

## PAMS Ozone Precursors (VOCs)

### Monitoring Requirements

Ozone precursor monitoring is required as part of the PAMS program. According to the Modified Network Plan for the Chicago Nonattainment Area, Indiana operates one Type 2 Unofficial PAMS site, Gary – IITRI (180890022). PAMS measurements are also required at each NCore site located in a CBSA with a population of 1,000,000 or more, based on the latest available census figures. Indpls – Washington Park (180970078) is Indiana’s NCore site. The specific requirements are addressed in 40 CFR Part 58 Appendix D §5. PAMS measurements include: (1) hourly averaged speciated VOCs; (2) carbonyl sampling; (3) hourly averaged O<sub>3</sub>; (4) hourly averaged NO, true NO<sub>2</sub>, and NO<sub>y</sub>; (5) hourly averaged ambient temperature; (6) hourly vector-averaged wind direction; (7) hourly vector-averaged wind speed; (8) hourly averaged barometric pressure; (9) hourly averaged relative humidity; (10) hourly precipitation; (11) hourly averaged mixing-height; (12) hourly averaged solar radiation; and (13) hourly averaged ultraviolet radiation. Almost all of these parameters are collected at Indiana’s two Unofficial PAMS except for hourly average mixing height, and NO<sub>y</sub> at Gary - IITRI. The U.S. EPA is currently evaluating the PAMS program. If one or both Unofficial PAMS designations are changed to PAMS, equipment for determining hourly average mixing height and NO<sub>y</sub> will be added by June 1, 2019.

This section deals with hourly averaged speciated VOCs. The other parameters are addressed in their own area. According to the plan, 56 speciated VOCs are to be collected at Indiana’s PAMS.

### Monitoring Methodology

Ozone precursor VOCs are collected continuously using a Perkin Elmer Clarus 500 GC, with dual Flame Ionization Detectors (FID)s and a TurboMatrix thermal desorber. In addition, canister samples are collected on a one-in-six day sampling schedule. These canisters are analyzed using the same analytical method. The 56 PAMS target compounds are shown in Table 16.

**Table 1 – PAMS Target Compounds**

Ethylene	Acetylene	Ethane	Propylene
Propane	Isobutane	1-Butene	n-Butane
t-2-Butene	c-2-Butene	<i>Isopentane</i>	1-Pentene
n-Pentane	Isoprene	t-2-Pentene	c-2-Pentene
2,2-Dimethylbutane	Cyclopentane	2,3-Dimethylbutane	2-Methylpentane
3-Methylpentane	n-Hexane	Methylcyclopentane	2,4-Dimethylpentane
Benzene	Cyclohexane	2-Methylhexane	2,3-Dimethylpentane
3-Methylhexane	2,2,4-Trimethylpentane	n-Heptane	Methylcyclohexane
2,3,4-Trimethylpentane	Toluene	2-Methylheptane	3-Methylheptane
n-Octane	Ethylbenzene	m-Xylene	p-Xylene
Styrene	o-Xylene	n-Nonane	Isopropylbenzene
n-Propylbenzene	m-Ethyltoluene	p-Ethyltoluene	1,3,5-Trimethylbenzene
o-Ethyltoluene	1,2,4-Trimethylbenzene	n-Decane	1,2,3-Trimethylbenzene
m-Diethylbenzene	p-Diethylbenzene	n-Undecane	Dodecane

In addition to these individual compounds, there are two aggregated parameters reported; sum of PAMS compounds and total NMOC.

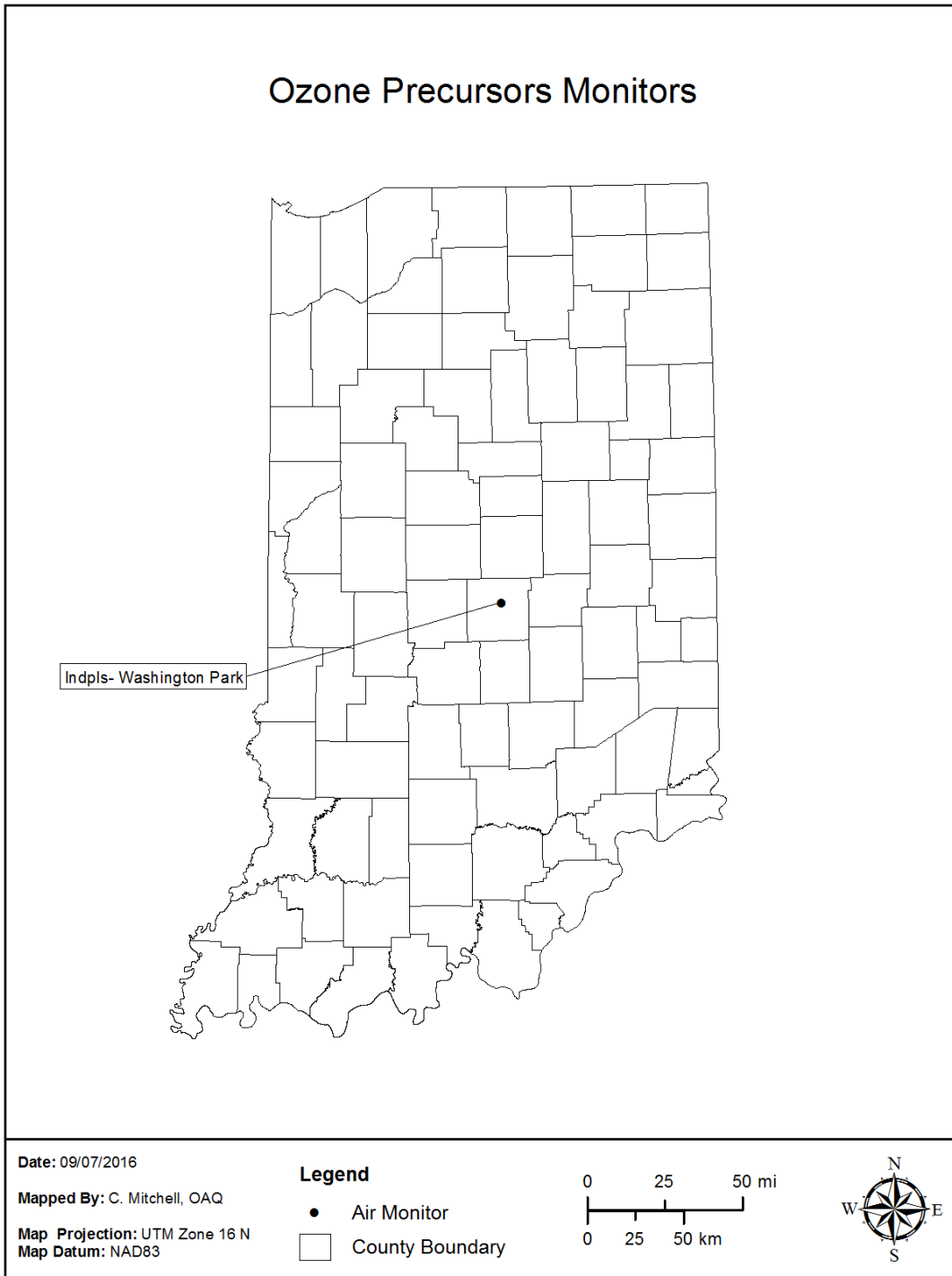
## **Monitoring Network**

Indiana operates an Unofficial PAMS monitoring site collecting ozone precursor VOCs at the Gary - IITRI site for the Chicago PAMS area. Another site, Indpls - Washington Park NCore collects data for the Indianapolis CBSA. The normal PAMS monitoring season is June, July, and August, but Indiana began collecting data year-round in 2011 to observe values outside the season as well. The monitors are shown in Figure 13 and site details are in Table 17.

## **Network Modifications**

The Gary – IITRI PAMS will be discontinued January 1, 2017. The automatic gas chromatograph is malfunctioning and needs to be replaced. Discontinuing this monitor will save the purchase expense of \$150,000.

Figure 1 – Ozone Precursors Network



**Table 2 – Ozone Precursor Monitoring Network**

Ozone Precursors														
RO: 0520 OPERATING AGENCY: Indiana Department of Environmental Management														
Site ID	Site Name	County	City	Address	Monitor Type (Network)	Start Date	Operating Schedule	Monitoring Method	Scale	Monitoring Objective	Latitude	Longitude	CBSA	Site Change Proposed?
180890022	Gary - IITFI	Lake	Gary	IITFI Bunker, 201 Mississippi St.	SLAMS (UNOFFICIAL PAMS)	07/06/95	Continuous	28	Middle	Max Prec. Em. Impact	41.606667	-87.304722	Chicago-Naperville-Elgin, IL-IN-WI	Discontinue
180890022	Gary - IITFI	Lake	Gary	IITFI Bunker, 201 Mississippi St.	SLAMS (UNOFFICIAL PAMS)	07/06/95	6-Day	146	Middle	Max Prec. Em. Impact	41.606667	-87.304722	Chicago-Naperville-Elgin, IL-IN-WI	Discontinue
180970078	Indpls - Washington Park	Marion	Indianapolis	Washington Park, 3120 E. 30th St.	SLAMS	07/01/11	Continuous	28	Middle	Max Prec. Em. Impact	39.810833	-86.114444	Indianapolis-Carmel-Anderson	No
<div style="border: 1px solid black; padding: 5px;"> <p>MONITORING METHOD: 128 - AUTO GC; SUBAMBIENT - DUAL FID 146 - AUTO GC; SUBAMBIENT - DUAL FID</p> </div>														

Comments on this amendment should be emailed to:

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