Document Readers

SF-424
Application for Federal Assistance
Title: MPCA FY11

Document Status

Document Phase:	Draft	**Last Modified:**	05/23/2011
Current Editor:	Mike Jones		
Delegate:	Dennis Finney		

IGMS Information

Competition Close Date:			
AAShip:			
Approving Region:	HQ		
Project Officer:	Mike Jones	**PO Phone:**	
Awarding Region:	HQ		
Grant Coordinator:			

Solicitation Information

Opportunity ID:	EPA-OAR-OAQPS-11-05	**Competition ID:**	
Opportunity Title:	Community-Scale Air Toxics Ambient Monitoring	**Competition Title:**	
Opening Date:	03/23/2011	**Closing Date:**	05/23/2011
Grants.Gov Tracking Number:	GRANT10874374		
Date Received by EAPPLY:	05/23/2011		

Submission Information

Submission:	Application	**Grant:**	Non-Construction
Date Submitted:	05/23/2011	**Time Submitted:**	12:21:19 PM
Type of Application:	New		

Applicant Information

	Grants.gov	IGMS
Applicant Type:	A: State Government	
Applicant Name:	Minnesota Pollution Control Agency	
Applicant DUNS #:	1972763060000	
Organizational Unit:	MN Pollution Control Agency	
Sub Org Unit:	Environ. Analysis & Outcomes	
EIN:	41-6007162	
Address:	520 Lafayette Road North	
City:	St. Paul	
State:	MN: Minnesota	
Zip:	55155-4194	
County:		
POC Name:	Victoria Cook	
POC Phone:	651-757-2289	
POC E-Mail:		
POC FAX #:		

Project Information

Federal Agency:	EPA

CFDA:	66.034
Project Title:	Calibrating Concern About PAHs (Polycyclic Aromatic Hydrocarbons) in Urban Air Using Monitoring and Modeling
Project Period Start:	10/01/2011
Project Period End:	09/30/2014

Congressional Districts

Estimated Funding

Federal	$555,720
Applicant	$126,859
(For all applicants including states)	
State	$0
(For state contribution to non-state applicants)	
Local	$1,000
Other	$35,206
Program Income	$0
TOTAL	**$718,785**

Is the Application subject to review by State Executive Order 12372 Process? No - Program Not Covered By E.O. 12372

Available for Review:

Is the Applicant delinquent on any Federal Debt? No

Authorized Representative

Key Contacts

Budget Summary

Application Attachments

Notifications History

OMB Number: 4040-0004
Expiration Date: 03/31/2012

Application for Federal Assistance SF-424

* 1. Type of Submission:	* 2. Type of Application:	* If Revision, select appropriate letter(s):
☐ Preapplication	☒ New	
☒ Application	☐ Continuation	* Other (Specify):
☐ Changed/Corrected Application	☐ Revision	

* 3. Date Received:	4. Applicant Identifier:
05/23/2011	

5a. Federal Entity Identifier:	5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:	7. State Application Identifier:

8. APPLICANT INFORMATION:

* a. Legal Name:	Minnesota Pollution Control Agency
* b. Employer/Taxpayer Identification Number (EIN/TIN):	41-6007162
* c. Organizational DUNS:	1972763060000

d. Address:

* Street1:	520 Lafayette Road North
Street2:	
* City:	St. Paul
County/Parish:	
* State:	MN: Minnesota
Province:	
* Country:	USA: UNITED STATES
* Zip / Postal Code:	55155-4194

e. Organizational Unit:

Department Name:	Division Name:
MN Pollution Control Agency	Environ. Analysis & Outcomes

f. Name and contact information of person to be contacted on matters involving this application:

Prefix:	Ms.	* First Name:	Victoria
Middle Name:	Anne		
* Last Name:	Cook		
Suffix:			

Title:	Agency Grants Coordinator
Organizational Affiliation:	Operational Support Division
* Telephone Number:	651-757-2289
Fax Number:	651-297-1456
* Email:	victoria.cook@state.mn.us

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

A: State Government

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

Environmental Protection Agency

11. Catalog of Federal Domestic Assistance Number:

66.034

CFDA Title:

Surveys, Studies, Research, Investigations, Demonstrations, and Special Purpose Activities Relating to the Clean Air Act

*** 12. Funding Opportunity Number:**

EPA-OAR-OAQPS-11-05

* Title:

Community-Scale Air Toxics Ambient Monitoring

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Calibrating Concern About PAHs (Polycyclic Aromatic Hydrocarbons) in Urban Air Using Monitoring and Modeling

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant: MN 004 | b. Program/Project: 4-6,8

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 10/01/2011 | * b. End Date: 09/30/2014

18. Estimated Funding ($):

* a. Federal	555,720.00
* b. Applicant	126,859.00
* c. State	0.00
* d. Local	1,000.00
* e. Other	35,206.00
* f. Program Income	0.00
* g. TOTAL	718,785.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix:	
* First Name:	Myrna
Middle Name:	M.
* Last Name:	Halbach
Suffix:	P.E.
* Title:	Assistant Chief Financial Officer
* Telephone Number:	651-757-2403
Fax Number:	651-297-1456
* Email:	myrna.halbach@state.mn.us
* Signature of Authorized Representative:	Victoria Cook
* Date Signed:	05/23/2011

BUDGET INFORMATION - Non-Construction Programs

OMB Approval No. 4040-0006
Expiration Date 07/30/2010

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Community-Scale Air Toxics Ambient Monitoring	66.034	$	$	$ 555,720.00	$ 163,065.00	$ 718,785.00
2.						
3.						
4.						
5. Totals		$	$	$ 555,720.00	$ 163,065.00	$ 718,785.00

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SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY (1)	(2)	(3)	(4)	Total (5)
	Community-Scale Air Toxics Ambient Monitoring				
a. Personnel	$ 104,556.00	$	$	$	$ 104,556.00
b. Fringe Benefits	31,367.00				31,367.00
c. Travel	5,000.00				5,000.00
d. Equipment	38,105.00				38,105.00
e. Supplies	5,000.00				5,000.00
f. Contractual	497,174.00				497,174.00
g. Construction					
h. Other					
i. Total Direct Charges (sum of 6a-6h)	681,202.00				$ 681,202.00
j. Indirect Charges	37,583.00				$ 37,583.00
k. TOTALS (sum of 6i and 6j)	$ 718,785.00	$	$	$	$ 718,785.00
7. Program Income	$ 0.00	$	$	$	$

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SECTION C - NON-FEDERAL RESOURCES

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
8. Community-Scale Air Toxics Ambient Monitoring	$ 126,859.00	$	$ 36,206.00	$ 163,065.00
9.				
10.				
11.				
12. TOTAL (sum of lines 8-11)	$ 126,859.00	$	$ 36,206.00	$ 163,065.00

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$ 210,000.00	$ 40,000.00	$ 70,000.00	$ 50,000.00	$ 50,000.00
14. Non-Federal	$ 70,000.00	20,000.00	30,000.00	10,000.00	10,000.00
15. TOTAL (sum of lines 13 and 14)	$ 280,000.00	$ 60,000.00	$ 100,000.00	$ 60,000.00	$ 60,000.00

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

(a) Grant Program	FUTURE FUNDING PERIODS (YEARS) (b)First	(c) Second	(d) Third	(e) Fourth
16. Community-Scale Air Toxics Ambient Monitoring	$ 180,000.00	$ 165,720.00	$	$
17.				
18.				
19.				
20. TOTAL (sum of lines 16 - 19)	$ 180,000.00	$ 165,720.00	$	$

SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges: $681,202

22. Indirect Charges: $37,583

23. Remarks: The federally approved indirect rate for the MPCA in State FY 2011 is 27.65%. The rate is applied to salary and fringe benefits. Only the actual approved rate will be assessed for each future fiscal year.

Proposal to the US Environmental Protection Agency
RFP No.: EPA-OAR-OAQPS-11-05
RFP Title: Community-Scale Air Toxics Ambient Monitoring

Project Title: Calibrating Concern About PAHs (Polycyclic Aromatic Hydrocarbons) in Urban Air Using Monitoring and Modeling

Applicant Information: Kristie Ellickson, Ph.D.
Minnesota Pollution Control Agency (MPCA)
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Paul Swedenborg, M.S. (MDH)
MDA/MDH Laboratory Building, 601 Robert St. North
St Paul, MN 55164
651.201.5333 (paul.swedenborg@state.mn.us)

Charles J. Lippert
Department of Natural Resources and Environment (DNRE)
Mille Lacs Band of Ojibwe
43408 Oodena Drive, Onamia, MN 56359
320.532.4704 (Charlie.Lippert@millelacsband.com)

c. Funding Requested: $555,720
d. Total Project Cost: $718,785 (MPCA will contribute in-kind monitoring equipment, monitoring staff time, model development staff time, and computer resources for modeling, MDH will contribute analytical equipment and laboratory staff time)
e. Project period: Start date flexible, can begin as soon as funding is available after September, 2011. Project duration 3 years.
f. DUNS number- 197276306.

(note that hypertext links are embedded in this document)

Narrative Proposal Work Plan

This proposal aims to characterize air concentrations of polycyclic aromatic hydrocarbons (PAHs) spatially and temporally in an inner city community with the goal of identifying sources, estimating potential health risks to residents, and comparing measured concentrations with model predictions. We address scope of work B.1. of the RFP, Community-Scale Monitoring. To varying degrees we respond to all five (a. to e.) of the needs/justifications under this category. To summarize briefly, three fixed site Hi-Volume PUF samplers will be used to collect samples every 12 days for analysis of gas and particle phase PAHs. One sampler will be located in a group of lower socio-economic status communities in central Minneapolis that is disproportionately affected by air pollution (Phillips), and the other two will be rotated among sites in Blaine (exurban speciation site), Harding High School in St. Paul (expected $PM_{2.5}$ nonattainment site), the Mille Lacs Reservation in central Minnesota (background site) and the Marathon-Ashland Refinery in South St Paul (identified as high risk source by EPA data and USA Today report). These samplers will be used to characterize temporal and large scale spatial variation in PAH concentrations. In addition, ten passive PAH samplers (Motelay-Massei et al, 2005; Bartkow et al, 2006; Santiago and Cayetano, 2007; Klanova et al, 2008) will be located in Phillips at sites identified by the Minnesota Risk Screening (MNRiskS) model to cover a gradient of expected concentrations from a variety of sources. These samplers will be used to characterize fine scale spatial distribution and source allocations. Passive samplers will also be co-located with the PUF samplers. The passive samplers will operate over 28 day sample periods. The data quality objectives are to be suitable for submission to EPA's AQS system and to be useable for verifying source contributions, emissions estimates, and model predictions of concentration and risk.

a. Basis and rationale

Phillips is comprised of the Ventura Village, Phillips West, East Phillips, and Midtown Phillips neighborhoods. These communities located in central Minneapolis are lower socio-economic status and disproportionately affected by air pollution. They are surrounded by busy roads, including the most highly trafficked roadway segment in the state on its northern boundary. Phillips has been the subject of EPA-funded studies of personal exposure to $PM_{2.5}$ and volatile organic compounds (VOCs, Sexton et al 2004a, 2004b, 2006; Adgate et al 2002, 2003; Pratt et al 2004, 2005), school children's exposure to air pollution (Greaves et al 2007; Adgate et al 2001, 2004, Claytona et al 2003), among others. The communities have been targeted for childhood lead exposure intervention and remediation around an arsenic-contaminated superfund site.

Phillips is demographically diverse, notably including the largest urban Native American community in the nation. Community leaders have been vocal in their opposition to air pollution emissions, and the Minnesota Pollution Control Agency (MPCA) has worked to develop relationships and programs to address community issues. MPCA operates an air monitoring site at Anderson School (page A-26 of embedded link) in Phillips with sampling for $PM_{2.5}$ (Federal Reference Method, continuous, and speciation), TSP metals, and VOCs. Figure 1 shows a map of Phillips generated using EPA's EJView program. The EJView demographic report for Phillips can be found here.

PAHs comprise a category of substances that are emitted to the air mainly from combustion sources. Petroleum and petroleum products can also emit PAHs. Incomplete combustion such as in uncontrolled burning (wildfires, structure fires, backyard burning, etc.) and internal combustion engines (cars, trucks, lawn and garden equipment, recreational equipment, etc.) tend to produce greater amounts of PAHs than controlled combustion of homogeneous fuels. PAHs are semi-volatile substances that can be present in the atmosphere in the gas phase, the particle phase, or both, depending on the environmental conditions and the vapor pressure of the specific compound. Toxicity and potency varies among individual PAHs, but many of them are known to cause health effects including cancer. Many PAHs are classified as persistent, bioaccumulative toxicants (PBTs) which, in addition to being toxic, persist in nature and bioaccumulate in the food chain. However most invertebrates metabolize PAHs into reactive intermediate species that are not accumulated, but can form adducts on proteins and nucleic acids (European Commission, 2002; IARC, 2010; US EPA, 2010). PAHs in the environment only occur in complex mixtures, and therefore, toxicity is best characterized through evaluation of whole mixtures (US EPA, 2002; 2010). However, relatively few mixtures have been evaluated. As a result, the toxicity of a few constituent PAHs are often combined and used as a surrogate for mixture toxicity and potency (US EPA, 1993; 2010). Data on many potent carcinogenic PAHs in ambient air are sparse.

Given their persistence, relatively high toxicity, and ubiquitous sources there is concern about the effects of PAHs on human and environmental health. Despite the high level of concern, there is relatively little monitoring data on the occurrence of PAHs in the environment in comparison to other air pollutants. Many studies have focused on specific industrial sites, workers' exposure, or remote areas due to the PBT properties of PAHs. Air monitoring of PAHs is being done in the gulf coast following the BP oil spill and is routinely done at an industrial site in Hamilton, Ontario. Hung et al (2005) found that PAH concentrations in the Canadian arctic mimicked those at mid-latitudes and were consistent with long-range transport to the Arctic, particularly for the lighter PAHs. Motelay-Massei et al (2005) and Santiago and Cayetano (2007) used passive PAH samplers and found gradients in concentrations from high values in the center city to lower values away from urban sources. In addition, they found seasonal differences, with higher concentrations in the winter months. Gouin et al. (2005) used passive and active air samplers as complementary methods for investigating the spatial and temporal occurrence of persistent organic pollutants in the Great Lakes Basin. There have been several studies monitoring airborne PAHs as a means of investigating sources of these and other air pollutants in urban areas (Harrison et al. 1996, Larsen and Baker 2003, Nielson et al. 1998, Schauer and Cass 2000, Simcik et al. 1999), but few studies have investigated the potential health consequences of typical urban PAH concentrations or used monitoring to compare to community scale modeling results. Owing to limited monitoring data, there is uncertainty about the health concerns due to PAH exposure in ambient air. An MPCA air pollution reduction strategy team selected PAHs as one of the 5 top priority pollutants for the state, though there was more uncertainty about sources, concentrations and emissions of PAHs than other priority pollutants.

MPCA developed and employs a statewide air toxics risk screening program called MNRiskS (Pratt et al 2011) with the capability of examining concentrations and risks from individual pollutants and groups of pollutants from individual sources or categories of sources (including point, non-point, on-road, and non-road subcategories) at a community level of spatial resolution. MNRiskS was originally developed with assistance from EPA and was peer reviewed by EPA in 2005. MNRiskS is specified in the MPCA Air Quality Strategic Plan as a tool for identifying pollutants, sources, and locations for targeting air pollution reduction activities (see goal A.2). It is also specified in the Environmental Performance Partnership Agreement between MPCA and EPA Region 5 (see pp. 17-18). MNRiskS provides greater spatial resolution than the National Air Toxics Assessment (NATA) and includes individual PAH compounds rather than naphthalene plus the total PAH/POM mixture category modeled in NATA. Figure 2 shows a MNRiskS output map of the inhalation cancer risks from a suite of 32 PAHs in the Phillips communities. The MNRiskS tool will be used in this project to estimate which specific PAHs are of concern, their sources, where in the neighborhood high concentrations are expected, and estimated cancer and non-cancer risks by relevant exposure pathways to adults and children. The model results will be used to inform the siting of passive samplers to capture gradients and source impacts. In turn, the monitoring results will be used to verify the model performance. Preliminary work with MNRiskS has identified commercial/consumer solvent use (mainly naphthalene from pesticides), on-road mobile sources, and residential wood smoke as important contributors to risks from PAH air emissions in the Phillips communities. In comparison, in NATA risks were highest from on-road sources of naphthalene and from non-point sources of PAH/POM. See Table 1 for a sample output from MNRiskS for one of the more highly impacted receptors on the edge of Phillips.

The results of this study will have implications for other urban communities including those affected by environmental justice concerns, will provide information on sources of PAHs, and will help calibrate the level of concern about PAH emissions that is appropriate for urban communities.

Table 1. Example output from MNRiskS for a receptor on the edge of Phillips.

COPC Name	CAS No.	SCC	Pathway	Cancer Risk	Hazard Quotient
Benzo(a)pyrene	50-32-8	Light Duty Gasoline Vehicles	Inhalation	3E-08	
Naphthalene	91-20-3	Comm./Consumer Solvent Use	Inhalation	1E-06	8E-03
Naphthalene	91-20-3	Light Duty Gasoline Vehicles	Vegetables		6E-06
Dibenz(a,h)anthracene	53-70-3	Residential Wood Combustion	vegetables	7E-07	
Naphthalene	91-20-3	Comm./Consumer Solvent Use	vegetables		2E-05

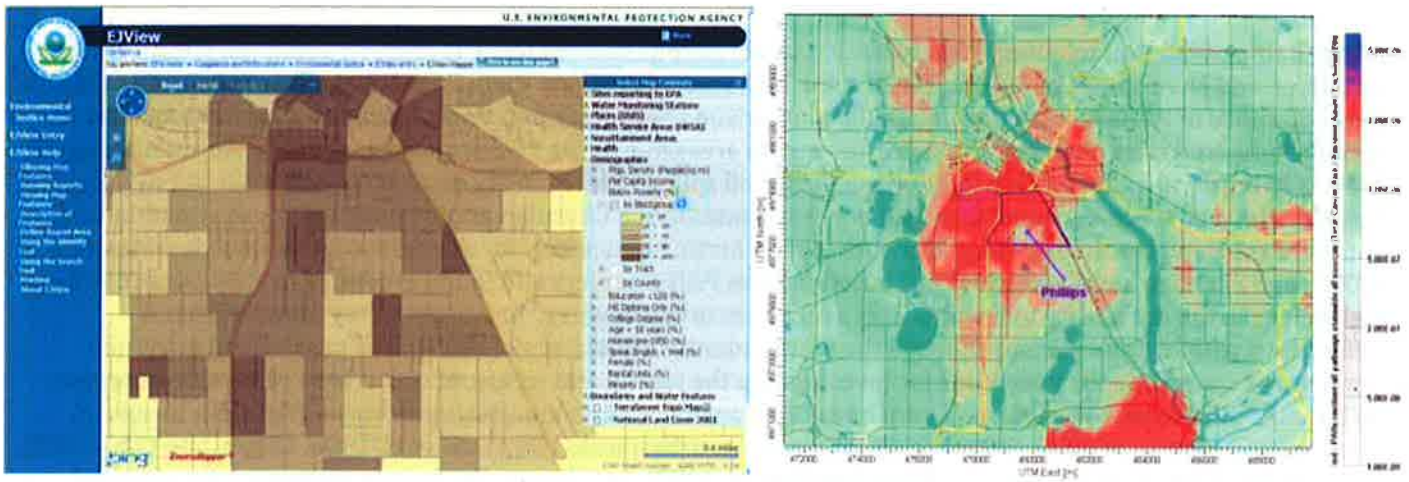

Figure 1. EJView generated map of the Phillips communities showing the percent below poverty.

Figure 2. MNRiskS map of Phillips (outlined in purple) showing major roadways, locations of point sources (small red squares), and adult resident cancer risk isopleths from the combination of all PAHs from all sources. Note the higher risks near the interstate highway commons in the northern and western edges of Phillips (Ventura Village and Phillips West) and the higher risks near two point sources (a smelter and an asphalt plant) in the southeastern corner (East Phillips). The high risk area in the bottom right is the MSP airport.

b. Technical Approach

Our primary technical goal is to obtain gas phase and particulate PAH measurements using passive samplers and high volume samplers at locations in an urban community. A Hi-Volume PUF sampler will be located at Anderson School in central Phillips for a two year sampling period. The remaining Hi-Volume PUF samplers will be rotated among sites in Blaine (exurban speciation site), Harding High School in St. Paul (expected $PM_{2.5}$ nonattainment site), the Mille Lacs Reservation in central Minnesota (background site) and the Marathon-Ashland Refinery in South St Paul (identified as high risk source by EPA data and USA Today report). Passive samplers will be co-located with the Hi-Volume PUF samplers. The remaining passive samplers will be used to cover fine to middle-scale spatial resolution in the Phillips communities for at least two years of data collection. The two year sampling period is needed to acquire sufficient data for statistically valid source apportionment and for reliable comparison of measured concentrations to chronic health benchmarks and to model predictions. Siting will be informed by MNRiskS modeling and environmental justice screening to cover gradients of risk, source contributions, and environmental justice rankings. Specific on-the-ground locations will be selected with the assistance of the Mille Lacs Tribal representative in Phillips. Preliminary MNRiskS results suggest three potential gradients for investigation: a north-south transect in central Phillips and two east-west transects (one in south and one in north Phillips near Interstate 94, extended westward into the Stevens Square/Loring Heights community). These transects will capture the impacts of mobile source emissions along the freeway corridors as well as the asphalt plant and foundry in southeast Phillips.

Table 2 gives an overview of the proposed sampling. Table 3 lists the PAH compounds that will be evaluated for inclusion in the study. The list of analytes was chosen based upon: presence on the MDH extended list of analytes, potential for updated cancer potency factors, presence in the MN Emissions Inventory (and therefore in MNRiskS), the availability of source profile data for receptor modeling analysis, and compounds collected on passive samplers published studies. The MDH extended PAH list was sufficient to encompass most of these criteria with the exception of a few PAH compounds, which are identified in the table. The Minnesota Department of Health (MDH) Public Health Laboratory will employ standard quality assurance methods including duplicate samples, laboratory blanks, and field blanks. The data quality objectives are to be suitable for submission to EPA's AQS system and to be useable for verifying source contributions, emissions estimates, and model predictions of concentration and risk.

The Phillips Communities have some of the largest urban Native American communities in the nation. The Mille Lacs Band of Ojibwe has demonstrated air quality expertise and strong presence in the community (20% of the total band population live in Phillips and 5% commute between this area and the reservation). Tribal staff have worked on air pollution grants (Seventh Generation) and air pollution reduction projects (CAIP) and currently operate a monitoring site on the Mille Lacs reservation in central Minnesota (one of the proposed Hi-Volume PUF sites). The air quality technician from the Mille Lacs Band of Ojibwe Department of Natural Resources and the Environment will facilitate site identification and deployment of passive samplers with the community and the MPCA, relying on their knowledge of the community and perception of highly impacted areas. The support of the DNRE will also be incorporated into preparation for and communication of the results of this work (see attachment a).

Table 2. Estimated number of samples

Sampler type	no. samplers	sampling frequency	sampling duration	no. samples
Hi-Vol PUF and TSP filter	4 (1 for 1 year only)	12 days	2 years	420*
Passive PAH	10	28 days	2 years	240

**Reflects PUF and filter sampling media. Samplers may be modified to collect $PM_{2.5}$ as needed if total depositional load (i.e. TSP) estimates are not needed.*

Table 3. PAH compounds to be evaluated for inclusion in this study.

CAS # or EPA ID#	PAH Compound Name	CAS # or EPA ID #	PAH Compound Name	CAS # or EPA ID #	PAH Compound Name
42397-64-8	1,6-Dinitropyrene	199-54-2	Benz[e]aceanthrylene	189-55-9	Debenzo(a,i)pyrene
42397-65-9	1,8-Dinitropyrene	202-33-5	Benz[j]aceanthrylene	226-36-8	Dibenz(a,h)acridine
5522-43-0	1-Nitropyrene	211-91-6	Benz[l]aceanthrylene	224-42-0	Dibenz(a,j)acridine
91-57-6	2-Methylnaphthalene	56-55-3	Benzo(a)anthracene	192-65-4	Dibenzo(a,e)pyrene
607-57-8	2-Nitrofluorene	50-32-8	Benzo(a)pyrene	53-70-3	Dibenzo(a,h)anthracen
56-49-5	3-Methylcholanthrene	205-99-2	Benzo(b)fluoranthene	189-64-0	Dibenzo(a,h)pyrene
57835-92-4	4-Nitropyrene	205-12-9	Benzo(c)fluorene	191-30-0	Dibenzo(a,l)pyrene
3697-24-3	5-Methylchrysene	192-97-2	Benzo(e)pyrene	5385-75-1	Dibenzo[a,e]fluoranthene
602-87-9	5-Nitroacenaphthene	191-24-2	Benzo(ghi)perylene	206-44-0	Fluoranthene
7496-02-8	6-Nitrochrysene	205-82-3	Benzo(j)fluoranthene	86-73-7	Fluorene
57-97-6	7,12-Dimethylbenz(a)anthracene	207-08-9	Benzo(k)fluoranthene	193-39-5	Indeno(1,2,3-cd)pyrene
194-59-2	7H-Dibenzo(c,g)carbazole	205-12-9	Benzo[c]fluorene	91-20-3	Naphthalene
83-32-9	Acenaphthene	86-74-8	Carbazole	198-55-0	Perylene
208-96-8	Acenaphthylene	218-01-9	Chrysene	85-01-8	Phenanthrene
120-12-7	Anthracene	191-07-1	Coronene	129-00-0	Pyrene
191-26-4	Anthrathrene	27208-37-3	Cyclopenta[c,d]pyrene		

c. Data Analysis

Data analysis will occur in five basic phases: (1) basic exploratory statistics (means, ranges, distribution estimations, etc.); (2) time trend analyses at each site and sites in combination when appropriate; (3) spatial mapping using a geographic information system and subsequent geospatial analyses to assess potential significant differences between sampling locations; (4) source apportionment (receptor modeling) and (5) model-based analyses (MNRiskS). The co-located high volume (gas and particle phase) and passive sampling data will be compared to determine biases between the two methods using standard statistical techniques (e.g., see Pratt et al., 2004 and 2005). Similarly, the two sets of monitoring data will be compared to model predictions to evaluate model performance. The largest source of model error in this type of analysis has usually been tied to

shortcomings in the emissions inventory. Thus, the model performance analysis will be used to point to areas for potential emissions inventory improvement.

Summary statistics plus time series, trend, and serial correlation analyses will be used to investigate temporal (seasonal, day of week, etc.) and spatial variability in the data. The spatial and temporal variations of PAH concentrations will also provide information useful for source apportionment along with other air pollutants (criteria and air toxics) monitored at these locations.

Concentrations of individual PAHs will be compared to toxicity benchmarks for cancer and non-cancer endpoints to estimate risks that can be evaluated individually and combined across pollutants and endpoints to provide a picture of the cumulative effects. These risk results will be compared to model results from MNRiskS using the data analysis methods cited above.

In the past 15 years, scientists and agencies have measured PAHs in air and analyzed their covariation to attribute their concentrations to source groups (i.e. source apportionment statistics). Source apportionment modeling techniques such as Chemical Mass Balance modeling and Positive Matrix Factorization will be used to attribute PAH concentrations to specific sources and source categories. This information together with toxicity benchmarks from MDH will be used to identify sources of greatest risk for focusing emissions reductions activities.

d. Environmental Justice Impacts

As described in section a. (basis and rationale) Phillips comprises four inner-city communities that are challenged in many ways, not least of which is poor air quality. Modeling and monitoring data and numerous studies have documented these challenges. Phillips communities' leaders have repeatedly pointed out the fact that their communities are disproportionately affected by environmental pollution. The situation has been recognized by the Minnesota State Legislature which passed Minnesota Statutes Section 116.07, Subdivision 4a requiring a "cumulative levels and effects" analysis before the MPCA may issue a permit in the area around Phillips.

This proposal aims to target additional monitoring and analysis work in the Phillips communities that have been the focus of environmental justice concerns. The results of this work will be used to prioritize on-going emissions reductions efforts among the MPCA, the City of Minneapolis, Native American tribal organizations, and Phillips Communities' neighborhood associations. The Mille Lacs Band of Ojibwe has a strong presence in the communities, and is participating as co-investigator in this proposal. The City of Minneapolis and the Phillips neighborhood associations' leaders have expressed their support for this proposal.

e. Community Collaboration and Outreach

In recent years, MPCA coordinated the Community Air Improvement Project (CAIP) encompassing the areas of East Phillips, Phillips West, Midtown Phillips and Ventura Village. Together, state agency, community leaders and members, tribal representatives and other stakeholders met for approximately a year to prepare and prioritize a list of potential activities to reduce air pollution in the communities. MPCA has also met within this area to solicit community response to "cumulative levels and effects analysis" for all air permits within this area of Minneapolis (see item d).

Preventing Harm Minnesota, the Native American Community Clinic and the University of Minnesota conducted "exposure mapping" to better understand perceived high exposure areas in the Phillips communities based on observation by community members. The resulting information and maps, along with other planned interactions, will allow for community knowledge to inform placement of passive monitors.

The MPCA expects four main foci of interaction with the impacted community during the conduct of this study: (1) initial meetings with CAIP and others to evaluate passive monitor placement; (2) ongoing information sharing during the period of sampling and analysis, through emails, website postings, and attendance at community meetings; (3) sharing final results of monitoring, estimated risk and source apportionment through the aforementioned channels; and (4) use of source allocation information in refining emissions reductions efforts

(e.g., CAIP). A communications plan for this grant is included in the appendices. Peer reviewed publications will also be submitted.

f. Environmental Results: Outcomes, Outputs, Performance Measures

The most basic outcome of the project will be air concentrations in gas and particle phase of PAHs on urban to exurban gradients and as well as nearby to farther-field roadway measurements. This will be the only dataset of measurements of semi-volatiles in air in Minnesota. The dataset will be used for analyses of health impacts from these pollutants and the identification of PAHs and sources with greatest risks. These data will ultimately be evaluated by their value to the scientific community and their usefulness in developing priorities and plans relevant to pollution reduction activities.

Building upon past work with the community, and experience with risk communication, the results of the project will be disseminated through a variety of methods (fact sheets, website, community meetings, and the Community Air Improvement Planning (CAIP) process]. We envision that community outreach incorporating this information will continue beyond the project timeframe. See attached communications plan for more detail.

As a result of this funding, the MDH Public Health laboratory will build capacity to conduct analytical measurements of PAHs in air. This capacity will allow future work assessing potential health impacts of air emissions of PAHs. All ambient air monitoring data collected by the MPCA must be of the appropriate quality to be entered into the EPA Air Quality System (AQS). Data collected by the project will be uploaded to AQS thereby allowing our results to be used nationally by other state, local and tribal agencies.

Table 4. Project timeline. The last two rows will be ongoing activities beyond the project timeline.

Activity	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Refine sampling plan w/ stakeholders												
Pilot sampling, analysis, QA methods												
Collect air samples												
Analyze samples for PAHs												
Statistically analyze data												
Communicate results w/ community												
Use results in emission reduction activities												
Prepare/submit reports/manuscripts												

g. Programmatic Capability and Past Performance

The MPCA manages millions of dollars in federal grant funds each year; total project costs of over $72 million (federal and state funds) are being managed at this time. The range of federally funded projects covers many environmental program areas. MPCA has demonstrated organizational capacity to manage a vast array of environmental programs and projects, with a proven record of timely reporting, project completion and performance. Three recent grants are described of similar nature and/or grant monetary value.

Example 1: Pollution Prevention Grant 2010, part of EPA Performance Partnership Grant (PPG), BG98568809: (Grant period 10/1/10 - 9/30/12). MPCA is currently managing this EPA P2 grant. Work is well underway to manage the projects of this grant and document its outputs and outcomes. MPCA is committed to successfully meeting the expectations of this grant and reporting results to EPA within all applicable deadlines.

Example 2: EPA $PM_{2.5}$ Monitoring Network FY2011 Allocation PM98577604 (Grant Period April 2008 to March 2012) EPA has extended the MPCA grant for conducting $PM_{2.5}$ monitoring. This grant funds monitoring and analysis activities to collect ambient fine particles under the Clean Air Act Section 103 for Minnesota's $PM_{2.5}$ sampling network. MPCA continues to meet all project reporting requirements.

Example 3: Water Quality Management Planning Clean Water Act Sections 205(j) and 604(B) EPA Grant Number C600E24903 Project Period: 10/1/09 – 9/30/10 Total Budget: $378,000 This grant supported water quality monitoring, including developing databases, water use assessments, reporting under Clean Water Act requirements, making data available to basin planners, local water planners and other decision-makers, and surface water monitoring coordination for the MPCA and agencies. Project was completed within grant period, and all reporting milestones, including final reports, were met on time.

h. Detailed Budget Narrative

Budgetary information is provided for the Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Health (MDH) and the Mille Lacs Band of Ojibwe. The salary costs for the MPCA include (1) the principal investigator to oversee the project and participate in the data analysis, report writing, communication with stakeholders, and inserting the findings into emissions reductions discussions and plans; (2) a senior scientist to provide guidance and mentoring and to participate in data analysis, report writing, communication with stakeholders, and inserting the findings into emissions reductions discussions and plans; (3) a monitoring technician to support sampler deployment and maintenance; (4) an air toxics scientist to participate in data analysis and report writing; and (5) a community outreach coordinator. Mille Lacs Band salary costs are for technical support in locating and servicing monitors and for assistance in interpretation and communication of results. MDH laboratory costs are calculated on a per sample basis and reflect laboratory personnel. Other MDH and MPCA personnel costs are contributed.

Table 5. Summary of Project Budget

Budget Item	EPA Cost	Cost-Share	Total
MPCA Personnel			
Principal Investigator @ 0.2 FTE x 3 years, $30.45/hr	$19,001	$19,001	$38,002
Senior Scientist @ 0.1 FTE x 3 years, $37.93/hr	$11,835	$11,835	$23,670
Monitoring Technician @ 0.15 FTE x 3 years, $20.02/hr	$12,493	$6,247	$18,740
Community Outreach Coordinator @ 0.05 x 3 years, $34.50/hr		$10,764	$10,764
Air Toxics Scientist @ 0.05 FTE x 3 years, $31.58/hr		$9,853	$9,853
Administrative support (0.03 x 3 years)		$3,527	$3,527
Fringe - 30% of Salary	$12,999	$18,368	$31,367
TOTAL PERSONNEL (INCL FRINGE BENEFITS)	$56,328	$79,595	$135,923
Travel (2 MPCA staff to national meetings to present results (per = per person), air fare $1000/per, registration $500/per, hotel $600/per, meals $200/per, preparation (posters, etc.) $100/per, land travel $100/per)	$5,000		$5,000
TOTAL TRAVEL	$5,000		$5,000
4 High volume air samplers with polyurethane foam plugs, XAD resin and filter housing		$38,105	$38,105
TOTAL EQUIPMENT		$38,105	$38,105
Passive Samplers ($200 *20, 2 replacements, shipping and handling)	$5,000		$5,000
TOTAL SUPPLIES	$5,000		$5,000
MDH - interagency agreement for lab analysis of PAHs ($625 per sample x 660 samples, ~47 analytes per sample, Accelerated Solvent Extraction (ASE) Equipment at $65,000 with ~50% cost share from MDH, Senior toxicologist @ 0.02 FTE x 3 years	$447,500	$35,206	$482,706
Mille Lacs Band of Ojibwe DNRE - sampling support and communication/outreach (air quality technician, 0.05 FTE, $22.08/hr, 59.1% fringe, 17.32% indirect, meeting space)	$13,468	$1,000	$14,468
TOTAL CONTRACTUAL	$460,968	$36,206	$497,174
Indirect Costs (27.65% of MPCA personnel)	$28,424	$9,159	$37,583
TOTAL INDIRECT	$28,424	$9,159	$37,583
TOTAL	$555,720	$163,065	$718,785

i. Leveraging (See also Section III.B)

MPCA staff time contributions will equal or (more likely) exceed the budgeted amounts. In addition, MPCA leases existing ambient monitoring sites and will continue to cover all of the utility costs, supplies, etc. for the maintenance of these sites. We have pre-existing relationships with the Phillips community which lowers outreach costs since we have worked together in past process development (MN Stat 116.07, Sub4a), air pollution improvement programs (CAIP), etc. and contacts are already in place.

The Minnesota Public Health Laboratory (MPHL) was established more than 100 years ago and has grown into a premiere national Public Health Laboratory. The Public Health Laboratory Environmental Section is well-positioned to support the analytical requirements of this grant. The laboratory is a full service analytical laboratory and scientists have extensive experience developing methods for environmental and clinical matrices for the presence of public health hazards. The laboratory currently has a staff of 37 chemists including four scientists at the Ph.D. level, and six Masters level scientists. The laboratory analyzes for a broad suite of organic chemistry compounds, metals, radiochemical isotopes, and general chemistry parameters. Specifically, PAHs in water and soil have been analyzed by the Public Health Laboratory for nearly 30 years. Initially the work included the set 16 EPA PAH compounds (EPA method 610) and analyses were conducted by high pressure liquid chromatography/fluorescence detection. Approximately 16 years ago the laboratory changed PAH analysis to gas chromatography/mass spectrometry (GC/MS) methodology. This technology allowed the laboratory to include a broader range of PAH analytes and when necessary to utilize GC/MS-SIM (selective ion monitoring) for increased sensitivity. Currently the laboratory offers several PAH methods including an expanded list of over forty PAHs and a detection limit in the parts per trillion range for many of the analytes. Through the completion of this work, the laboratory will build the capacity to analyze trace levels of PAHs in air samples (gas and particles) to support health impact work as well as source assessments. This enhanced capacity and capability will be available to all state programs to support air quality measurements and track trends for a broader geographical proportion of Minnesota.

The purchase of a pressurized solvent extraction system for sample preparation will replace traditional Soxhlet extractions, allowing for a reduced solvent extraction method and faster analytical throughput. Following analyte extraction from the collection media samples will be concentrated and subjected to chromatography clean-up. The final extracts will be analyzed using gas chromatography-mass spectrometry analysis. The MDH Public Health Laboratory will provide in kind support for 50% of the purchase price of the pressurized solvent extraction system. In addition, the laboratory will support the staff time for analytical method development and the development of a quality assurance project plan.

Primary programs that the Public Health Laboratory supports include the Minnesota Pollution Control Agency (MPCA) Closed Landfill Program, the EPA Safe Drinking Water Program, the State of Minnesota OSHA program, and the MPCA Lakes and Streams Monitoring Program. In addition, the MPHL is one of ten national Level 1 chemical laboratories in support of the Laboratory Response Network (LRN) analyzing for chemical terrorism agents and toxic industrial compounds. All of these activities are supported by utilizing in-house ICP/MS, GC/MS, GC/MS/MS, and LC/MS/MS instrumentation. The MPHL is housed in a new 60,000 square-foot state-of-the-art laboratory built in 2005.

The state of Minnesota recently completed a study involving ambient air sampling of perfluorinated compounds (PFCs). The Hi-Volume PUF samplers from that study will be used in this study to capture gas and particle phase semi-volatiles. MNRiskS was recently updated to year 2005 (emissions/meteorology/traffic/methodologies) and is currently in use. Much work in source identification, stack parameter data, emissions inventory, etc. has been put into the development of MNRiskS. Measurements of PAHs in air will assist in the calibration of MNRiskS.

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APPENDICES/ATTACHMENTS

a. Communications Plan Attached

b. Biographical Sketches Attached

c. Negotiated Indirect Cost Rate Agreement Attached.

d. Quality Assurance Narrative Statement.

e. Support Letters

f. Full References