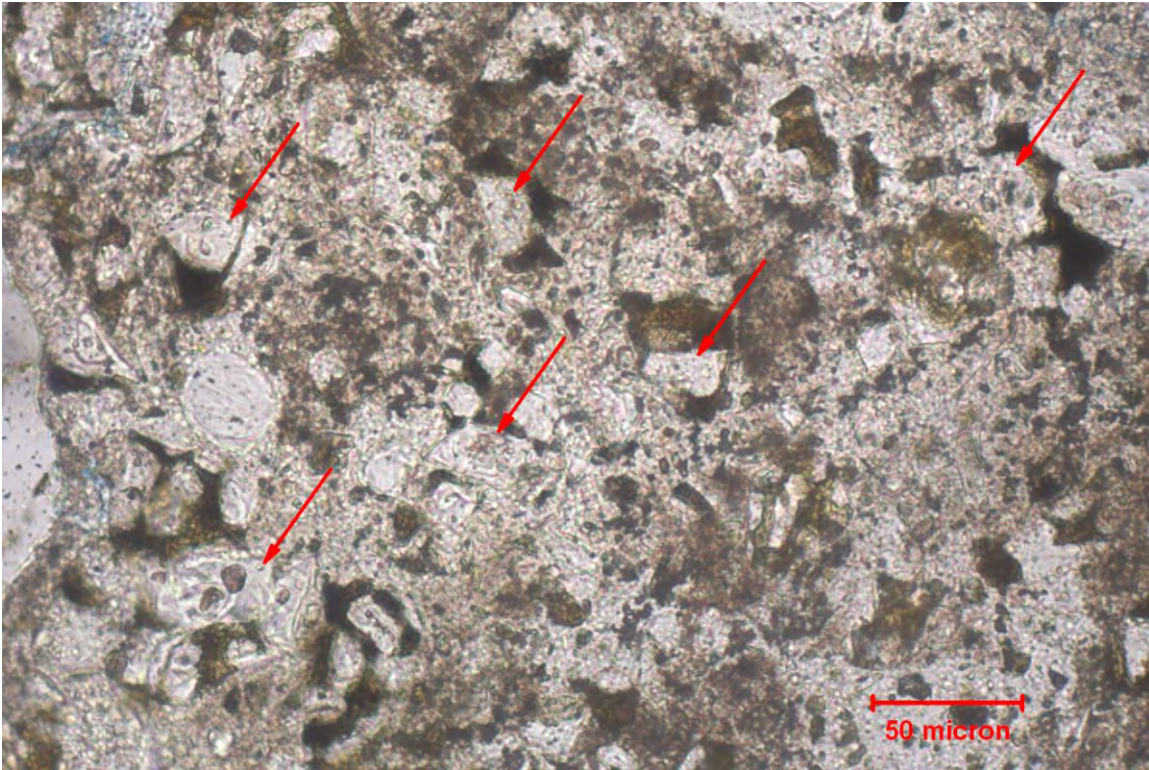
SAMPLE ID: B7  
MAG: 200x  
DESCRIPTION: Ettringite filling air voids in a thin section of the sample under cross polarized light.



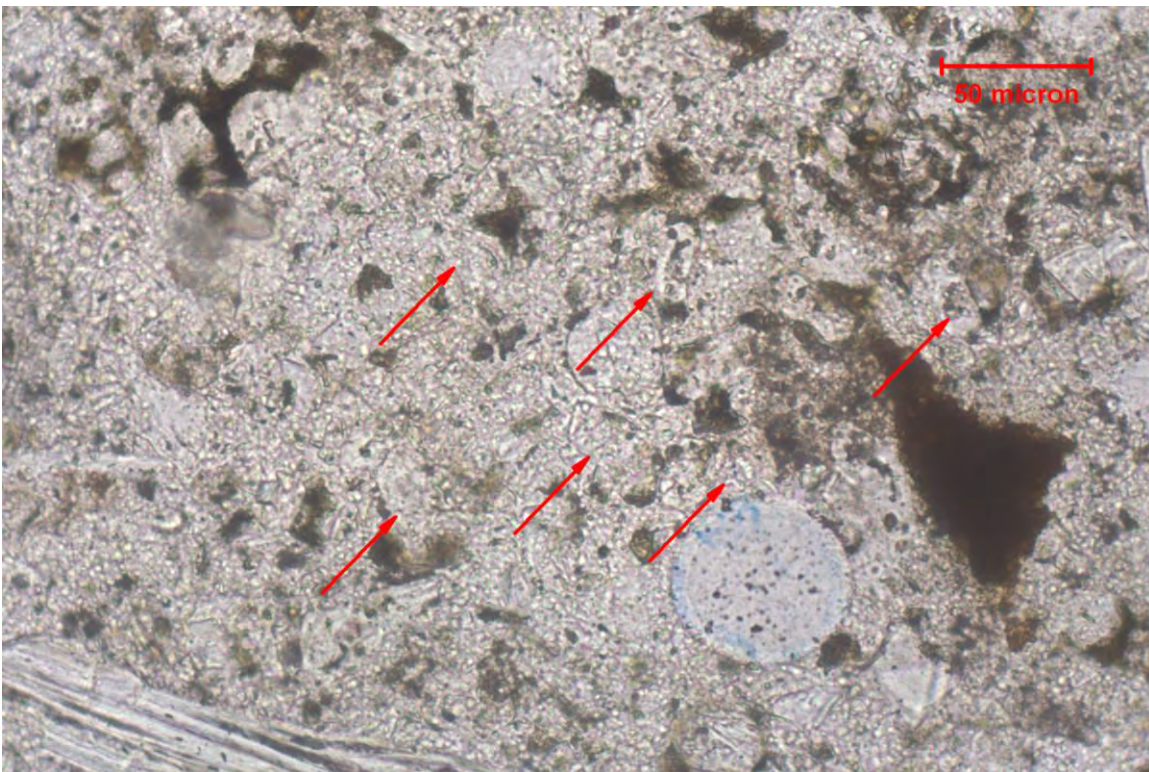
SAMPLE ID: P20  
MAG: 100x  
DESCRIPTION: Ettringite partially filling to filling air voids in a thin section of the sample under plane polarized light.

**APS #:** 10-06903  
**PROJECT:** MEMPHIS TERMINAL APRON RECONSTRUCTION

**DATE:** MARCH 7, 2010



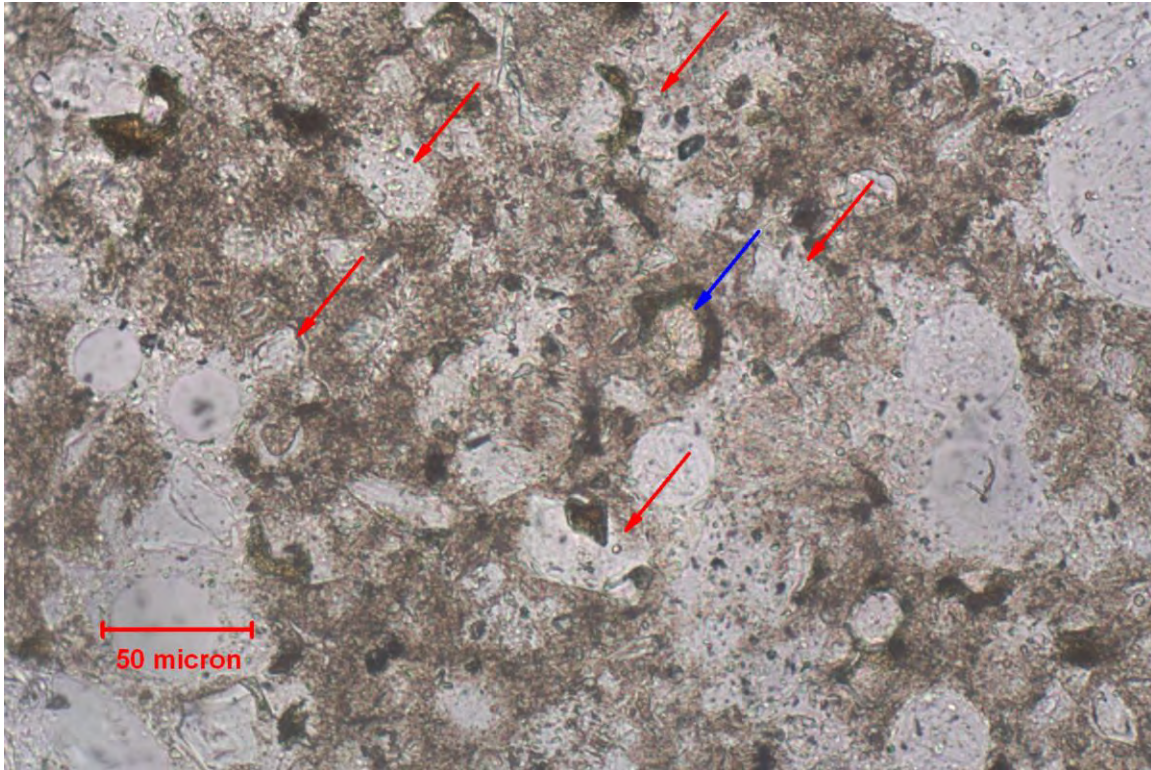
**SAMPLE ID:** B4  
**MAG:** 400x  
**DESCRIPTION:** Mostly fully hydrated alite portland cement clinker particles in a thin section of the hardened cement paste under plane polarized light.



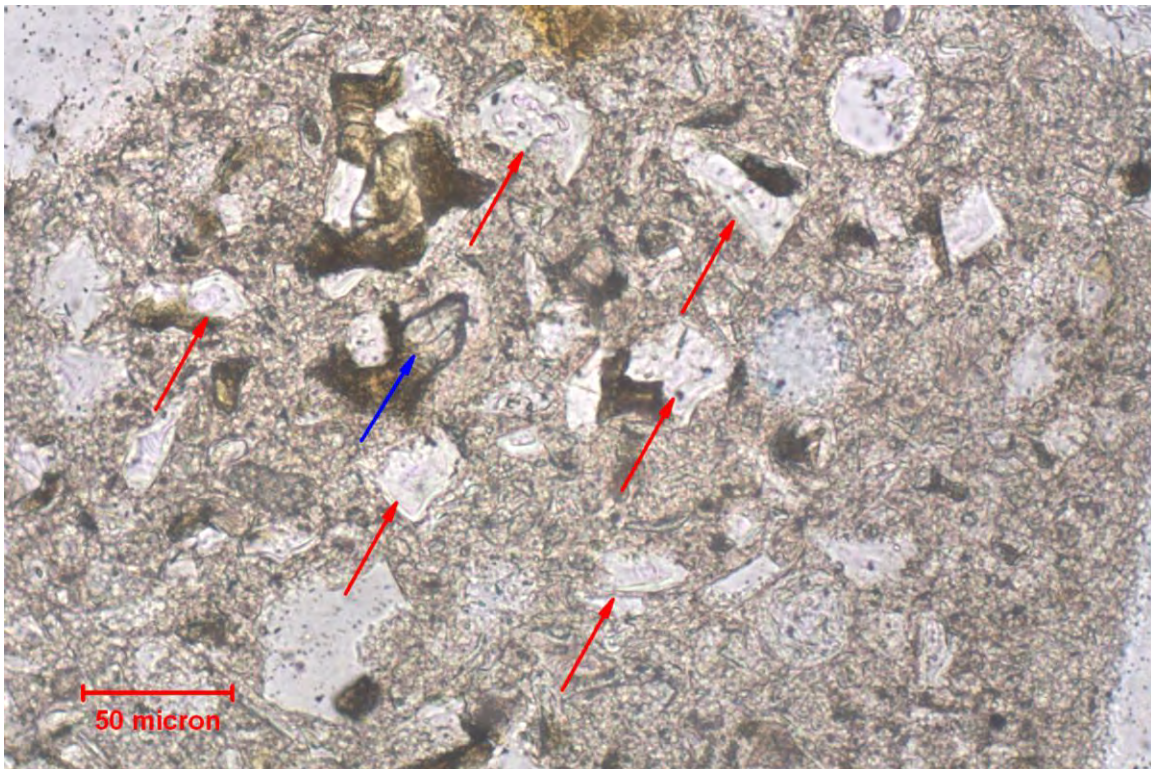
**SAMPLE ID:** B7  
**MAG:** 400x  
**DESCRIPTION:** Mostly fully hydrated alite portland cement clinker particles in a thin section of the hardened cement paste under plane polarized light.

APS #: 10-06903  
PROJECT: MEMPHIS TERMINAL APRON RECONSTRUCTION

DATE: MARCH 7, 2010



**SAMPLE ID:** P20  
**MAG:** 400x  
**DESCRIPTION:** Mostly fully hydrated alite portland cement clinker particles (red arrows) and a moderately hydrated belite particle in a thin section of the hardened cement paste under plane polarized light.



**SAMPLE ID:** P35  
**MAG:** 400x  
**DESCRIPTION:** Mostly fully hydrated alite portland cement clinker particles (red arrows) and a moderately hydrated belite particle in a thin section of the hardened cement paste under plane polarized light.

**DOCUMENT 4: LETTER ONE – ARUN WAGH INC.**



**ARUN WAGH, INC.**  
**GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS**

August 13, 2011

Mr. Gary Scruggs, P.E.  
Pickering Firm, Inc.  
6775 Lenox Center Ct., Suite 300  
Memphis, TN 38115

SUBJECT: Terminal Apron, MSCAA Project # 08-1259-00  
Memphis International Airport  
Memphis, Tennessee  
AWI Project No.: GEC-5339

Dear Mr. Scruggs:

I had prepared the geotechnical report for the referenced project as a consulting engineer for Tri-State Testing Services (TSTS). In that report I had given recommendations for the CBR and coefficient of subgrade reaction values. Recently you asked me during a telephone conversation to also give recommendations for bearing capacities for the design of foundations. You also said that recommendations are needed for all types of structural supports, such as isolated square (pad) footings, continuous (wall) footings, and mat/slab foundation. While no specific structure type or loading information is available, I have presented a discussion regarding the soil conditions (somewhat repetitive from the original report but, nonetheless, relevant to this report) and then some general recommendations for bearing capacities in the following paragraphs, which I would like to review once the structure and loading- related information is finalized. For a more detailed soil description I refer to the original report.

The soils investigated consisted of natural soils as well as fill soils. Table 1 below, reproduced from the original report, indicates the depth extent of fill in different borings and related notes. This table is strictly based on my inferences drawn from sample inspection. All soils, natural as well as fill, were found to be silty clays or clayey silts. With the exception of boring B-9, the soils were indicated (by the SPT blow counts and unconfined compression strength tests) to be of stiff to very stiff consistencies. Boring B-9 indicated very moist and weaker soils at critical depths. Two favorable factors about the fill are: 1) the fill is dormant for awhile and, therefore, has had a chance to settle under its own weight, and 2) all the borings in apparent fill consistently indicated stiff to very stiff consistencies. I still caution that even with these favorable results obtained from the investigation we should be mindful that in general investigation results in an uncontrolled fill mass cannot be considered as entirely fool proof.

**TABLE-1**

| <b>Boring Number</b> | <b>Inferred Depth of Fill Soils</b> | <b>Boring Number</b> | <b>Inferred Depth of Fill Soils</b> |
|----------------------|-------------------------------------|----------------------|-------------------------------------|
| 1                    | None                                | 9                    | None                                |
| 2                    | None                                | 10                   | 15'                                 |
| 3                    | 15'                                 | 11                   | 8'                                  |
| 4                    | None                                | 12                   | 8'                                  |
| 5                    | 5'                                  | 13                   | 5'                                  |
| 6                    | None                                | 14                   | 15'                                 |
| 7                    | 15'                                 | 15                   | None                                |
| 8                    | 5'                                  |                      |                                     |

**NOTES:**

1. All borings were terminated at a depth of 15'. Thus, when the inferred depth of fill is given as 15', it implies – to the depth extent of the boring.
2. The depths given in the above table are with reference to the existing surface. Thus, the pavement is included in the depths given.
3. Although no fill is mentioned in B-2, small amount of sand and gravel was noted at the top of the first sample at 3.5' – 5.0'.

I have given detailed recommendations in the original report regarding checking of the fill by proof rolling and digging test pits. I note here that test pits should be dug away from the footing/foundation areas so as to not disturb the subgrade in those areas. I have made special mention in the original report regarding boring B-9, which showed questionable soils. Depending on the field observations decisions should be taken regarding need of any undercut in this area. If any structure is to be built in this area, please contact me for additional comments.

Subject to observing above precautions, I have recommended below (next page) allowable bearing capacities for different type of foundations. I consider these bearing capacities as conservative vis-à-vis the soil investigation data in the original report. I also consider this conservatism to be justified given the uncertainties associated with any uncontrolled fill mass. Also, wherever presence of natural soils is inferred, it is strictly based on sample inspection and without a high degree of certainty.

Footings should be set below the frost depth. Typically, the footings/foundations are set at a minimum depth of 18" in this area. If the footings are relatively large (that is, if loads are relatively large, say greater than 150 kips for columns and 6 kips per foot for walls), please contact me for an evaluation with respect to the area and boring in that area. Mat foundation tends to bridge over small irregularities and heterogeneity of the soil mass beneath. Still a very conservative soil bearing pressure has been recommended below for two reasons – 1) to account for the fill-related uncertainty factor, which would be exaggerated for the larger mat foundation, and 2) the recommended bearing pressure generally has been found to suffice in most cases.

Following are the Recommended Allowable Bearing Capacities:

Pad Footings: 3,000 psf

Continuous Footings: 2,500 psf

Mat Foundation: 1,500 psf

If higher bearing pressures are needed for the design, I would be pleased to review the data with respect to the specific structure, loads, and the area it is to be built in.

For proof rolling, test pits, site preparation, fill placement, and inspection I refer to the original report. However, I emphasize here that footing/foundation subgrade should be inspected by a geotechnical engineer or an engineering technician working under the direction of the engineer.

If you have any questions regarding this report, please feel free to call this office at (901) 755-3230.

Very truly yours,

Arun Wagh, P.E.  
AWI

**DOCUMENT 5: LETTER TWO – ARUN WAGH INC.**



**ARUN WAGH, INC.**  
**GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS**

August 18, 2011

Mr. Gary Scruggs, P.E.  
Pickering Firm, Inc.  
6775 Lenox Center Ct., Suite 300  
Memphis, TN 38115

SUBJECT: Terminal Apron, MSCAA Project # 08-1259-00  
Memphis International Airport  
Memphis, Tennessee  
AWI Project No.: GEC-5339-A

Dear Mr. Scruggs:

I had submitted a letter report dated August 13, 2011, in which I had given bearing capacity values for various foundation types. Subsequently, Mr. Joe Smith, the structural engineer, requested through Mr. Ken Bilson to provide a value for angle of internal friction ( $\Phi$ ) for the soil that can be used to calculate that lateral pressures on the vault walls. I present my discussion and recommendations in the following paragraphs.

I assume that this request is related to the soils investigated in TSTS's report of recommendations (prepared by me) for the referenced project. In that investigation all the soils investigated were predominantly cohesive materials, classified as silty clays (CL) or clayey silts (ML). Such soils are generally not considered as desirable for use behind retaining walls. Granular materials are generally considered as suitable behind retaining walls. For predominantly cohesive materials,  $\Phi$  angle would be obtained from drained shear strength or S-test, and used as a long-term soil parameter. Strictly based on the soil type, and based on correlation with plasticity index, I conservatively recommend a value of  $26^0$ .

I recommend use of predominantly granular material to be used behind retaining walls. If the material inherent to the site is predominantly cohesive, typically a  $45^0$  wedge behind the wall is filled with compacted granular material.

We recommend that if backfill is placed behind the wall/s, it should be compacted to at least 95% of the dry density obtained from the standard moisture-density (standard Proctor) density test, ASTM D-698. Soil within about 5 feet of the wall should be compacted with hand compactors to avoid excessive stresses on the wall/s. For compacted clean sand I conservatively recommend

a value of  $35^0$  for the  $\Phi$  angle.

Crushed concrete may be considered for backfill since it acts as predominantly granular material, and generally proves to be cost-effective. For this type of material I conservatively recommend a value of  $32^0$  for the  $\Phi$  angle. A separation type of geofabric should be used at the interface of the predominantly cohesive soils and crushed concrete backfill.

Provision of good drainage behind the walls is critical.

Backfill placement, inspection of retaining wall footings, and other related work should be completed under the oversight of a geotechnical engineer or an engineering technician working under the direction of the engineer.

If you have any questions regarding this report, please feel free to call this office at (901) 755-3230.

Very truly yours,

Arun Wagh, P.E.  
AWI

**DOCUMENT 6: LETTER THREE – ARUN WAGH INC.**



**ARUN WAGH, INC.**  
**GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS**

August 19, 2011

Mr. Gary Scruggs, P.E.  
Pickering Firm, Inc.  
6775 Lenox Center Ct., Suite 300  
Memphis, TN 38115

SUBJECT: Terminal Apron, MSCAA Project # 08-1259-00  
Memphis International Airport  
Memphis, Tennessee  
AWI Project No.: GEC-5339-B

Dear Mr. Scruggs:

I add to my August 19, 2011 letter that if clean sand (in general granular soils with less than four percent by weight passing the No. 200 sieve, or less than eight percent for a uniform gradation) were to be used as backfill behind the retaining walls, then relative density criterion would be more appropriate for compaction. I recommend that the sand backfill should be compacted to at least 70% relative density as defined by ASTM Designations D-4253 and D-4254 instead of 95% of standard Proctor density.

If you have any questions regarding this report, please feel free to call this office at (901) 755-3230.

Very truly yours,

Arun Wagh, P.E.  
AWI

**DOCUMENT 7: LETTER FOUR – B & W  
ENGINEERING LABORATORIES INC.**

# B & W Engineering Laboratories, Inc.

P.O. Box 341091

Memphis, Tennessee 38184-1091

(901) 373-7957

12 September 2011

Job No. 7835

Serial No. D-1489

Mr. Tyler Johnson  
Pickering Firm, Inc.  
6775 Lenox Center Court  
Suite 300  
Memphis, TN 38115  
(901) 726-0810  
[tjohnson@pickeringfirm.com](mailto:tjohnson@pickeringfirm.com)

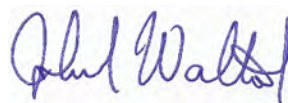
Ref: Concrete Core Strength Tests  
Memphis International Airport  
Memphis, Tennessee

Dear Tim:

Compressive strength test results of tests performed on concrete cores received from Tri-State Testing Services, Inc., are attached. As indicated on the applicable test report, the nominal eight and nine inch diameter cores were re-cored to a nominal four inch diameter prior to testing. All cores were saw cut on both ends to achieve an acceptable length to diameter ratio and to avoid inclusion of reinforcing steel noted in some of the un-cut cores within the cores to be tested. In some instances, two testable cores were obtained from the same core; in such instances, both cores were tested. All testing was performed in accordance with ASTM C39, *Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens*. If there are any questions, or if additional information is required, please advise.

Respectfully submitted,

B & W Engineering Laboratories, Inc.



John L. Walton, Sr., P.E.  
President

JLW/jw0911

Attachements (2)

# B & W Engineering Laboratories, Inc.

P.O. Box 341091

Memphis, Tennessee 38184-1091

(901) 373-7957

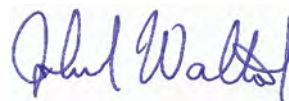
12 September 2011  
Job No. 7835  
Serial No. D-1487

Memphis International Airport  
Nominal 4" diameter Concrete Cores  
Provided by Tri-State Testing Services

| Core No. | Diameter (in) | Area (sq in) | Length (in) | L/D Ratio | Cor. Factor | Load (pounds) | Compressive Strength (psi) |
|----------|---------------|--------------|-------------|-----------|-------------|---------------|----------------------------|
| P1a      | 3.90          | 11.94        | 6.625       | 1.70      | .98         | 71796         | 5890                       |
| P1b      | 3.90          | 11.94        | 5.375       | 1.38      | .95         | 62442         | 4970                       |
| P2a      | 3.87          | 11.76        | 5.96        | 1.54      | .96         | 64144         | 5240                       |
| P2b      | 3.87          | 11.76        | 7.625       | 1.97      | 1           | 70745         | 6020                       |
| P4a      | 3.87          | 11.76        | 7.67        | 1.98      | 1           | 46364         | 3940                       |
| P4b      | 3.87          | 11.76        | 7.23        | 1.87      | .99         | 49324         | 4150                       |
| P7       | 3.85          | 11.64        | 7.54        | 1.96      | 1           | 69833         | 6000                       |
| P9       | 3.84          | 11.58        | 7.68        | 2         | 1           | 67950         | 5870                       |
| P27      | 3.83          | 11.52        | 7.65        | 2         | 1           | 68461         | 5940                       |
| P34      | 3.83          | 11.52        | 7.65        | 2         | 1           | 70741         | 6140                       |
| P40      | 3.83          | 11.52        | 7.125       | 1.86      | .99         | 72827         | 6260                       |
| P51      | 3.86          | 11.70        | 7.67        | 1.99      | 1           | 82751         | 7070                       |
| P61      | 3.84          | 11.58        | 7.125       | 1.86      | .99         | 63369         | 5420                       |
| P72      | 3.88          | 11.82        | 5.15        | 1.33      | .94         | 64674         | 5140                       |
| P79      | 3.91          | 12.00        | 7.33        | 1.88      | .99         | 59111         | 4880                       |
| P85a     | 3.86          | 11.70        | 7.65        | 1.98      | 1           | 68451         | 5850                       |
| P85b     | 3.86          | 11.70        | 5.74        | 1.49      | .96         | 61164         | 5020                       |

Respectfully submitted,

B & W Engineering Laboratories, Inc.



John L. Walton, Sr., P.E.  
President

JLW/jw0911

# B & W Engineering Laboratories, Inc.

P.O. Box 341091

Memphis, Tennessee 38184-1091

(901) 373-7957

12 September 2011

Job No. 7835

Serial No. D-1488

Memphis International Airport


Nominal 8"/9" diameter Concrete Cores

Provided by Tri-State Testing Services

| Core No. | Re-cored Diameter (in) | Area (sq in) | Length (in) | L/D Ratio | Cor. Factor | Load (pounds) | Compressive Strength (psi) |
|----------|------------------------|--------------|-------------|-----------|-------------|---------------|----------------------------|
| B-2      | 3.81                   | 11.40        | 7.00        | 1.84      | .99         | 63257         | 5490                       |
| B-3      | 3.81                   | 11.40        | 4.67        | 1.23      | .93         | 60582         | 4940                       |
| B-5      | 3.81                   | 11.40        | 6.79        | 1.78      | .98         | 58632         | 5040                       |
| B-6      | 3.82                   | 11.46        | 6.125       | 1.60      | .97         | 79616         | 6740                       |
| B-9      | 3.82                   | 11.46        | 7.625       | 2         | 1           | 72630         | 6340                       |
| B-10     | 3.81                   | 11.40        | 6.83        | 1.79      | .98         | 53837         | 4630                       |
| B-11     | 3.81                   | 11.40        | 7.625       | 2         | 1           | 59273         | 5200                       |
| B-13     | 3.80                   | 11.34        | 7.625       | 2.01      | 1           | 55472         | 4890                       |
| B-15     | 3.81                   | 11.40        | 6.125       | 1.61      | .97         | 57216         | 4870                       |

Respectfully submitted,

B & W Engineering Laboratories, Inc.



John L. Walton, Sr., P.E.  
President

JLW/jw0911