

GRANT PROPOSAL
USEPA Local-Scale Air Toxics Ambient Monitoring Program
Request for Application (RFA)
August 2005

Project Title

Southwest Indianapolis Community Air Toxics Monitoring and Risk Characterization Project

Requesting Agency

The Indiana Department of Environmental Management

Partner Agency

City of Indianapolis, Office of Environmental Services

Project Stakeholders

Indiana Department of Environmental Management
City of Indianapolis
Marion County Health Department
United States Environmental Protection Agency, Region 5

If the project is approved, other stakeholders will be invited to participate.

U.S. EPA Regional Office Contact

Motria Caudill
U.S. EPA Region 5
Air Programs Branch
77 West Jackson Boulevard
Chicago, IL 60604-3590
312-886-0267

IDEM Contact/Project Manager

Brian Wolff
Office of Air Quality
IN Dept. of Environmental Mgmt.
100 N. Senate Ave.
Indianapolis, IN 46204
317-234-3499
bwolff(at)idem.in.gov

Grant Requested

\$244,262

Funding Mechanism

USEPA Local-Scale Air Toxics Monitoring Program (OAR-EMAD-05-16)
FY2006 State and Local Agency Grant

Other Resources

Resources dedicated to supporting this project are projected to be approximately 3.75 full-time employees (FTE). This projection is for IDEM and City of Indianapolis resources only and does not account for participation, review and other activities provided by other project stakeholders. IDEM is only seeking funds associated with costs for .4 of one full-time employee as part of this grant (refer to project budget).

The Indiana Department of Environmental Management will dedicate resources to:

- Manage the project.
- Locate and operate monitoring sites for air toxics within the primary study area.
- Analyze and interpret data collected from this project.
- Collect HAP emissions data from sources in the primary and secondary study areas.
- Significantly enhance the HAP emissions inventories for all source categories within the primary and secondary study areas.
- Conduct modeling to characterize risk (cancer and non-cancer) in the primary and secondary study areas.
- Work with identified stakeholders to review all data associated with the project.
- Develop written documentation (including final report summarizing results of project) of the project analysis and implementation to facilitate experience and knowledge transfer to support capacity development for other local community air toxics assessments.

The City of Indianapolis, Office of Environmental Services will dedicate resources to:

- Retrieve monitoring data and filters.
- Send filters, etc. to lab for analysis.
- Collect data from the lab and compile for analysis.
- Assist in analysis of monitoring and emissions inventory data.
- Assist with outreach (community and emission sources).
- Assist with the preparation of written documentation, including a final report summarizing the results of the project.

Study Area

For the purposes of this project, a primary and secondary study area is proposed. The map on page 12 of this document depicts the boundaries of both study areas. The air toxics monitoring portion of this project, as well as the model to monitor comparison shall apply to the primary study area only. The primary study area accounts for approximately one-third of the secondary study area. The boundaries of the secondary study area are preliminary at this point and are likely to be redefined once 12 months of monitoring data is analyzed, and the emissions inventories have been refined. The secondary study area will encompass the industrial sources found to most likely contribute to monitored concentrations within the primary study area. The emissions inventories will be refined and then modeling will be conducted for the secondary and primary study areas.

Background

On December 31, 2002, the Indiana Department of Environmental Management published a report summarizing key hazardous air pollutant (HAP) risk issues in Indiana, based on a comprehensive review of existing emissions, monitoring and modeling data. This report addressed the requirements of Senate Enrolled Act (SEA) 259, which was passed by the Indiana General Assembly in 2002. In addition to summarizing HAP risk issues, the report also contained a five-year strategy, with priorities, for further assessing and addressing these issues.

One finding of the assessment was that, based on US EPA's 1996 National Air Toxics Assessment (NATA), some areas of the state (e.g., Marion, Allen and Lake Counties) have significantly higher estimated risk from HAPs. These three counties, which account for 27% of the state population, have a population-adjusted estimated cancer risk of 94 in a million – almost 60% greater than the statewide average. The risk in these counties is driven primarily by point source emissions.

Further, certain census tracts may be subject to even greater risk associated with exposure to air toxics. Two census tracts located in southwest Marion County (#342600 and #358100) are of particular concern. Based on the 1996 NATA, these two census tracts, which are adjacent, rank #17 and #21 nationally (out of over 60,000 census tracts assessed). The risk in these census tracts appears to be driven by point source emissions, primarily chromium. The map on page 9 incorporates these census tracts and depicts the study area boundary. Furthermore, preliminary information associated with the 1999 NATA indicates that cancer risk within certain portions of the proposed study area may even be greater and driven by arsenic (primarily from a single industrial source).

Southwest Marion County (Indianapolis) is heavily industrialized with a number of large stationary sources like the Chrysler Foundry, Eli Lilly, Allison Transmission, Rolls Royce, Indianapolis Power and Light, Quemetco, inc., Valspar, and Reilly Chemical Industries. According to the 2002 Toxics Release Inventory, this select group of stationary sources alone account for over 1000 tons of HAPs annually. The Indianapolis International Airport is located within a few miles of the assessment area, and two urban interstates (I-70 and I-465) interconnect near the assessment area. Both of these urban interstates are among the most heavily traveled transportation arteries in Indiana. All of these elements add up to an assessment area with significantly impacted air quality.

As the attached news articles from the *Indianapolis Star* indicate, the community of southwest Indianapolis has expressed concern regarding toxic emissions and the high rates of asthma and lung cancer in the area. The affected census tracts within the assessment area consist primarily of low income, minority populations.

Proposed Project

There are six elements of this proposed project:

1. Conduct community-scale air toxics monitoring within the primary study area, using a variety of monitoring technologies and techniques.
2. Collect additional emissions information from sources within the primary and secondary study areas and significantly enhance the emissions inventories for all source categories within the areas.
3. Conduct HAP modeling to identify model-to-monitoring relationships for the primary study area.
4. Establish capacity for use of the Regional Air Impact Modeling Initiative (RAIMI) to evaluate the potential health impacts resulting from exposure to multiple contaminants from multiple sources, at a community level of resolution.
5. Assess the exposure and characterize the health risk from HAPs within the primary and secondary study areas.
6. Form a stakeholder group to communicate results of study and identify risk reduction strategies, if necessary.

IDEM, in conjunction with the City of Indianapolis will conduct air monitoring to assess ambient air concentrations of metals, carbonyls and VOC HAPs in the primary study area. IDEM will operate two identical sites within the primary study area. There will be one upwind and one downwind site, each will be strategically located based on an evaluation of the 1996 and 1999 NATAs, proximity to major sources for HAP emissions, and other criteria deemed appropriate. Each site will operate on a one in six-day frequency collecting 24-hour composite samples. Total Suspended Particulate filters will be collected using Hi-Volume samplers for trace metals analysis. Carbonyl samples will be collected using Atec 2-channel DNPH tube samplers, which allow for duplicate sample runs for quality assurance/quality control purposes. Hazardous Air Pollutants will be collected in 6-liter stainless steel Summa-polished canisters using Meriter air toxic samplers, also capable of duplicate runs for QA/QC. All canister HAP samples will be analyzed by IDEM as an in-kind contribution to this project. All other samples collected will be analyzed by the U.S. EPA via a qualified contractor as an in-kind service under this grant program. All additional criteria and non-criteria pollutant monitoring conducted in the Southwest Indianapolis sector, as well as the whole of Marion County, will also be analyzed to aid in the characterization of the air toxic source/receptor relationship.

As an additional in-kind service under this program, the U.S. EPA via a qualified contractor will operate one specialized monitor (RMESI Model 924-Cr+6 Sampler or equivalent) at the downwind site location to collect hexavalent chromium data. Data will be collected at the one site for one year. This activity will include sixty samples (1 every 6 days), ten-percent duplicates (additional 6), and twelve field blanks, for a total of seventy-eight samples. Data collected will enable IDEM and the U.S. EPA to determine what portion (fraction) of the total measured chromium is hexavalent (Cr+6).

This study will take place in three stages, with the parameters of the second and third dependent on the results of the previous stage. First, as described above, monitoring will be conducted in the primary study area. The monitored concentrations of HAP will be evaluated to determine if there are levels of concern as compared to other Indiana air toxics monitoring sites and based on inhalation risk estimates of such exposures.

Second, IDEM will develop a refined emissions inventory of sources and categories of sources likely to be contributing to the HAP concentrations at the monitors. The location of these sources will define the secondary study area. IDEM will conduct dispersion modeling of these sources to compare to the monitored values.

Third, once there is good model to monitor correlation (sound model performance), IDEM will conduct dispersion modeling of the contributing sources over a larger grid of receptors to determine if there are HAP concentrations of concern in the secondary study area and to characterize the inhalation health risk of those exposures.

Information from this project will not only support or invalidate preliminary findings (i.e. NATA) that this area may be an air toxics hot spot, but will serve to provide context for future HAP-related risk studies. The ambient data will also be used to identify air toxics of concern based on comparison to available dose-response data. Since southwest Indianapolis is an industrial area and is the location of a large point source of benzene emissions (Reilly Industries), the monitoring data will provide good comparison to data from the School #21 project (currently being funded by a U.S. EPA Community Assessment and Risk Reduction grant).

The School #21 project focuses on benzene emissions from a coke production plant in Southeast Indianapolis. IDEM has monitored air toxics, including benzene, at School #21 for several years now. Although IDEM does not expect benzene to be the primary risk driver within Southwest Indianapolis, monitoring and source emissions data from Southwest Indianapolis will provide for comparison with monitoring and source emissions data from the School #21 site. The experience and expertise gained from the School #21 risk assessment and subsequent community outreach will assist IDEM in preparing for and executing the Southwest Indianapolis project. However, the School #21 project focused primarily on a single HAP and stationary source, whereas the Southwest Indianapolis project will be more complex as it will entail a variety of HAPs and stationary sources.

IDEM will also significantly refine the emissions inventories for all source categories in the assessment area to better understand the sources of air toxic emissions in the primary and secondary study areas. The assessment of emissions will include an evaluation of emissions and impacts from several large industrial sources located in the area, including Chrysler Foundry, Quemetco, and Reilly Industries. In addition, the impacts of the Indianapolis International Airport, mobile sources and area sources will be evaluated. The monitoring data assessment and refined emissions inventories will provide a sound platform for modeling. The refined emissions inventories will be reported in conjunction with the National Toxics Inventory. IDEM will conduct dispersion modeling to predict ambient air concentrations and limited deposition flux values resulting from emissions from sources in the assessment area. The Regional Air Impact Modeling Initiative (RAIMI) will be used to evaluate the potential for health impacts resulting from exposure to multiple contaminants from multiple sources, at a community level of resolution. When performing a community risk analysis, it is advantageous to take a broader approach like this, as opposed to the traditional source-by-source, program-by-program evaluation. Developing the capability to conduct localized assessments in a timely manner will be useful when seeking voluntary emission reductions in areas with higher estimated risk, and provide better information to stakeholders. The modeling results will be used in the exposure/risk characterization phase of the assessment.

Grant funds will be used to purchase monitoring equipment and supplies necessary to assess ambient air concentrations of pollutants of concern, specifically heavy metals and VOC HAPs. Additionally, the grant will be used to collect monitoring samples, fund laboratory analysis to be conducted by an off-site subcontractor, and data analysis.

IDEM has an approved quality management system in place. The manual, dated July, 2004 is titled "IDEM's Quality Management System" and is available at the following link:

<http://www.in.gov/idem/air/amb/qa/qamannual.html>

Also applicable to this project is the IDEM Quality Assurance Manual, Chapter 8 (Air Toxics), revised Dec. 1, 2005. Both documents are on file with U.S. EPA Region 5.

Project Outputs and Outcomes

Outputs:

- Identification of air toxics and the associated levels within specified community.
- Identification of sources for air toxics within the community and the associated contribution of each source.
- Identification of probable risk due to exposure to air toxics within the community.
- Identification of emission and risk reduction opportunities.
- Identification of pollution prevention opportunities.
- Identification of public awareness/education opportunities.
- Publication that summarizes the project, the findings and conclusions.

Outcomes:

Short-Term Outcome

- Understanding of ambient levels of air toxics within community and the origin of the pollutants.

Intermediate Outcome

- Understanding of probable risks associated with exposure to air toxics within the community.

Long-Term Outcome

- Better understanding of HAPs, their origin, and health impacts.
- Reduced HAP emissions, exposure to HAP emissions, and overall risk.
- Enhanced technical abilities to perform similar work in the future.

Project Implementation Schedule

	Completion Date		
	2006	2007	2008
Stakeholder Group Formed (Meet Bi-Monthly)	March		
First Year Monitoring Begins	March		
Request for Emissions Data Report from Sources	June		
Emissions Inventories Refined	October		
HAPs Modeling		February	
Model to Monitor Comparison		May	
Risk Characterization		July	
Communication of Results		October	
Identification of Risk Reduction Strategies		October	
Interim Report Issued		December	
Second Year Monitoring Complete			February
Final Report Issued			March

Note: The schedule of milestones is dependant upon when funds are awarded and the schedule for equipment and supply delivery and installation. Quarterly progress reports will be submitted from the project start date, through the submittal of the final report.

Relationship with the Urban Air Toxics Strategy (UATS)

This project will assist in accomplishing the goals of the UATS in the following ways:

- Increases knowledge of refined risk information on the local level (improved inventories, ambient monitoring data, refined modeling/exposure calculations.)
- Develops federal, state and local capabilities in air toxics assessments.
- Provides localized risk information to supplement NATA.
- Promotes multi stakeholder collaboration.
- Achieves a better understanding of an urban hot spot.
- Provides information on areas for future risk reduction projects.
- Establish capacity for use of RAIMI to evaluate the potential for health impacts as a result of exposure to multiple contaminants from multiple sources, at a community level of resolution.

Duration of Project

Once awarded, the monitoring portion of this project will be implemented from February 2006 through March 2008. An interim report, including the results of the risk characterization, will be issued by December 31, 2007. A final report, incorporating the results of the two full years of monitoring, will be issued by March 2008. For the full project implementation schedule, please refer to the schedule above. Please note that the two-year schedule is dependent upon the date of award and date of project initiation.

Project Reporting

Quarterly Progress Reports

IDEM agrees to submit quarterly progress reports to the U.S. EPA Project Officer within 30 days after the end of each reporting period. The reporting periods begin at the project start date and shall include at a minimum the information below:

- A. Overview of work status, work progress, preliminary data results, and evaluations made during the reporting period, including a comparison of actual accomplishments with the goals and objectives for the period. Address difficulties encountered (or might encounter) in carrying out this project and corrective actions (to be) taken. If the aims of the project have not changed from the original application, state this. If these have been modified, provide the revised aims and discuss the reason for the modification.
- B. A discussion of any absences or changes of key personnel involved in the project.
- C. A discussion of expenditures to date along with a comparison of the percentage of the project completed to the project schedule, and an explanation of any costs that are higher than originally estimated. Revised budget information will be required under this agreement if any significant changes in the size or scope of the project or in the originally-negotiated total estimated costs are anticipated for the project period.

Final Report

A Final Report will be submitted within 90 days after the expiration of the project period. This report will include a discussion of (1) project activities over the entire period of funding, describing the achievements with respect to the stated project's purpose and objectives; (2) complete details of all technical aspects of the project, both negative and positive, the findings, conclusions, and results, including the associated quality assurance results; (3) use of the grant funds and any problems that were associated with the spending of the grant funds; (4) publications arising from this project. Copies of publications and reprints which have not previously been submitted to the U.S. EPA will be enclosed with the report; and (5) were any copy right materials, software, etc. developed as the result of this project.

Data Reporting

Quality assured ambient monitoring data shall be reported to the U.S. EPA's Air Quality System (AQS) Database (<http://www.epa.gov/ttn/airs/airsaqs>) on a quarterly schedule within 120 days of completing a data collection quarter. For example, if data collection begins on February 15, then first data collection quarter is complete on May 15 and quality assured data is due to AQS by September 15. Data arising from other than ambient air monitoring will be submitted to the U.S. EPA Project Officer on the same schedule using commonly available spreadsheet software (e.g. Excel).

Monitoring Equipment Usage

IDEM will consult with and seek U.S. EPA Region 5 approval prior to purchasing monitoring equipment. At the close of the project period, IDEM may continue monitoring at the site locations, or recommend the equipment be moved and used at a new geographic location(s). IDEM shall consult with and seek U.S. EPA Region 5 approval prior to moving the equipment or using it for purposes other than those associated with this project.

Project Budget

A. Personnel	\$9,028
B: Fringe Benefits	\$2,446
C. Travel	\$1,010
D. Equipment	\$68,490
E. Supplies	\$4,000
F. Contractual	\$29,184
G. Other	\$128,455 (Portion U.S. EPA In-kind)
Total Direct Charges	<u>\$242,613</u>
H. Indirect Charges	\$1,649
 Grant Total	 \$244,262

Federal Funds Requested: **\$125,807**

U.S. EPA In-Kind \$118,455

Explanation of Budget Framework:

A: Includes salary for .1 of one full time employee (\$4,514 X 2 years)
-Environmental Manager 2 position
-Annual salary of \$45,140
-10% of time dedicated to project

B: Fringe equals .1 of salary (\$9,028) times 17.19% plus .1 of \$8,945 (additional benefits).

C: Travel includes one trip to the U.S. EPA's Data Analysis Workshop to present the results of the study. Costs may include the following:

-Air Fare:	\$600
-Hotel:	\$300
-Per Diem:	\$110

D: Equipment:

<u>Quantity</u>	<u>Item</u>	<u>Unit Cost</u>	<u>Total Cost</u>
3	Two Channel Carbonyl Sampler	\$12,000	\$36,000
2	VOC Sampler	\$10,000	\$20,000
2	Hi Vol Sampling Systems	\$2,400	\$4,800
1	RAIMI Capable Computer and Associated Equipment	\$7,690	\$7,690

E: Supplies: Projected costs for supplies necessary to commonly support site construction and maintenance. Example supplies and associated costs include:

- Replacement of the pumps on VOC sampler \$1500
- Replacement of panel mount gauges \$ 300
- Swagelok supplies which includes fittings, valves, and tubing's for installation of all equipment \$ 1500
- Back-up Mass flow controller for VOC sampler \$700

Note: Supplies will be ordered and used on an as needed basis.

F: Contractual:

City of Indianapolis Personnel Costs:

Salary of .3 full-time employee (two times .15) annually for two years \$22,800

Fringe at 28% times \$22,800 = \$6,384

Total: \$29,184

G: Other:

IDEM Monitor Site Construction/Set-Up (\$10,000):	<u>1st Year</u>	<u>2nd Year</u>
Site Setup (Electricity & Security Fence)	\$6,000	2,000
Sampler Platforms (lumber, hardware)	\$2,000	

U.S. EPA In-Kind Contributions (\$118,455):

(costs include off-site analysis and shipping)

Carbonyl analysis 1/6 Day Sampling 2-Years	\$155	X 240	\$37,200
Metals analysis 1/6 Day Sampling 2-Years	\$250	X 240	\$60,000
Hexavalent Chrome 1/6 Day Sampling 1-Year	\$181	X 78	\$14,118
TOTAL			\$111,318

Note: All canister HAP samples will be analyzed by IDEM as part of the 3.35 FTE non-grant funded hours dedicated to this project.

Hexavalent Chromium Base Support (in kind):

Per site: \$6,637

Shipping: \$500

Total per site: \$7,137

Support includes:

Site support (problem solving/trouble shooting)

Site Coordination

Instrument Certification and Installation (travel to site)

QA/QC Program and Standards

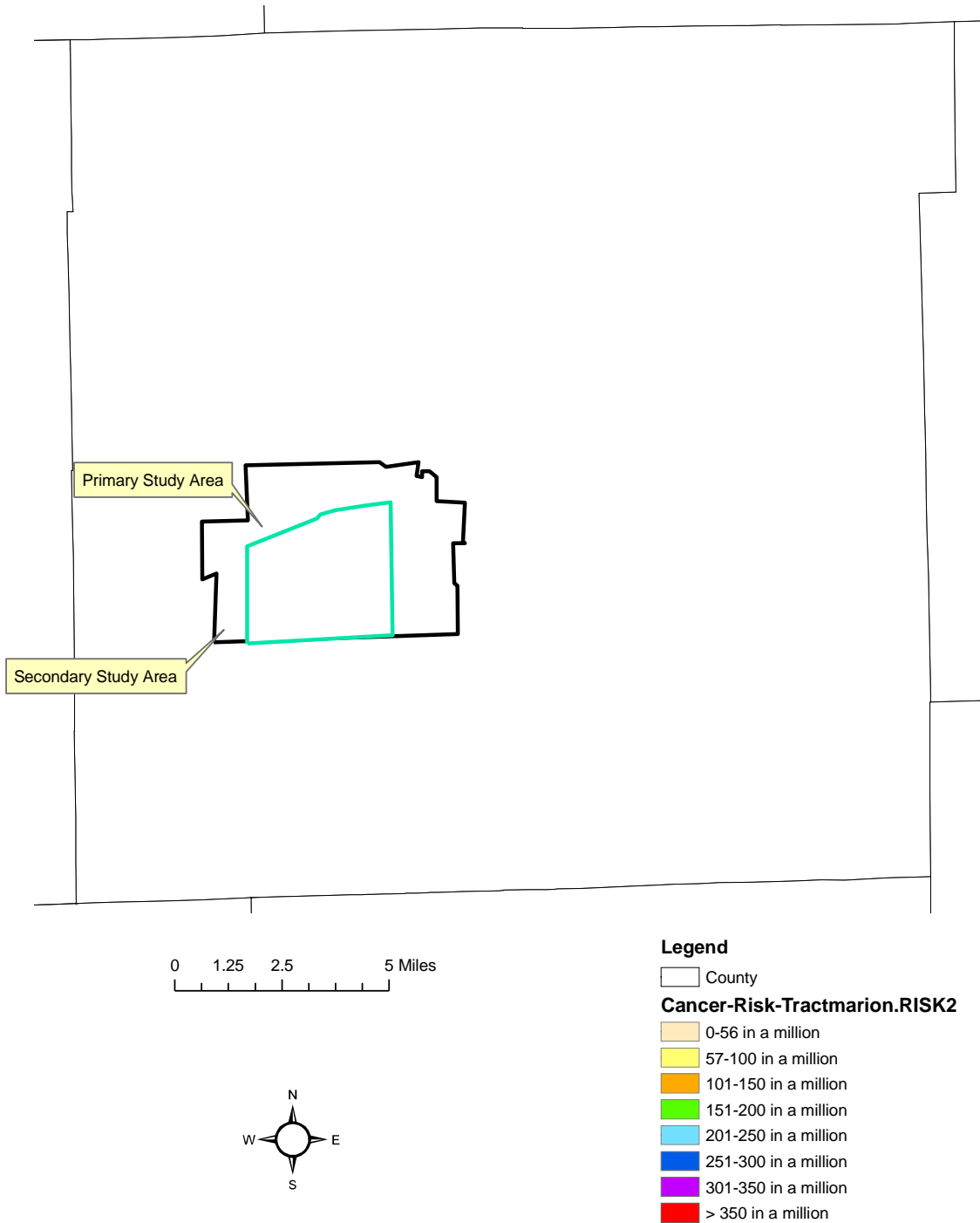
Final Data Validation, Reduction, Reporting

H: Indirect Costs calculated by .1 of salary plus .1 of total fringe times 14.37%.

Measures of Success

- Identification of air toxics that present the greatest health risk based on comparison of air monitoring and modeling data to dose-response values tabulated by U.S. EPA's Office of Air Quality Planning and Standards (OAQPS).
- Confirmation of NATA results, specifically to determine if chromium and/or arsenic are the primary risk drivers in this area of Indiana when compared to other monitoring data.
- Development of Federal, State and local capacities in air toxics assessment, specifically experience and knowledge that will be documented and transferable to other local assessments.
- Establishment of capacity to use RAIMI to evaluate potential health impacts as a result of exposure to multiple contaminants from multiple sources, at a community level of resolution.
- Increased awareness within the community about the potential health risks.
- Voluntary emission reductions from sources and/or source categories impacting potential health risks.

Marion County Cancer Risk and Proposed Study Areas



Note: Cancer risk data from 1996 NATA, pending release of 1999 NATA.