

# GRIGGS & MALONEY

INCORPORATED

Engineering & Environmental Consulting

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March 2, 2012

Hon. Jim Cope  
Rutherford County Attorney  
16 Public Square North  
Murfreesboro, TN 37130

RE: **BENZENE EVALUATION – RUTHERFORD COUNTY JUDICIAL BUILDING, MURFREESBORO, TENNESSEE**  
G&M Project Number 300-44

Dear Hon. Cope:

As requested by Mr. Ben Mankin representing Rutherford County, Griggs & Maloney, Inc. (G&M) conducted sampling and analysis of air at the Rutherford County Judicial Building on the northeast corner of the Public Square in Murfreesboro. The sampling was conducted on February 2 and February 15, 2012. The building comprises two distinct structures including the “bank building” (the westernmost, two-story structure) and the “court building” (the easternmost, five-story structure). The two structures are connected only by a single doorway on the first floor of both structures.

### *Overview of Benzene*

Benzene is a component of products derived from coal and petroleum and is found in gasoline and other fuels according to the U.S. Occupational Health and Safety Administration (OSHA). OSHA regulates employee exposure to benzene. OSHA and the U.S. Environmental Protection Agency (EPA) have identified benzene as a carcinogen (cancer-causing compound). OSHA states that with exposures from less than five years to more than 30 years, individuals have developed, and died from leukemia. Long-term exposure may affect bone marrow and blood production. OSHA states that short-term exposure to high levels of benzene can cause drowsiness, dizziness, unconsciousness and death. OSHA states “Individuals employed in industries that make or use benzene may be exposed to the highest levels of benzene. These industries include benzene production (petrochemicals, petroleum refining, and coke and coal chemical manufacturing), rubber tire manufacturing, and storage or transport of benzene and petroleum products containing benzene.” OSHA states that other workers who may be exposed to benzene because of their occupations include steel workers, printers, rubber workers, shoe makers, laboratory technicians, firefighters, and gas station employees.

OSHA has established a regulatory permissible exposure limit (PEL) of 1 part per million (ppm) averaged over an eight-hour work day (time weighted average - TWA) benzene in air and a short-term exposure limit (STEL) of 5 ppm for employees.

The following information is quoted verbatim from The American Cancer Society.

- Benzene is a colorless, flammable liquid with a sweet odor. It evaporates quickly when exposed to air. Benzene is formed from natural processes, such as volcanoes and forest fires, but most exposure to benzene results from human activities.
- Benzene is among the 20 most widely used chemicals in the United States. It is used mainly as a solvent (a substance that can dissolve or extract other substances) and as a starting material in making other chemicals. In the past it was also commonly used as a gasoline additive, but this use has been greatly reduced in recent decades.
- Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.
- The main route of exposure to benzene is by inhaling contaminated air. Benzene can also be absorbed through the skin during contact with a source such as gasoline, but because liquid benzene evaporates quickly, skin absorption is less common.
- People can be exposed to benzene at work, in the general environment, and through the use of some consumer products. The highest exposures have typically been in workplace, although these have decreased greatly over the last several decades due to federal regulations. Other exposures have also gone down over time, such as the amount of benzene allowed in gasoline.
- Workers in industries that make or use benzene may be exposed to high levels of this chemical. These industries include the rubber industry, oil refineries, chemical plants, shoe manufacturers, and gasoline-related industries. Benzene is also used to make some types of lubricants, dyes, detergents, drugs, and pesticides. Other people who may be exposed to benzene at work include steel workers, printers, lab technicians, and firefighters. Federal regulations limit exposure to benzene in the workplace.
- Sources of benzene in the environment include gasoline, automobile exhaust fumes, emissions from some factories, and waste water from certain industries. While benzene is commonly found in air in both urban and rural areas, the levels are usually very low. However, exposures can be substantial to people in enclosed spaces with unventilated fumes from gasoline, glues, solvents, paints, and art supplies. Areas of heavy traffic, gas stations, and areas near industrial sources may also have higher air levels.
- Cigarette smoking and secondhand smoke are important sources of exposure to benzene. Cigarette smoke accounts for about half of the US national exposure to benzene.

Benzene levels in rooms contaminated by tobacco smoke may be many times higher than normal.

- People can also be exposed to benzene in contaminated drinking water and some foods.

#### Scope of Work:

The scope of work for this evaluation included collecting air samples by the use of SUMMA canisters, metal canisters evacuated of air and supplied to G&M by the environmental laboratory. The sampling included two rounds of sample collection.

#### *First Round of Sampling – February 2, 2012*

G&M collected an air sample (Sample 1) from a desktop at the rear of the bank building on the first floor (Room 107) at 4:50 p.m. on February 2, 2012. G&M collected an air sample (Sample 2) from a desktop in the Court Clerk's Office (Room 101) at 5:20 p.m. on February 2, 2012.

#### *Second Round of Sampling – February 15, 2012*

The second round of sampling was requested by the County after receiving a verbal report of the results of the first round of sampling. The second round of sampling included collecting an air sample from a desktop in the central portion of the first floor in the bank building (Sample 3) at 4:36 p.m. on February 15, 2012 and an air sample from the basement of the bank building near a sewage grinder (Sample 4) at 4:43 p.m. on February 15, 2012.

#### Sampling:

The sampling involved placing each SUMMA canister in the position in the building indicated by county personnel and collecting a "grab" sample of air by opening the valve of the canister until the previously evacuated canister reached pressure equalization with the ambient air pressure and then closing the valve. The canister was then labeled with the sample name and the canisters were transported to the ESC environmental laboratory in Mt. Juliet, Tennessee for air analysis for benzene.

#### Sample Analysis and Results:

The attached ESC benzene analytical results indicate that Sample 1 collected from the desktop in the rear portion of the bank building on the first floor contained 0.46 parts per billion (ppb) benzene. Sample 2 collected from the desktop in the Court Clerk's Office on the first floor in the court building contained no detectable benzene concentrations (<0.20 ppb). Sample 3 collected from the desktop in the central portion of the first floor of the bank building contained 0.26 ppb and Sample 4 collected in the basement where no occupants are located contained a concentration of 0.35 ppb benzene.

Mr. Ben Mankin  
March 2, 2012  
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Conclusions:

None of the samples contained benzene at concentrations that approach the OSHA regulatory levels of 1 ppm PEL and 5 ppm STEL. In fact the measured benzene concentrations on the sampling dates and at the described sampling locations are at levels 10,000 times lower than the regulatory action concentrations.

The source(s) of the detected benzene in the sampled areas could not be determined from this limited sampling strategy. However, the sampling and laboratory analysis indicated that benzene exposure on the sampling dates was well within allowable limits.

Recommendations:

If further investigation of benzene in air is determined to be warranted in the judicial building in an attempt to identify the source(s), we recommend that a Certified Industrial Hygienist (CIH) be consulted. G&M can recommend a CIH upon request.

If you have any questions, or need additional information, please call me at 895-8221.

Sincerely,  
**GRIGGS & MALONEY, INC.**



Kerry Given  
Sr. Environmental Scientist



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Mt. Juliet, TN 37122  
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Mr. Kerry Given  
Griggs & Maloney, Inc.  
PO Box 2968  
Murfreesboro, TN 37133

### Report Summary

Tuesday February 21, 2012

Report Number: L560907

Samples Received: 02/16/12

Client Project: 300-44

Description: Bank BLDG.IAQ

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

  
Jimmy Hunt, ESC Representative

#### Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,  
FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016,  
NC - ENV375/DW21704/BIO041, ND - R-140, NJ - TN002, NJ NELAP - TN002,  
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,  
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TNC00032011-1,  
TX - T104704245-11-3, OK - 9915, PA - 68-02979

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

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REPORT OF ANALYSIS

Mr. Kerry Given  
Griggs & Maloney, Inc.  
PO Box 2968  
Murfreesboro, TN 37133

February 21, 2012

Date Received : February 16, 2012  
Description : Bank BLDG. IAQ  
Sample ID : 3  
Collected By : Kerry Given  
Collection Date : 02/15/12 16:36

ESC Sample # : L560907-01  
Site ID : MURFREESBORO, TN  
Project # : 300-44

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatile Organics									
Benzene	71-43-2	78.1	0.200	0.640	0.26	0.83	TO-15	02/16/12	1
1,4-Bromofluorobenzene	460-00-4				90.15	% Rec.	TO-15	02/16/12	1

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

The reported analytical results relate only to the sample submitted.

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Reported: 02/20/12 12:07 Revised: 02/21/12 10:38



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REPORT OF ANALYSIS

February 21, 2012

Mr. Kerry Given  
 Griggs & Maloney, Inc.  
 PO Box 2968  
 Murfreesboro, TN 37133

Date Received : February 16, 2012  
 Description : Bank BLDG.IAQ  
 Sample ID : 4  
 Collected By : Kerry Given  
 Collection Date : 02/15/12 16:43

ESC Sample # : L560907-02  
 Site ID : MURFREESBORO, TN  
 Project # : 300-44

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatile Organics									
Benzene	71-43-2	78.1	0.200	0.640	0.35	1.1	TO-15	02/17/12	1
1,4-Bromofluorobenzene	460-00-4				90.6	% Rec.	TO-15	02/17/12	1

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

The reported analytical results relate only to the sample submitted.

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Reported: 02/20/12 12:07 Revised: 02/21/12 10:38

Summary of Remarks For Samples Printed  
02/21/12 at 10:38:39

TSR Signing Reports: 350  
R5 - Desired TAT

Paperless

Sample: L560907-01 Account: GRIGGS06 Received: 02/16/12 15:25 Due Date: 02/23/12 00:00 RPT Date: 02/20/12 12:07  
6-liter summa; TO-15 = Benzene only  
Sample: L560907-02 Account: GRIGGS06 Received: 02/16/12 15:25 Due Date: 02/23/12 00:00 RPT Date: 02/20/12 12:07  
6-liter summa; TO-15 = Benzene only



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March 30, 2012

Ernest Burgess  
Rutherford County Mayor  
Public Square  
Murfreesboro, TN 37130

**RE: G&M Project Number 300-44**

Dear Mayor:

We are in receipt of your letter dated March 27, 2012, in which you express your understanding of the Griggs & Maloney, Inc. (G&M) report related to the benzene sampling we conducted in February of 2012, the findings of the benzene analytical results and comparisons to regulatory action thresholds. We agree that based on the Occupational Health and Safety Administration (OSHA) regulatory exposure allowances and the data collected from the building thus far it does not appear to be appropriate or expedient to conduct further investigation to identify the source of benzene.

Let us clarify our recommendations. The environmental investigation of a potential or apparent source of the benzene can be conducted by our staff and does not require the services of a Certified Industrial Hygienist (CIH). However, if health effects of exposure to benzene at such low-level concentrations are of continuing concern, a CIH should be consulted as this capability is outside our expertise.

We are aware that a service station, potentially having underground storage tanks (USTs) and pre-dating the promulgation of state and federal regulations related to closure and cleanup was located at the northwest corner of the former bank building. This is a potential source of the benzene in air concentrations. If further investigation for the intended ultimate removal (remediation) of a benzene source is determined as warranted and expedient, G&M is ready to assist the county with the investigation.

If you have any questions, or need additional information, please advise.

Sincerely,  
GRIGGS & MALONEY, INC.



Kerry Given  
Sr. Environmental Scientist