CITY OF HOUSTON

Department of Health and Human Services

Bill White
Mayor

Stephen L. Williams, M.Ed., M.P.A.
Director
Health and Human Services Department
8000 N. Stadium Drive
Houston, Texas 77054-1823

T.713.794.9311
F.713.798.0862

www.houstonhealth.org

August 19, 2005

Michael N. Jones
U.S. EPA (D243-02)
EMAD/AAMG
Research Triangle Park, NC 27711

Re: RFA No: OAR-EMAD-05-16

Dear Mr. Jones:

Attached is the City of Houston Department of Health and Human Services' application for EPA RFA OAR-EMAD-05-16.

The Houston area is home to the largest petrochemical complex in the world and has difficult air toxics challenges to address from these air sources. We look with great hope and interest to be the recipient of this funding opportunity, to help with our tough air toxics challenges and better address the health needs of our impacted communities.

If you have any questions or need additional information, contact Wei-Yeong Wang at 713-640-4236.

Sincerely,

Stephen L. Williams, M.Ed., M.P.A.
Director
Houston Department of Health and Human Services

SLW

Attachment

SF-424 Application for Federal Assistance

Version 7/0

APPLICATION FOR FEDERAL ASSISTANCE

1. TYPE OF SUBMISSION:
Application: ☐ Construction ☒ Non-Construction
Preapplication: ☐ Construction ☐ Non-Construction

2. DATE SUBMITTED	Applicant Identifier
August 22, 2005	
3. DATE RECEIVED BY STATE	State Application Identifier
4. DATE RECEIVED BY FEDERAL AGENCY	Federal Identifier

5. APPLICANT INFORMATION

Legal Name: Houston Department of Health and Human Services
Organizational DUNS: 19 458 6517
Address:
Street: 7411 Park Place Blvd.
City: Houston
County: Harris
State: Texas
ZIP: 77087-4441
Country: USA

Organizational Unit:
Department: Houston Department of Health and Human Services
Division: Environmental Health – Bureau of Air Quality Control
Name and telephone number of the person to be contacted on matters involving this application (give area code)
Prefix:
First Name: Wei-Yeong
Middle Name:
Last Name: Wang
Suffix: Ph.D., P.E.
Phone Number *(give area code)*: 713-640-4236
FAX Number *(give area code)*: 713-640-4343

6. EMPLOYER IDENTIFICATION NUMBER *(EIN)*: 74-6001164

8. TYPE OF APPLICATION: ☒ New ☐ Continuation ☐ Revision
If Revision, enter appropriate letter(s) in box(es): (See back of form for description of letters) ☐ ☐
Other *(specify)*:

7. TYPE OF APPLICANT: *(See back of form for Application Types)*: C. Municipal
Other *(Specify)*:

9. NAME OF FEDERAL AGENCY: Environmental Protection Agency

10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: 66-034
TITLE: *(Name of Program)*: Surveys, Studies, Investigations, Demonstrations and Special Purpose Activities Relating to the Clean Air Act

11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT: Mobile Laboratory to Measure Air Toxics in the Houston Ship Channel Area

12. AREAS AFFECTED BY PROJECT *(cities, counties, states, etc.)*: Houston and Harris County

13. PROPOSED PROJECT:
Start Date: October 15, 2005
Ending Date: October 14, 2007

14. CONGRESSIONAL DISTRICTS OF:
a. Applicant: 25th
b. Project:

15. ESTIMATED FUNDING:

a. Federal	$499,657.00
b. Applicant	$466,500.00
c. State	
d. Local	
e. Other	
f. Program Income	
g. TOTAL	$966,157.00

16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?
a. ☒ YES. THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON:
DATE with final application
b. ☐ NO. PROGRAM IS NOT COVERED BY E.O. 12372 OR PROGRAM HAS NOT BEEN SELECTED STATE FOR REVIEW

17. IS APPLICATION DELINQUENT ON ANY FEDERAL DEBT?
☐ YES If "Yes," attach an explanation. ☒ No

18. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION/PREAPPLICATION ARE TRUE AND CORRECT, THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED.

a. Authorized Representative

Prefix	First Name	Middle Name
	Stephen	L.
Last Name		**Suffix**
Williams		M.Ed., M.P.A.
b. Title		**c. Telephone Number *(give area code)***
Director		713-794-9311
d. Signature of Authorized Representative		**e. Date Signed**
Stephen L. Williams		8/18/05

Mobile Laboratory to Measure Air Toxics in the Houston Ship Channel Area

Submitted to:

The Environmental Protection Agency

Local-Scale Air Toxics Ambient Monitoring

Request for Application Number: OAR-EMAD-05-06

Submitted by:

Houston Department of Health and Human Services

August 16, 2005

Contact Information:

Wei-Yeong Wang, Ph.D., P.E.

Bureau of Air Quality Control

Houston Department of Health and Human Services

Phone: 713-640-4236

wy.wang@cityofhouston.net

Table of Contents

"Blanco, Arturo - HLT"
<Arturo.Blanco@cityofhouston.net>

08/19/2005 02:49 PM

To Mike Jones/RTP/USEPA/US@EPA

cc "Wang, Wei-Yeong - HLT" <Wy.Wang@cityofhouston.net>, "Marks, Elena - MYR" <Elena.Marks@cityofhouston.net>, "Berger, Pamela - MYR"

bcc

Subject Application for OAR-EMAD-05-16, Part 2 of 2

This is the second of two emails with Houston's Department of Health and Human Services application for OAR-EMAD-05-16. This email attaches the indirect cost rates.

Please reply to confirm receipt. You may call me (713/640-4214) or Dr. Wei-Yeong Wang (713/640-4236) if you have any questions.

<<indirect.PDF>>

Arturo J. Blanco
Pollution Control Chief
Bureau of Air Quality Control
Houston Department of Health and Human Services
(713) 640-4214
(713) 640-4347

indirect.PDF

The City of Houston, Texas

FY 2005 OMB A-87 Cost Allocation Plans
and
Related Indirect Cost Rates

FN: H\W\Cost\HUD – FY 2005 Plans

MAXIMUS®
HELPING GOVERNMENT SERVE THE PEOPLE®

June 16, 2004

Gary E. Gray, CPA
Assistant Director
Finance and Administration
City of Houston
611 Walker
Houston, TX 77002

Dear Mr. Gray:

MAXIMUS, Inc. (MAXIMUS) has completed our limited review of the following cost allocation plans for fiscal year 2005 based upon actual expenditures for fiscal year ending June 30, 2003:

- Citywide Full Cost Allocation Plan
- Citywide OMB Circular A-87 Indirect Cost Allocation Plan
- Houston Police Department OMB Circular A-87 Indirect Cost Allocation Plan
- Houston Fire Department OMB Circular A-87 Indirect Cost Allocation Plan

In addition, MAXIMUS has reviewed the indirect cost rate calculations associated with both the Full Cost and the OMB Circular A-87 Cost Allocation plans. A summary of the rates MAXIMUS reviewed is attached to this letter.

Jane Kuo has answered all of our questions and addressed all outstanding issues sufficiently. In addition, we reviewed the adjustments she made to the cost allocation plans based upon our discussions. We believe that the cost allocation plans are acceptable for review by the federal negotiators for HUD, the Federal Aviation Administration and/or any other federal or state agencies that audit or review the City of Houston's Indirect Cost Allocation Plans. Based upon our review, we are not aware of any material modifications that should be made to the Citywide OMB Circular A-87 Plan, the Police OMB Circular A-87 Plan, the Fire OMB Circular A-87 Plan, or the rates associated with each plan, for them to be in conformity with OMB Circular A-87 guidelines.

We reviewed the Plans for reasonableness, consistency, and compliance with OMB Circular A-87. As you realize, the limited scope and budget in this project did not allow us to verify all financial data and allocation base information. However, we identified those areas where verification was needed and understand that the City has made adjustments, where needed. In summary, we believe that the allocation bases that are used in the final version provide for an equitable allocation to grant programs and all other citywide programs that receive service from the City of Houston's central service departments. Each basis reflects a quantitative presentation of the activity's cost of

service. The allocated costs are allowable by the OMB Circular A-87, and the unallowable costs have been identified and disallowed.

Overall, the City of Houston's Full Cost and OMB Circular A-87 Cost Allocation Plans were prepared quite competently and are well documented. MAXIMUS appreciates the opportunity to assist the City of Houston with the review of the internally prepared indirect cost allocation plans.

Thank you again for the opportunity to assist the City of Houston with this important project.

Sincerely,

MAXIMUS, INC.

J. Mark Carpenter
Senior Manager

Attachment

JMC/snn

FY 2005 Plan **22-May-04**
8:17 PM

CITY OF HOUSTON

Police - OMB Plan

Indirect Cost Rate for FY 2005
Based on FY 2005 OMB A-87 Cost Allocation Plan (1)

FY 2003 Plan charges (budgeted & used)	$	127,546,647
Less: FY 2003 actual charges (FY 2005 Plan)		**(120,067,210)**
Over / (Under) charged $ amount		*7,479,437*
(To be carried forward to FY 2005 Plan)		
FY 2005 Plan		*120,067,210*
Subtract: Over-charged / Add: Under-charged $ amount		*(7,479,437)*
FY 2005 Indirect Cost /	$	*112,587,773*
Total Direct Salaries (2)	$	*276,755,866*
Indirect Cost Rate for FY 2005 (7/1/2004 - 6/30/2005)		***40.68 %***

SALARIES:

General Fund (100) - Total Salaries	$	333,794,489
Grants - Total Salaries		5,889,135
Police Auto Dealers (Fund 204)		1,955,887
Police Special Services (Fund 205)		1,489,901
Asset Forfeiture (Fund 212)		0
Asset Forfeiture - Justice (Fund 213)		579,382
Asset Forfeiture - State (Fund 215)		3,755,856
Total Salaries		*347,464,650*
Less: Allocated Salaries (From FY2005 Plan)		(70,708,784)
Total Direct Salaries (2)	$	***276,755,866***

(1) Based on FY2003 actual expenditures
(2) Total Salaries less Allocated Salaries

FN: H:\Q\Cost\Rates (Tab: A)

FY 2005 Plan

22-May-04
8:09 PM

CITY OF HOUSTON

Parks and Recreation Department

Indirect Cost Rate for FY 2005
Based on FY 2005 OMB A-87 Cost Allocation Plan (1)

FY 2003 Plan charges (budgeted & used)	$	**13,772,385**
Less: FY 2003 actual charges (FY 2005 Plan)		**(11,249,665)**
Over / (Under) charged $ amount		*2,522,720*
(To be carried forward to FY 2005 Plan)		
FY 2005 Plan		*11,249,665*
Subtract: Over-charged / Add: Under-charged $ amount		*(2,522,720)*
FY 2005 Indirect Cost /	$	*8,726,945*
Total Direct Salaries (2)	$	*30,895,278*
Indirect Cost Rate for FY 2005 (7/1/2004 - 6/30/2005)		***28.25 %***

SALARIES:		
General Fund (100) - Total Salaries	$	27,589,097
Grants		876,530
Park Special Revenue Fund (206)		2,429,651
Total Direct Salaries (2)	$	*30,895,278*

(1) Based on FY2003 actual expenditures

FN: H:\Q\Cost\Rates (Tab: A)

FY 2005 Plan **22-May-04**
8:09 PM

CITY OF HOUSTON

Health and Human Services Department

Indirect Cost Rate for FY 2005
Based on FY 2005 OMB A-87 Cost Allocation Plan (1)

FY 2003 Plan charges (budgeted & used)	$	19,977,620
Less: FY 2003 actual charges (FY 2005 Plan)		**(18,581,024)**
Over / (Under) charged $ amount		*1,396,596*
(To be carried forward to FY 2005 Plan)		
FY 2005 Plan		*18,581,024*
Subtract: Over-charged / Add: Under-charged $ amount		*(1,396,596)*
FY 2005 Indirect Cost /	$	*17,184,428*
Total Direct Salaries (2)	$	*38,244,447*
Indirect Cost Rate for FY 2005 (7/1/2004 - 6/30/2005)		***44.93 %***

Direct Salaries:

General Fund (100) - Total Salaries	$	29,653,084
Grants - Total Salaries		15,144,318
Total Salaries		*44,797,402*
Less: Allocated Salaries (3)		(6,552,955)
Total Direct Salaries (2)	$	*38,244,447*

(1) Based on FY2003 actual expenditures
(2) Total Salaries less Allocated Salaries
(3) From FY2005 Cost Allocation Plan
FN: H:\Q\Cost\Rates (Tab: A)

FY 2005 Plan **22-May-04**
8:08 PM

CITY OF HOUSTON
Library Department

Indirect Cost Rate for FY 2005
Based on FY 2005 OMB A-87 Cost Allocation Plan (1)

FY 2003 Plan charges (budgeted & used)	$	3,492,265
Less: FY 2003 actual charges (FY 2005 Plan)		**(3,171,614)**
Over / (Under) charged $ amount		*320,651*
(To be carried forward to FY 2005 Plan)		
FY 2005 Plan		*3,171,614*
Subtract: Over-charged / Add: Under-charged $ amount		*(320,651)*
FY 2005 Indirect Cost /	$	*2,850,963*
Total Direct Salaries (2)	$	16,587,060
Indirect Cost Rate for FY 2005 (7/1/2004 - 6/30/2005)		***17.19 %***

(1) Based on FY2003 actual expenditures
(2) FY 2003 Actual Expenditures (Dept. 34 Fund 100)

FN: H:\Q\Cost\Rates (Tab: A)

Narrative Work Plan

a. Project Title: Mobile Laboratory to Measure Air Toxics in the Houston Ship Channel Area

The Houston Department of Health and Human Services (HDHHS) intends to become a national leader in applying proven best-in-class mobile laboratory monitoring technologies towards developing processes for source identification and characterization of air toxics and other pollutants.

b. Category: Source Identification and Characterization

HDHHS intends to become a national leader for implementing processes that identify the source(s) of air toxics using proven technologies. Houston has extremely difficult air toxics challenges to address because it is significantly impacted by air emissions from one of the largest petrochemical complexes in the world. Harris County, home to Houston, was exposed to over 19 million pounds of hazardous air pollutants in 2003, including 456,333 pounds of 1,3 butadiene and 750,325 pounds of benzene according to the EPA's 2003 Toxic Release Inventory (TRI) report. The Texas Air Quality Study in 2000, which involved more than 200 scientists and in excess of $20 million, used aircraft to measure volatile organic compounds (VOCs) above refineries and chemical plants in the Houston area. The study found that VOCs were approximately 6 times higher than emissions reported by the petrochemical facilities. Since TRI data uses many of the same estimating techniques used in reporting VOC emissions, it is very likely that air toxic emissions are underreported as well. Harris County is particularly vulnerable to air toxics exposures because some of the Houston Ship Channel area facilities are responsible for producing and supplying a significant portion of the nation's benzene, 1,3 butadiene and other hazardous air pollutants.

The method that HDHHS currently has for measuring air toxics is to collect a Summa canister sample at a given location and deliver it to its EPA-certified laboratory for analysis. However many chemicals, such as 1,3 butadiene, are not stable and will degrade long before the sample can be introduced into the analyzer. Present procedures are inadequate because they do not accurately account for the concentrations of ambient 1,3 butadiene and do not inspire confidence communities in the Houston Ship Channel area.

Many of the Houston Ship Channel industries share a common fence line and neighboring companies frequently use or produce similar chemical compounds making it extremely difficult to identify the source of emissions. The analytical measuring device selected for this project will be capable of measuring many different compounds in addition to the air toxics of interest such as 1,3 butadiene and benzene. By placing the mobile laboratory at several locations and measuring wind direction and speed, results can be used to characterize a range of emissions, which will help "fingerprint" or identify the emission patterns of specific facilities.

The initial target of this project, the Milby Park area in Houston not far from the Manchester neighborhood, is an excellent case study, because three nearby companies (Goodyear, ExxonMobil and Texas Petrochemicals) have common boundaries and all are sources of 1,3 butadiene. These three plants are within one mile of Cesar Chavez High School. According to a January 16, 2005 article in the Houston Chronicle describing emissions in the Houston Ship Channel area, "In 2003, the annual average for butadiene in Manchester reached 7.15 µg/m3 -- more than 11 times higher than the EPA screening standard for toxic waste dumps." 1,3 butadiene is one of the hazardous air pollutants that the National Air Toxics Assessment (NATA) has listed as a toxic chemical of greatest concern due to its potential contribution to population risk.

Characterization is another critical element for HDHHS in order to identify specific emission sources. Each of the three facilities previously mentioned use different production processes, and the "fingerprint" or emissions pattern of chemicals released into the air by any single facility will be different from those of others. Although the Houston area has more air monitoring stations than any other, with 45 locations measuring ozone and other

air pollutants, and eight fixed-based auto-gas chromatograph (auto-GC) stations in the Ship Channel area that can measure parts per billion (ppb) concentrations of over 50 different volatile organic compounds (VOCs) in the ambient air, these monitoring stations are focused on ozone or relatively high concentrations of ozone precursors. The existing monitoring stations are not designed to provide accurate measurements of low concentrations of air toxics, and there are not enough monitors to perform source identification or source characterization. This proposal is designed to employ a mobile monitoring system with a systematic approach to identify specific sources of emissions. Unusually, both the specificity and the sensitivity of the concentration measurements will be significantly improved in this project because the analytical device will have lower detection limits, be more accurate at assigning peaks, and be calibrated for fewer compounds (thereby improving the accuracy of any single compound). In addition the analytical instrument will be brought to several different locations in the targeted area.

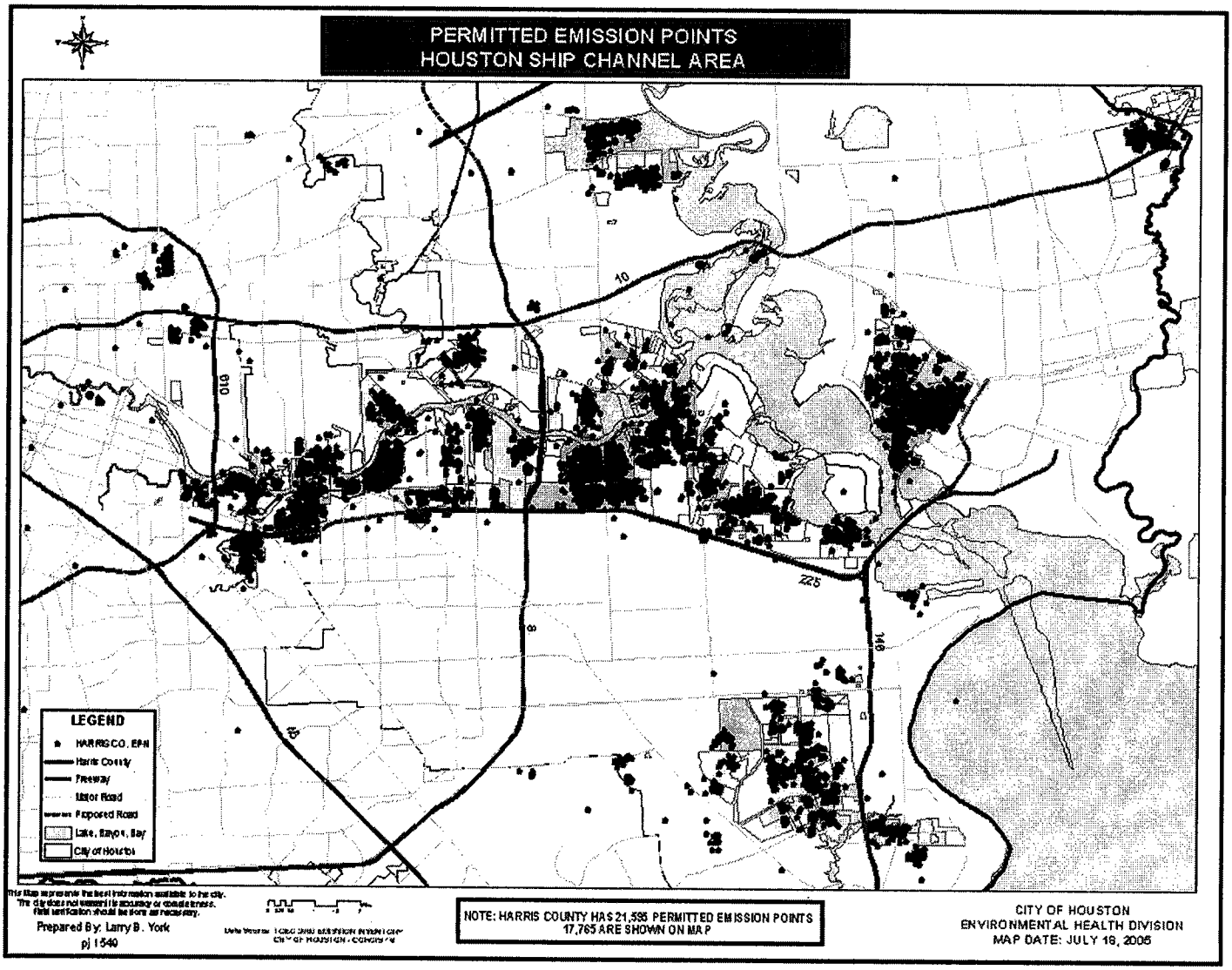

Figure 1
Permitted Emission Points in the Houston Ship Channel Area

The mobile monitoring technique that HDHHS proposes to use consists of an automatic sampling and sample concentration device, electrical cooling, a thermal desorption system and a gas chromatograph with a combined flame ionization detector and mass spectrometer (auto-GC/FID/MS) detection system. The auto-GC/FID/MS has been chosen over the standard auto-GC construction that is currently used in the Photochemical Assessment Monitoring System (PAMS), because those auto-GC's only use an FID and not an MS, which decreases accuracy and limits compound confirmation. The mobile laboratory platform will allow HDHHS to take measurements for an extended period of time at several locations immediately next to the facilities suspected of releasing high levels of air toxics. HDHHS's proposed well-integrated sampling, conditioning, calibration and analysis system will provide good detection limits for round-the-clock, on-line and cryogen-free monitoring of the specific components of interest, as well as other components that may assist in identifying the sources of air toxics.

Although existing auto-GC measurements may not be as accurate and are located further from the points of interest than the mobile laboratory, the data will be reviewed to identify additional information about the organic compounds that are measured. When the auto-GC and mobile laboratory GC/FID/MS is combined with measurements of wind speed and wind direction taken from the meteorological equipment on the mobile laboratory and quality assured with information provided from nearby PAMS it will provide a strong case for identifying pollution sources.

HDHHS has chosen Milby Park to be the model application for this two-year study because there is strong evidence that 1,3 butadiene is present at high levels and there are three possible sources from facilities that share a common fence line. Although these sources are currently providing varying degrees of cooperation in solving this problem, there has already been finger pointing by one facility that another is the real source of the problem. Resolving this situation will not be accomplished using the traditional techniques. One of the facilities has promised to install two open path Fourier Transform Infrared (FTIR) Spectroscopy instruments along their fence line to monitor 1,3 butadiene during the fourth quarter of 2005. This will not provide information about the emissions along other fence lines, and will not address problems related to emissions that may be released from equipment at higher levels and float over the FTIR path. The HDHHS mobile laboratory monitoring systems will provide numbers to compare with the FTIR instruments and be able to check concentrations at various locations.

Once this study is complete HDHHS intends to apply the same technology and approach, with modifications based on experience from the Milby Park project, to address problems where air toxics have been measured at high levels such as Allendale, Manchester, and other locations in Houston. HDHHS plans to use some grant funding to sponsor a meeting with local, state and national governments to discuss preliminary findings and develop stronger connections with others who have or are working towards starting a mobile laboratory. Once the Milby Park study is complete HDHHS intends to collaborate with the EPA to identify the best means for sharing the experience with other local, state and national government agencies to continuously improve their own techniques, as well as to provide guidance to help others resolve their issues with source identification.

c. Applicant Information

Applicant: Houston Department of Health and Human Services
Contact Person: Wei-Yeong Wang, PhD, PE
Bureau of Air Quality Control
7411 Park Place Blvd.
Houston, Texas 77087-4441
Phone: 713-640-4236
Fax: 713-640-4343
wy.wang@cityofhouston.net

d. Funding Requested.

HDHHS is requesting $499,657 from EPA.

e. Total Project Cost.

The total cost for the two-year grant period will be $966,157. HDHHS will contribute $466,500. This includes the pro-rated cost of salaries for two new employees and their supervisor, an annual maintenance cost, and an initial startup cost of $50,000.

HDHHS will hire two new full time employees at an estimated cost of $140,000/year to provide ongoing support to the mobile laboratory and GC/FID/MS procured with this grant. In addition, HDHHS will set aside $30,000/year for supervision of the employees and the mobile laboratory program. Finally, HDHHS will pay an initial $50,000 to cover the costs associated with preparing the required mobile laboratory infrastructure including installing a power supply when the mobile laboratory is not operating with generator power, pouring a cement slab and installing housing to protect and secure the mobile laboratory on the premises. HDHHS anticipates spending a one-time cost of $50,000 and an on-going annual cost for operational expenses of $245,000/year. In the future, HDHHS will seek additional internal and external funding to extend the capabilities of the mobile laboratory with additional analytical, meteorological and communication equipment to enhance expertise in source identification and characterization.

f. Project Period

The project will begin October 15, 2005 and end October 15, 2007. In the first eight months the HDHHS will develop a detailed specifications packet, present the package to contractors for bidding, award the contract, and provide time for the mobile laboratory to be built, inspected and delivered to Houston. The ninth month will be allocated to start-up and testing of the mobile laboratory vehicle and analytical technique. Months 9-20 will be devoted to gathering data and initial data analysis work. The final 4 months will be used to complete the interpretation of the data, compile the report and submit it to EPA.

g. Description of How the Proposed Project Meets the Established Guidelines

g.1. Detailed Project Summary

At Milby Park in Houston, Texas several studies have identified elevated levels of 1,3 butadiene, exceeding recommended limits published in the peer reviewed literature. There are three petrochemical facilities in the immediate area, all of which handle 1,3 butadiene in their processes. These facilities are located within one mile of a public high school.

It is critical for HDHHS to be able to identify when high levels of 1,3 butadiene occur, and to rapidly identify the specific source so that actions can be taken to reduce and eliminate the release of this toxic substance. HDHHS plans to develop a process for addressing this issue by carefully applying proven best-in-class mobile monitoring technologies to measure chemical and meteorological properties of the air.

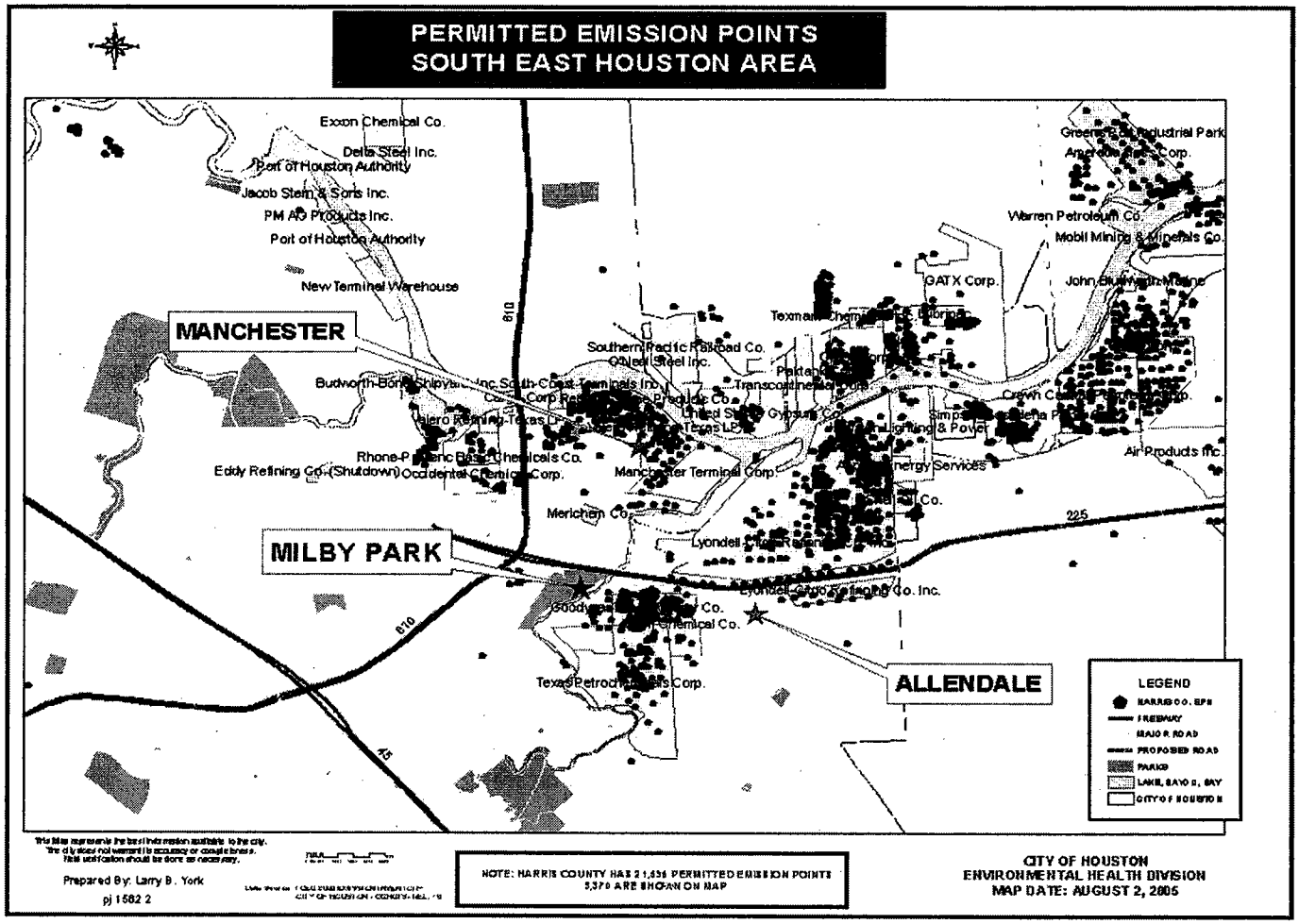

Figure 2
Permitted Emission Points in the Southeast Houston Area

The chemistry of the air will be investigated on two levels: the specific concentration of the air toxic(s) in question (in this case 1,3 butadiene), and the identification of other chemicals in the air that will assist in determining the emission source(s). The ambient air sampling will be accomplished using an automated sampling system with sample concentration, electrical cooling, and thermal desorption in a cryogen-free technology. The analytical measurement tool will be a gas chromatograph (GC) with a combined flame ionization detector (FID) and a mass spectrometer (MS). This combined sampling and sample conditioning GC/FID/MS instrument will provide the highest level of accuracy and specificity that is commercially available. Very low detection limits (approximately 1 ppb) can be achieved for most common detectable organic compounds. Since this device will be mounted on a mobile vehicle, samples will be automatically taken on-line and measured on-site round-the-clock. This has a great advantage over standard canister samples that must be collected and delivered to a laboratory where they are analyzed. In many cases, such as with 1,3 butadiene, the chemicals are very reactive so the composition changes significantly whenever there is a gap between the time the sample is caught and the time the sample is analyzed.

The meteorology of the air sampled will also be addressed by data collected from meteorological devices in the mobile vehicle. The mobile laboratory meteorological devices will provide information on the wind direction and wind speed for any time at which a sample is taken. The meteorological information will be quality assured

using information from a nearby PAMS. Other information that will be provided and considered in data analysis from PAMS will be the temperature and the humidity.

HDHHS will use portable organic vapor analyzers for ambient air screening and siting of hot spots for the mobile laboratory sampling locations. Monitoring by the mobile monitoring laboratory will be conducted around the Milby Park facilities on different days, and at different times during the day and night. Careful attention will be given to when and where the concentration of 1,3 butadiene is high. The meteorological information will be captured at the same time that the monitoring data is taken.

The GC/FID/MS will also be configured to analyze other components in the air that may be specific to only one of the three facilities. By collecting several data sets and analyzing component compositions and the associated meteorological conditions, HDHHS hopes to fingerprint each of the petrochemical plants.

This process will take considerable set-up time. HDHHS anticipates that it will take one year before the mobile laboratory and GC/FID/MS is assembled and two full time city employees are hired and trained. Next a three-month start-up period will be required to familiarize the employees with aspects of performing calibrations and taking samples in the field. That will be followed by a six-month period in which samples will be taken. Finally, in the three months remaining, the data will be assembled, analyzed and a final report will be written and submitted to EPA. The final report will include the findings, when it was and was not possible to identify the sources of the air toxic chemicals, as well as plans for improving the process in future campaigns.

Description of specific actions and methods to be undertaken and the responsible institutions, including estimated time line for each task are given below. The asterisks in the table are for items that HDHHS has initiated and plans to continue developing in anticipation of the EPA award.

Specific Actions and Methods to be Undertaken	**Responsible Institution**	**Estimated time for completion**
Write up the grants package, QMP, QAPP and DQOs and submit to EPA	HDHHS	10/15/2005 – 12/15/2005
Write up detailed specifications for the mobile laboratory and all components (e.g. diesel generator, cab shelving and support for GC/FID/MS and ancillary equipment, meteorological equipment, connections, etc.), GC/FID/MS configuration details, analytical method requirements, etc. (preliminary work has been initiated).	HDHHS	10/15/2005 – 12/15/2005*
Identify potential contractors to assemble the mobile laboratory and GC/FID/MS (preliminary work has been initiated).	HDHHS	10/15/2005 – 12/15/2005*
Initiate the bid process	HDHHS	12/15/2005 – 1/15/2006
Review bids and award a contract	HDHHS	1/15/2006 – 2/15/2006
Construct Mobile Laboratory with GC/FID/MS - Includes assembly of the Mobile Laboratory with all associated parts, installation of the GC/FID/MS with the specific analytical method (GC columns, etc.) and calibration gases, and a complete check-out of the system.	Contractor	2/15/2006 – 6/1/2006
Receive EPA Approval of QMP, QAPP	EPA	4/15/2006
Hire two employees to run the mobile laboratory - Prepare paperwork/approvals etc., publish advertisement, interview applicants, select the two best applicants for hire to start work on 3/1/2006	HDHHS	1/1/2006 – 3/1/2006

Specific Actions and Methods to be Undertaken	Responsible Institution	Estimated time for completion
Familiarize/Train new employees on the mobile laboratory and GC/FID/MS	HDHHS	3/1/2006 – 6/1/2006
Construct power supply, parking location and housing	HDHHS	3/1/2006 – 6/1/2006
Inspect Mobile Laboratory and GC/FID/MS	HDHHS	5/15/2006 – 6/1/2006
Deliver Mobile Laboratory system	Contractor	5/1/2006 – 6/1/2006
Perform start-up/testing activities - Identify specific monitoring locations. Determine length of time to start-up and shutdown, and how many samples can be taken in one workday.	HDHHS	6/1/2006 – 7/1/2006
Gather data	HDHHS	7/1/2006 – 7/1/2007
Interpret data and compile final report	HDHHS	7/1/2007 – 10/15/2007

* HDHHS has initiated and plans to continue develop these in anticipation of the EPA award.

g.2. The associated work products to be developed

i. A mobile laboratory with an automated GC/FID/MS and meteorological equipment.
The mobile laboratory and GC/FID/MS system will be constructed by a single contractor who will have responsibility for making the entire system work.
ii. An EPA Quality System (QAPP, QMP and DQOs).
iii. Analytical method(s) for the GC/FID/MS
iv. Calibration Procedures
Methods used to create standard reference gases, introduction of reference gases into the sample system (vs. introduction of sample), number of calibration runs, cycle time for the analyzer, etc.
v. Data Results
Data results will include chemical composition (species and concentrations) from the GC/FID/MS and wind speed and wind direction from the meteorological equipment from the mobile laboratory and from the nearest PAMS.
vi. Data Analysis
Analysis of the chemical and meteorological data, including: analysis of the possible locations of the emission sources, the ability to determine which of several petrochemical plants can be identified as the source, level of uncertainty and potential sources of error.
vii. Source Identification and Characterization Process
A well-defined process for source identification using a mobile laboratory, including specific recommendations for how to improve the laboratory for future applications.

g.3. An explanation of project benefits to the public

The City of Houston, in Harris County, which, together with neighboring counties, has the largest concentration of petrochemical plants in the world, has a higher density of pollution monitors than any other city; however, the number of pollution monitors, the type of monitoring and the existing data are not adequate for addressing community short-term health risks and concerns and pinpointing and characterizing pollution sources.

Houston area communities have made demands in numerous town-hall meetings in early 2005 for better monitoring of air toxics, as well as increased understanding of pollution sources and personal exposure. Implementation of this project will demonstrate to the concerned public that the local government is looking out for their needs.

g.4. An explanation of how project outcomes will be transferable

As mentioned previously, the Milby Park project will be a model for other source identification and characterization applications in Houston and elsewhere. Other locations can use the same technique proposed in the project for quick identification of targeted air toxics sources by using a mobile laboratory with proven integrated sampling and analysis technologies. The mobile laboratory approach can be leveraged for use in other areas with or without petrochemical facilities for other types of air toxics and other VOC's located in various areas such as congested traffic/on-road sources, construction sites, superfund sites, etc. The nature and purpose of a mobile laboratory is that it can be used in a variety of settings. Some changes may be needed to the GC/FID/MS analytical method in order to measure specific hazardous air pollutants of interest as well as other organic compounds required to categorize the specific sources.

The other objective of this project is to create a documented process for identifying the location of emission sources. This process will include looking at concentration measurements from the mobile laboratory GC/FID/MS as well as other analytical measurements from canisters or nearby PAMS. Meteorological measurements taken from the mobile laboratory will be compared to PAMS readings as well. Improvements to the process will be made as data is taken, and recommendations will be made in the final report for further improvements. This report will be informative for others who are performing source identification with mobile laboratories and other monitoring technologies.

g.5. Plan for Tracking and Measuring Progress

This project will measure specific concentrations of 1,3 butadiene around three different facilities that share common fence lines. This information will be coupled with wind direction and speed at each monitoring location. Together this information will provide HDHHS and the Texas Commission on Environmental Quality (TCEQ) a better understanding of the distribution of 1,3 butadiene around these three facilities, and an improved understanding of exposure to air toxics experienced by people who live in surrounding neighborhoods, including that of Cesar Chavez High School, which is less than one mile away. The goal of this project is to identify which petrochemical facility is responsible for the highest level of emissions and which part of which facility is the highest emitter. This will provide policymakers with a means to develop effective, targeted approaches for reducing hazardous air pollutants.

The air toxics data that is gathered by the mobile laboratory will be gathered at different times of the day and during different days of the week and be made available to the EPA's Air Quality System database. The immediate goal of the project is to identify which of three petrochemical facilities is the most likely source of the high levels of 1,3 butadiene experienced in the Milby Park area. If the data is able to pinpoint the source of emissions even further, to a specific location inside a plant, then the appropriate action will be taken. This model will be used to pinpoint hotspots in other locations.

The mobile laboratory represents an improvement in monitoring methods because it will develop a process for identifying emission sources, and because it will be used to identify other pollutants at other sources. The process of source identification and characterization which is developed will be analyzed for strengths and weaknesses, including but not limited to the choices made about the methods used, the time interval used to take the samples, the number of samples stations used for taking samples and the time of day the samples were taken. The report will review the potential impact of the air toxics measured to the nearby high school and surrounding community.

g.6. An explanation of how project success will be evaluated

Success for the mobile laboratory will be evaluated by achieving specific milestones along the way and ultimately creating a final report that documents the findings of the measurements, potential impact to the surrounding neighborhood, and recommendations for the process, which should be used in the future.

Some of the milestones are as follows:

a. The mobile laboratory delivered on time (one year after the funding).
b. The start-up, sampling, data analysis and reporting are all completed on time.
c. The samples are verifiable with calibration standards and canister samples.
d. The meteorological equipment readings from the mobile laboratory agree with the readings from nearby PAMS.
e. The results narrow down the possible source of the pollutant(s) of interest.

To be a success the final document will:

a. Include descriptions of the methods and measurements used that meet or exceed the quality assurance expectations of scientists who may perform a peer review.
b. Identify a specific petrochemical facility (if not a specific location within a facility) responsible for the majority of 1,3 butadiene that is released.
c. Describe a process for source identification that will be used by other environmental entities in other locations.

g.7. A description of the roles of the applicant and partners

In the interest of conserving space, the partners were not asked for letters of support, but to provide comments, noted below. Letters may be acquired upon request.

The Texas Commission on Environmental Quality (TCEQ) can provide technical advice and is also the agency that will be involved with any enforcement actions that may arise from measuring air toxics and identifying the sources.

Harris County is an important partner because it significantly increases the jurisdiction of sites that might be chosen in future studies; as many of the petrochemical plants are just outside of Houston city limits but may still have a significant impact on Houston. Harris County has expressed a great deal of interest and support for this project. Many other facilities that are of concern as possible sources of air toxics lie outside Houston city limits, but are within the jurisdiction of Harris County.

The Houston Advanced Research Center (HARC) can provide HDHHS with technical direction, contacts and coordinate research studies with a variety of partners that may be interested in performing related studies. HARC manages $10-12 million each year in air quality related research projects funded by the State of Texas. HARC has numerous contacts with regulatory agencies for counties, the State of Texas, EPA, university researchers, Non-governmental organizations (NGO's) and industry. HARC will provide consulting assistance to HDHHS for help in the planning, sample gathering and execution of this project.

The University of Houston has specialized expertise in chemical and meteorological measurements (as well as air quality modeling). They are also in the process of installing a stationary laboratory to measure ambient air on top of one of the University's buildings. They are willing to provide advice, are interested in the results of this study and collaborating on future projects. The University of Houston Geosciences and Chemistry Departments support this effort, and have indicated that they would be willing to answer technical questions about the meteorology and chemistry as they arise.

EPA, Office of Research and Development, National Risk Management Research Laboratory, Air Pollution Prevention and Control Division will become an important partner. HDHHS has discussed with EPA Researcher Eben Thoma ways to identify how HDHHS can implement EPA and other technologies to measure air toxics at the ppb level and below.

The Texas Commission on Environmental Quality (TCEQ) - TCEQ operates 8 monitoring vans with analytical equipment and they have been successfully running vehicles with laboratory equipment for 17 years. Their focus has been on fence line and neighborhood monitoring to address specific concerns or issues. They have provided information used to develop this proposal and their experience, procedures and protocols for monitoring in this capacity will be useful for this project. In addition, TCEQ is interested in the monitoring results to be obtained from this project.

Galveston County will be an excellent partner to HDHHS because they are home to a large, concentrated petrochemical complex as well. Galveston County has expressed a great deal of interest and support for this project, and are interested in the data that is obtained and how it might apply to their area.

g.8. Biographical information of the key personnel

The following list identifies the people who will be integral to this project and provides biographical information that demonstrates that they are well qualified to develop, plan and implement a mobile laboratory with a GC/FID/MS. In addition they will execute the plan for taking chemical and meteorological measurements, compiling and analyzing the data to determine source identification and characterization, and write a final report that will be presented to the EPA.

Wei-Yeong Wang, Ph.D., P.E., Technical Services Section Chief, Bureau of Air Quality Control, HDHHS, **Project Manager**
Twenty four years of experience working at chemical industries (Union Carbide and Dow Chemical) and City of Houston's Bureau of Air Quality Control in air monitoring, laboratory analysis, laboratory operation and management, quality assurance, air toxics studies, regulation, permitting, compliance, emission abatement, engineering, research and development, and management of environmental projects and programs.
Ph.D. Chemical Engineering, 1981, City University of New York

Arturo J. Blanco, M.P.A, Bureau Chief, Bureau of Air Quality Control, HDHHS
Eleven years working at Texas Commission on Environmental Quality and HDHHS in field investigation, permitting, compliance, enforcement, environmental policy and management, community outreach, state and local government air quality functions, and management of grants and contracts. MPA, 1993, Troy State University; B.S. in Professional Aeronautics, 1991, Embry-Riddle Aeronautical University.

Devendra Srivastva, Ph.D., Intermittent Air Monitoring Section Supervisor and Quality Assurance Supervisor, Bureau of Air Quality Control, HDHHS;
Twenty-eight years working at academic and research institutions, environmental laboratories, environmental consulting firms, and HDHHS in chemical sampling, analysis, environmental and health sciences, laboratory operation and management, quality assurance, and project and grant management. Ph.D. Chemistry, 1970, Banaras Hindu University, India

Patricia Beltz, Continuous Air Monitoring Section Supervisor and Quality Assurance Supervisor, Bureau of Air Quality Control, HDHHS
Fifteen years experience working at Texas Commission on Environmental Quality and City of Houston's Bureau of Air Quality Control, including fourteen years in Houston ambient air monitoring, laboratory

operation and management, quality assurance, data validation, instrument purchase, maintenance and repairs, and project management.
B.S. Biochemistry and Biophysical Sciences, 1982, University of Houston

Daniel Hoyt, P. E., Supervising Engineer, Bureau of Air Quality Control, HDHHS
Ten years of experience working at HDHHS's Environmental Health Division, including eight years at HDHHS in air regulations, permitting, compliance, enforcement, air toxics emission inventory, emission events, process equipment leaks, emission investigation, emission reduction and data analysis, air dispersion modeling, geographical information system application, planning, and management of engineering projects and programs.
M.S. Environmental Engineering, 1997, University of Houston

Alex Cuclis, Research Scientist, Houston Advanced Research Center (HARC).
Fifteen years working at Shell Oil Company's Deer Park Refinery, working as a chemical engineer. Duties included specifying, installing and providing technical support for on-line analyzers, including those used to measure pollutants from stationary sources for regulatory purposes. Three years working on air quality projects for the University of Houston before he began working as a Project Manager at HARC.
B.S. Chemical Engineering, University of Texas, MS Analytical Chemistry, University of Illinois.

g.9. Information to address the ranking factors listed in Section V

Capacity building

HDHHS will build on its existing environmental program with this project by creating a mobile laboratory. This will include hiring two additional employees devoted entirely to mobile laboratory projects, as well as the supervision needed at a cost of $170,000/year. This grant will provide initial support for purchasing the minimum equipment needed to conduct a mobile laboratory study – the truck designed for monitoring and a commercially supported, state-of-the-art GC/FID/MS for analysis. HDHHS will commit another $75,000/year for maintenance of the truck and instrumentation and will identify the most effective ways to expand its mobile analytical measurement capabilities for improved monitoring of the air. HDHHS is committed to build and strengthen this program in the future, initiate coordination with others around the country with conference calls and meetings so that HDHHS can establish the best source identification model, recommend future research projects and become recognized as a national leader in source identification and characterization.

Background/Basis

HDHHS has been very concerned about the risks due to air toxics because of its proximity to one of the highest concentration of petrochemical facilities in the world. Several studies performed in Houston have found elevated levels of 1,3 butadiene and benzene. This is not surprising because these chemicals are produced in their pure form for sale as feedstock to other chemical plants locally and elsewhere. Many other hazardous air toxics are formed as intermediate products. In 2000 an environmental advocacy group, The Texas Bucket Brigade, took several air samples and claimed to have found several high readings for air toxics in the Houston Ship Channel area.

In January 2005 The Houston Chronicle (Chronicle) published a series of articles related to air toxics in the Houston Ship Channel area. The Chronicle chose to perform monitoring in four neighborhoods (located in three different counties) that were ranked highest in hazardous air pollution in Texas during 2002, since that was the most recent data that the Chronicle could obtain from EPA and TCEQ. The Chronicle took samples north to northeast of the facilities, since that was the most likely position to be downwind. The Chronicle used personal monitors adhered to houses in the neighborhoods of concern for three days. The sample result is the average over those three days, and there are concerns about the accuracy of personal monitors, particularly when issues like humidity and rain are a problem. In contrast, HDHHS will use a GC/FID/MS that will be

parked at the location of interest. Sample results will be obtained once per hour during the sampling period. The GC/FID/MS provides much greater accuracy than measurements taken with personal monitors.

The Chronicle looked at emissions of benzene correlated with emissions of xylene and described the source as being unclear, because they can come from either cars or refineries. However when benzene was correlated with styrene it indicated petrochemical sources. HDHHS will perform similar work in its characterization of 1,3 butadiene sources, to distinguish emission sources from different petrochemical facilities. Other air toxics will be examined in future projects.

HDHHS intends to become a national leader in source identification and characterization by using the best equipment. In order to stay within the limits of the grant funds and the funding to be provided by HDHHS, the equipment has been limited to the mobile laboratory and the GC/FID/MS. However HDHHS has been working with the leading manufacturer of mobile laboratories, ENG Mobile Systems Inc. (http://www.e-n-g.com/index.asp), who has built over 120 mobile laboratories worldwide. In addition HDHHS has been working with the worldwide leader in gas chromatography and chromatographic methods, Agilent Technologies, to provide the best GC design for the mobile laboratory/air toxics application.

National Ambient Air Monitoring Strategy and the EPA Strategic Plan

HDHHS will support the EPA's national-scale assessment goal to identify air toxics that are the greatest potential concern, in terms of contribution to population risk. Several previous studies have indicated that the targeted area for this proposal, Milby Park, is perhaps the neighborhood at greatest risk in Houston. The results that HDHHS obtains and the process that is used to obtain them will be used to set priorities for the collection of additional air toxics data (e.g., emissions data and ambient monitoring data). HDHHS will continue to seek out and implement the best analytical technology for the pollutants of greatest concern, and incorporate those technologies into their mobile laboratory. In the future HDHHS plans to integrate the mobile laboratory/analytical measurement work with techniques already implemented by the Texas Commission on Environmental Quality (TCEQ) that allow GC measurements of volatile organic compounds, including some air toxics, to be published in near real time on a web site.

List of Acronyms

DQOs	Data Quality Objectives
EPA	Environmental Protection Agency
FID	Flame Ionization Detector
FTIR	Fourier Transform Infrared
GC	Gas Chromatograph
HARC	Houston Advanced Research Center
HDHHS	Houston Department of Health and Human Services
MS	Mass Spectrometer
NATA	National Air Toxics Assessment
NGO's	Non-governmental organizations
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
PAMS	Photochemical Assessment Monitoring System
TCEQ	Texas Commission on Environmental Quality
TRI	Toxic Release Inventory
VOCs	Volatile Organic Compounds

Detailed Itemized Budget

a. Personnel **$42,000**

Wei-Yeong Wang, Ph.D., P.E., Project Management **$42,000**

b. Fringe Benefits **$18,291**

43.55% (Fringe breakdown is as follows: Pension-16.4%, FICA-7.65%, Health Ins-16.0%, Workers Comp-3.0%, Unemployment-0.2%, and LTD-0.3%.)

c. Contractual Costs **$19,280**

Consultant – Assistance with project planning, product specifications and project development.	$19,280

d. Travel **$4,000**

Inspection and Delivery of Mobile Lab	$4,000

e. Equipment **$291,715**

Truck w/AC/heat and Generator/No vent hood (15ft)	$132,581
ENG Hydrogen Generator	$7,219
ENG Nitrogen and Air Generator	$8,300
ENG Vacuum Pump system	$2,200
ENG Manual Met Tower	$2,153
ENG GC Cooling vent	$262
Agilent GCMS- with FID, Includes installation/familiarization and PC Chemstation software bundle	$67,000
Sample Concentrator/Desorber	$40,000
Markes Real time monitoring system	$32,000

f. Supplies **$35,000**

Regulators, tubing, pumps, etc.	$10,000
Calibration Standards	$25,000

g. Other **$70,500**

Truck power supply, security, location set-up	$6,000
GC Method Development/Calibration Procedures	$15,000
Assemble Equipment (Turn-key)	$20,000
Security/Building Electric line/power supply	$4,000

Training on all equipment for two city employees and Supervisor	$10,000	
Comparison Samples (Canisters)	$7,500	
Start-up/Orientation	$5,000	
Meeting to discuss results with other government agencies	$3,000	

h. Total Direct Costs **$477,786**

i. Total Indirect Costs: **$18,871**

44.93% x $42,000 salaries

j. Total Cost: **$499,657**

Notes:
1. Quotes for the mobile laboratory equipment came from ENG Mobile Systems Inc.
2. Quotes for the GC/FID/MS and associated sampling equipment came from Agilent Technologies.
3. Calibration standards at $25,000 are based on an estimate provided by the Texas Commission on Environmental Quality (TCEQ) which operates 8 mobile laboratories (TCEQ claims that the cost for standards can be up to $60,000 for monitoring toxics with GC/MS techniques, depending on the number and concentration of components ant the level of accuracy required. HDHSS will focus on a few select compounds for this project).
4. The consultant will provide assistance with developing detailed strategies, identifying key specifications of the mobile laboratory and play a leading role in developing the project plan. An estimated 200 hours will be used at a fully burdened rate of $96/hour.
5. All purchases will be bid out according to the procedures set by Houston Department of Health and Human Services.
6. As indicated previously, HDHHS will contribute $466,500 during the two-year project period. $50,000 will be a one-time startup fee, and the remaining $416,500 will be the prorated costs for labor, supervision and annual equipment maintenance, HDHHS will continue to provide $245,000 for annual operating expenses.

Quality Assurance Narrative

HDHHS has been managing an environmental laboratory for over 37 years. HDHHS is committed to Quality Assurance by maintaining planned and systematic actions to provide reliable air monitoring data. HDHHS currently gathers ambient air data under Federal and State funded clean air programs. HDHHS monitors the city ambient air with oversight from the Texas Commission on Environmental Quality (TCEQ). HDHHS operates and maintains ambient air monitoring networks under State approved Quality Management Plan and Quality Assurance Project Plan. For many years, HDHHS's air monitoring sites have been part of the NAMS and SLAMS air monitoring networks and data from these sites have regularly been used in the preparation of the state's State Implementation Plan.

HDHHS will implement this project with tremendous care and attention to quality assurance and quality control procedures in order to obtain the most accurate and most defensible results possible. HDHHS is fully aware of the importance of having data that can withstand challenges, because the owners of any emission source(s) that are identified may challenge the findings of this report. HDHHS will publish specific instructions for the procedures that are used. HDHHS will also publish the calibration results and other tests performed to identify the amount of error in any data. These procedures will be part of the Quality System that HDHHS implements. The Quality System will be composed of the Quality Assurance Project Plan (QAPP) and the Quality Management Plan (QMP). The QMP will be developed using the template provided by EPA and information included in HDHHS's Quality Management Procedures for their own laboratory. This QMP will be generated using the EPA Quality Assurance (QA) regulations and guidance as described in EPA QA/R-2, EPA Requirements for Quality Management Plans and the accompanying document, EPA QA/G-2, Guidance for Developing, Reviewing and Implementing Quality Management Plans. All pertinent elements of the QMP regulations and guidance are addressed in this document. HDHHS will use the guidance and requirements on preparation of QAPPs that can be found in EPA documents QA/R-5 and QA/G-5. HDHHS will also develop and submit Data Quality Objectives (DQO's) to EPA. The DQO's will contain statements about the expectations and requirements of the data user. The DQO's will follow the guidance provided by the document, EPA/600/R-96-055.

The Quality System documents (QAPP, QMP, and DQO's) will allow the reader to easily determine the level of uncertainty in the data. No data collection will begin until after EPA approves the QAPP and QMP. The Quality System will address issues related to specifications of the equipment (the mobile laboratory, the sampling system, the gas chromatograph, the meteorological equipment, etc.), specification of the analytical method, training, sampling, calibrations, operating procedures, crosschecking of samples (both chemistry and meteorological results), data analysis and documentation. HDHHS will not gather any data until EPA has approved the Quality System. HDHHS will validate, wherever possible, the data obtained from this project by using data from the many different monitoring stations throughout Houston and Harris County. In cases where data is gathered by monitors not run by the HDHHS, HDHHS will provide to EPA the Quality System descriptions that are available.