



2014 Aamjiwnaang Air Monitoring Station Results

Ministry of the Environment and Climate Change

April 19, 2016

Outline

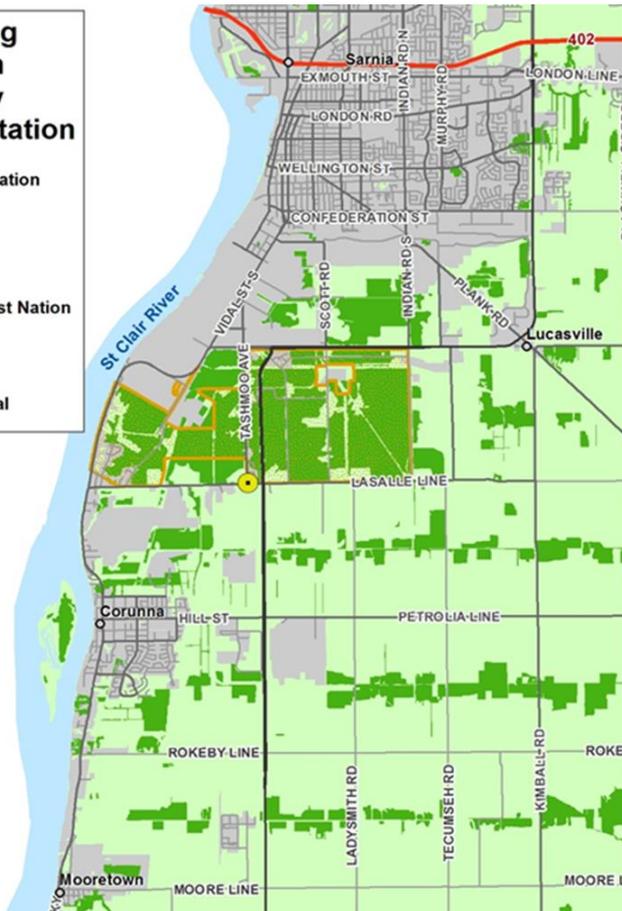
- Key Results
- Parameters Measured
- Benchmarks
- 2014 Report Results
- Mobile Monitoring Results
- Monitoring Updates
- Questions

Key Results

- Levels of contaminants measured at Aamjiwnaang in 2014 generally met Ontario's Ambient Air Quality Criteria (AAQC).
- Exceedances of the AAQC were seen for ozone, benzene, and benzo[a]pyrene. Elevated levels of fine particulate matter were seen as well.
- Results were generally similar to previous years and to findings in other communities in southwestern Ontario.

Parameters Measured

Aamjiwnaang First Nation Community Air Monitoring Station



Continuously:

- Sulphur dioxide (SO_2)*
- Nitrogen dioxide (NO_2)*
- Ground-level ozone (O_3)*
- Total reduced sulphur compounds (TRS)*
- Carbon monoxide (CO)*
- Respirable (fine) particulate matter ($\text{PM}_{2.5}$)*
- Selected volatile organic compounds (VOC)
 - 13 compounds (updated periodically)

Periodically:

- Suspended particulate (SP) and metals [every 6 days]
- A broader range of VOC [every 12 days]
 - 154 compounds
- Polycyclic aromatic hydrocarbons (PAH) [every 12 days]
 - 9 compounds including benzo[a]pyrene

* Air Quality Index (AQI) parameters

Benchmarks

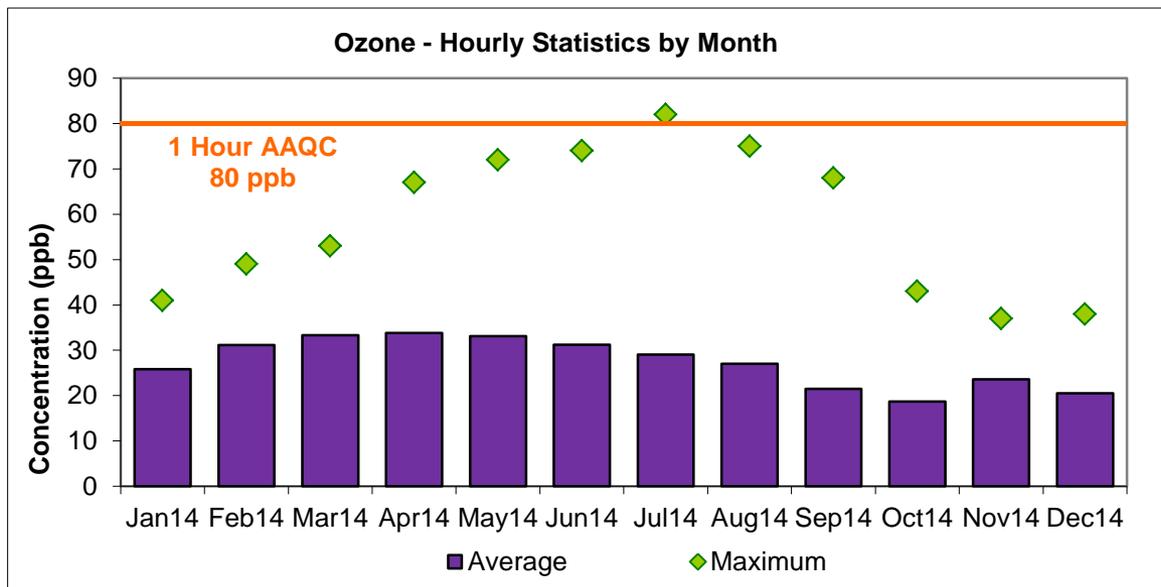
- Monitoring results were compared to the following benchmarks:
 - **Ontario's Ambient Air Quality Criteria (AAQC)** - used to assess general air quality resulting from all sources of a contaminant to air.
 - **Air Quality Index (AQI)** – a rating scale for outdoor air in Ontario. The AQI uses concentrations for six common air pollutants to create an index for describing air quality at each monitoring station (*Very Good, Good, Moderate, Poor, Very Poor*).
 - **Canadian Ambient Air Quality Criteria (CAAQS)** – federal standards for PM_{2.5} and O₃.
- Results were also compared with data from other MOECC or Environment Canada monitoring stations in southwestern Ontario, including Sarnia, Windsor, and Wallaceburg.

Air Quality Index (AQI) Pollutants

- Concentrations of the following compounds fell within the *Very Good* or *Good* range all year:
 - Sulphur dioxide (SO₂)
 - Nitrogen dioxide (NO₂)
 - Total reduced sulphur compounds (TRS)
 - Carbon monoxide (CO)
- Elevated concentrations of fine particulate matter (PM_{2.5}) and ozone (O₃) led to some *Moderate* and *Poor* AQI ratings.

Air Quality Index Pollutants – Ozone (O₃)

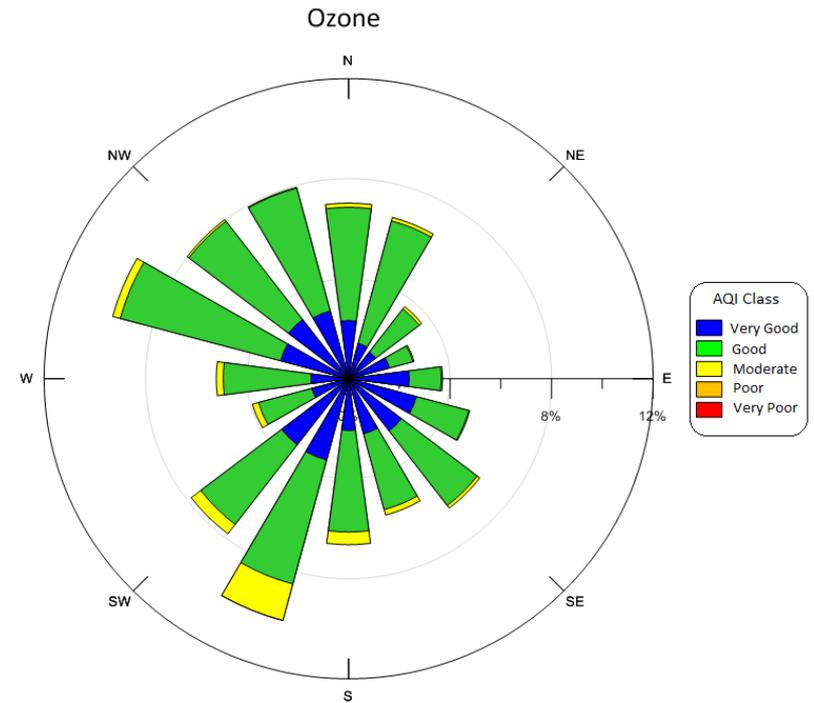
- The 2014 average and maximum ozone concentrations, as well as the number of AAQC exceedances, have decreased from 2013.
- One AAQC exceedance led to a *Poor* air quality rating for an hour in July.



1-hr AAQC (80 ppb) Exceedances	
2009	1
2010	2
2011	28
2012	50
2013	12
2014	1

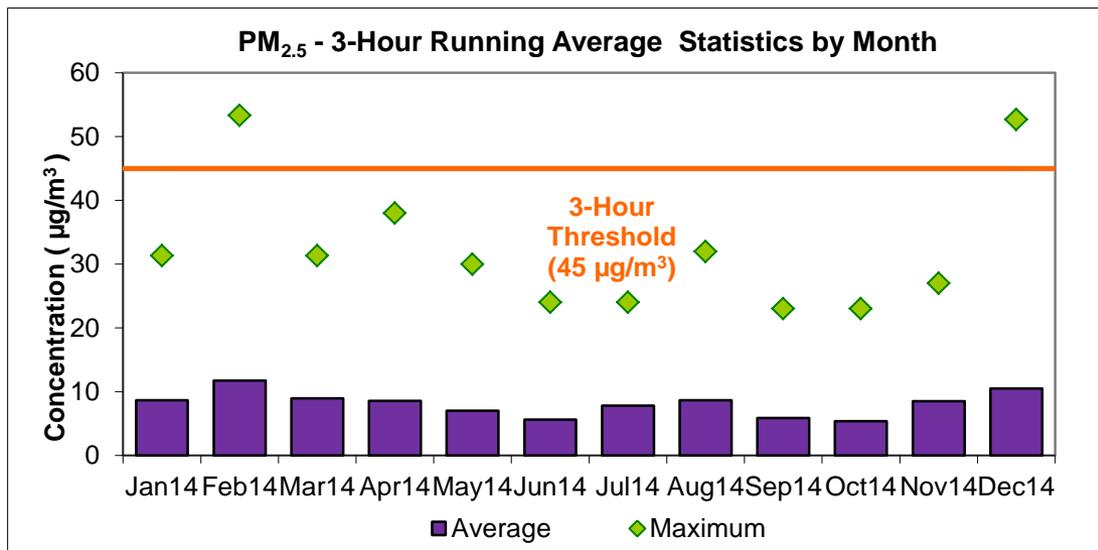
Air Quality Index Pollutants – Ozone (O₃)

- Higher frequencies of *Moderate* AQI ratings were related to winds from the south.



Air Quality Index Pollutants – Fine Particulate Matter (PM_{2.5})

- The average and maximum PM_{2.5} concentrations decreased from those of 2013.
- There were six occasions when concentrations fell in the *Poor* AQI range (compared to three in 2013).



Moderate AQI (45 µg/m ³) Exceedances	
2009	19
2010	37
2011	15
2012	10
2013	3
2014	6

Suspended Particulate (SP) and Metals

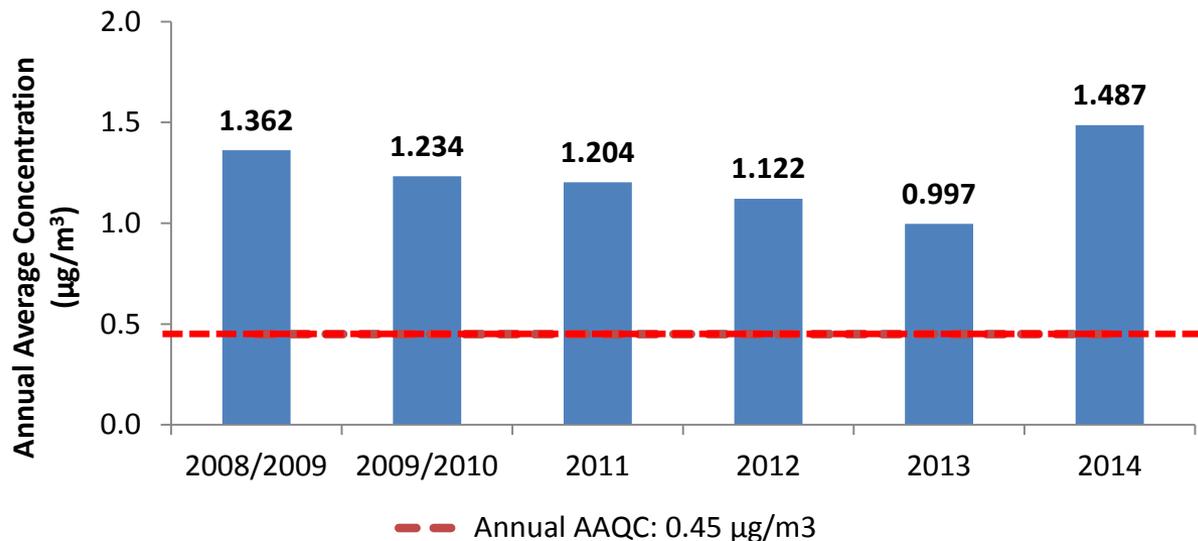
- There were no AAQC exceedances measured for suspended particulate or any of its metal constituents.
- Most levels were below 10% of AAQC.
- Note – the ministry was unable to collect samples between mid-June and the end of September due to a shortage of filters.

Volatile Organic Compounds (VOC)

- The continuous (hourly) list of target compounds was updated.
- Continuous and non-continuous sampling showed that the 2014 annual average benzene concentration exceeded the AAQC, and was the highest annual average observed since monitoring began at the Aamjiwnaang station in 2008.
- Continuous sampling determined that benzene was below the 24-hour AAQC 88% of the time, and above the AAQC 12% of the time. The number of 24-hour exceedances determined by non-continuous sampling was consistent with this finding.
- None of the other VOC monitored, continuously or non-continuously, exceeded their respective AAQC in 2014.
- Results were generally similar to findings from other communities in southwestern Ontario, however, benzene and 1,3-butadiene concentrations were higher in Aamjiwnaang and Sarnia than in surrounding communities.

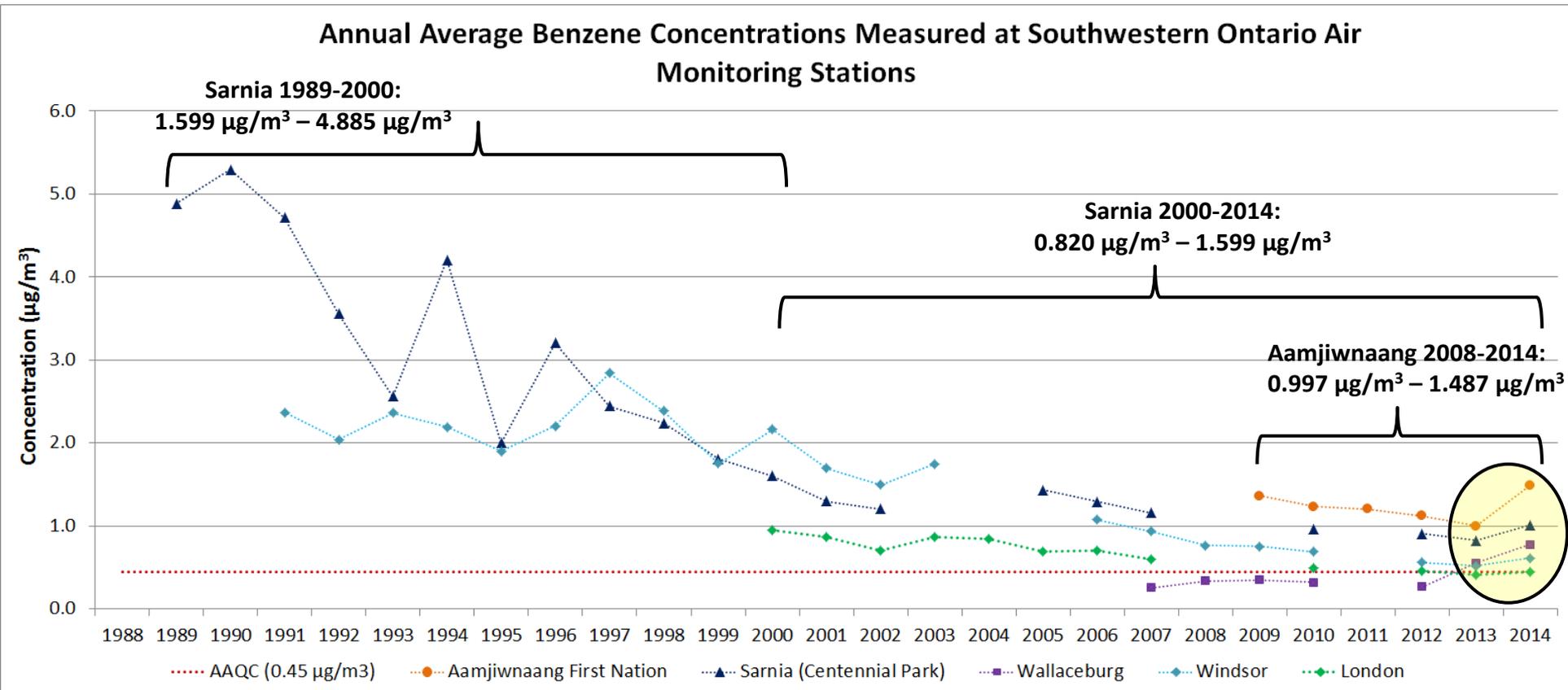
Volatile Organic Compounds (VOC)

- The 2014 annual average benzene concentration represents a 9.2% increase from the previous highest annual average, which was observed in the first year of monitoring (2008/2009).
- Benzene was detected when winds were coming from all directions, however, the highest concentrations were measured when winds were coming from the west-northwest.



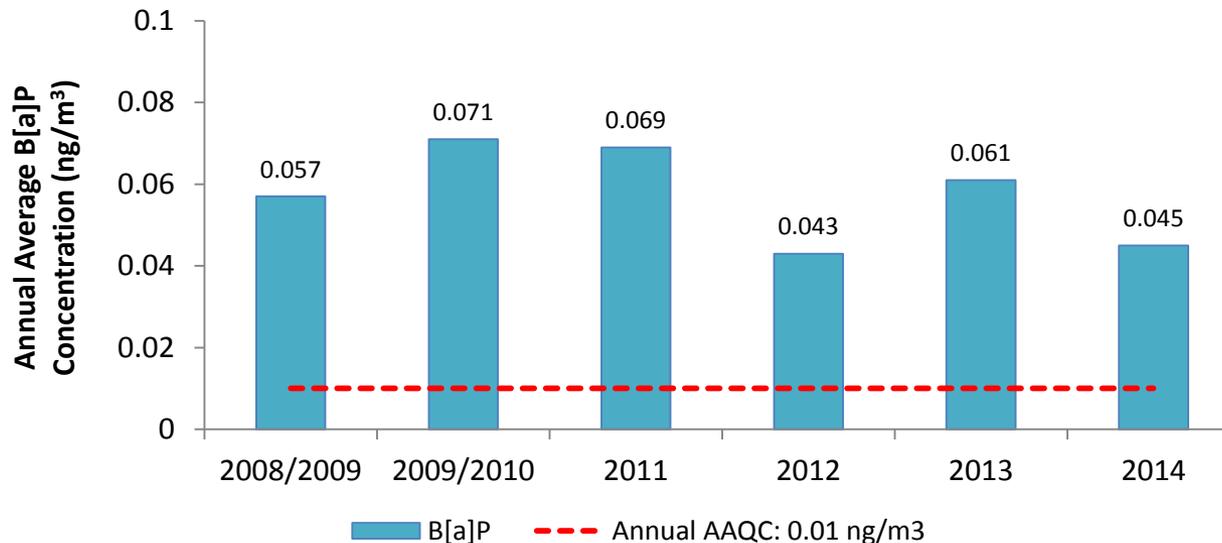
Volatile Organic Compounds (VOC)

- Benzene concentrations at Aamjiwnaang in comparison to historical data from other southwestern Ontario monitoring locations:

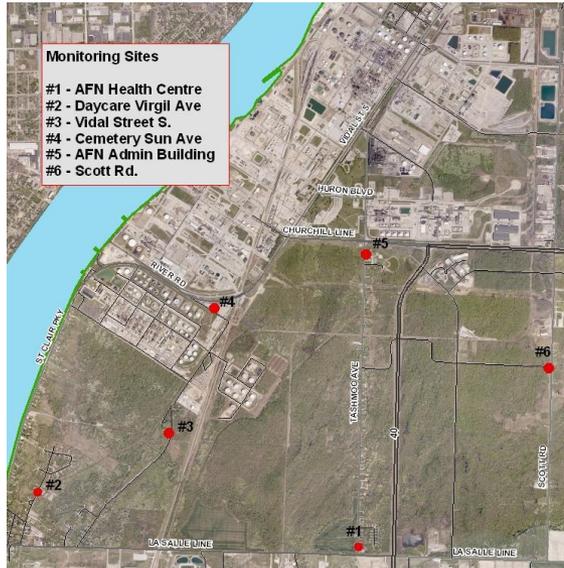


Polycyclic Aromatic Hydrocarbons (PAH)

- 9 of the 31 samples (29%) exceeded the 24-hour AAQC for benzo[a]pyrene (B[a]P).
- The annual average B[a]P concentration exceeded the annual AAQC, as it has in each of the five previous years of monitoring.
- Aamjiwnaang values are lower than those measured in Windsor (industrial area) but higher than Wallaceburg (rural area).



Southwestern Region Mobile Monitoring



- SWR conducted a mobile monitoring program around the Aamjiwnaang First Nation on 8 days between April and December 2014.
- The mobile air monitoring van collected half-hour samples at six sites, which were analyzed for 16 VOC.
- Results were compared to a half hour “comparison value” calculated by scaling the 24 hour Ambient Air Quality Criteria (AAQC) to a ½-hr averaging time.
- 13 of the 16 VOC were detected, two of which were seen only once.
- All compounds were below the comparison value except benzene.
- Benzene was detected in about 35% of the 48 samples. Six of the benzene samples, or about 12.5%, were above the comparison value.

EMRB TAGA Mobile Monitoring



- The ministry's Trace Atmospheric Gas Analyzer (TAGA) conducted a mobile air monitoring survey in the Aamjiwnaang First Nation area in October 2014.
- ½ hour samples were collected at four sites over the course of 9 days, and were analyzed for SO₂, TRS, and ten VOC.
- Results were compared to O. Reg. 419/05 contaminant concentration standards or guidelines.
- Concentrations of all chemicals measured were below applicable O. Reg. 419/05 contaminant concentration standards and guidelines.

Monitoring Updates

Changes to monitoring at the Aamjiwnaang First Nation station were implemented in 2016 to allow for a more focussed assessment of priority contaminants.

- Replaced GRIMM particulate monitor with SHARP monitor

- Removed CO and O₃ monitors

Future change:

- Replace GC/MS with a new continuous VOC monitor
- Reduce target list to benzene and 1,3-butadiene

Continuously:

- Nitrogen dioxide (NO₂)
- ~~Ground-level ozone (O₃)~~
- Respirable (fine) particulate matter (PM_{2.5})
- Sulphur dioxide (SO₂)
- Total reduced sulphur compounds (TRS)
- ~~Carbon monoxide (CO)~~
- Selected volatile organic compounds (VOC)
 - ~~14 compounds (updated periodically)~~
- Wind speed/wind direction

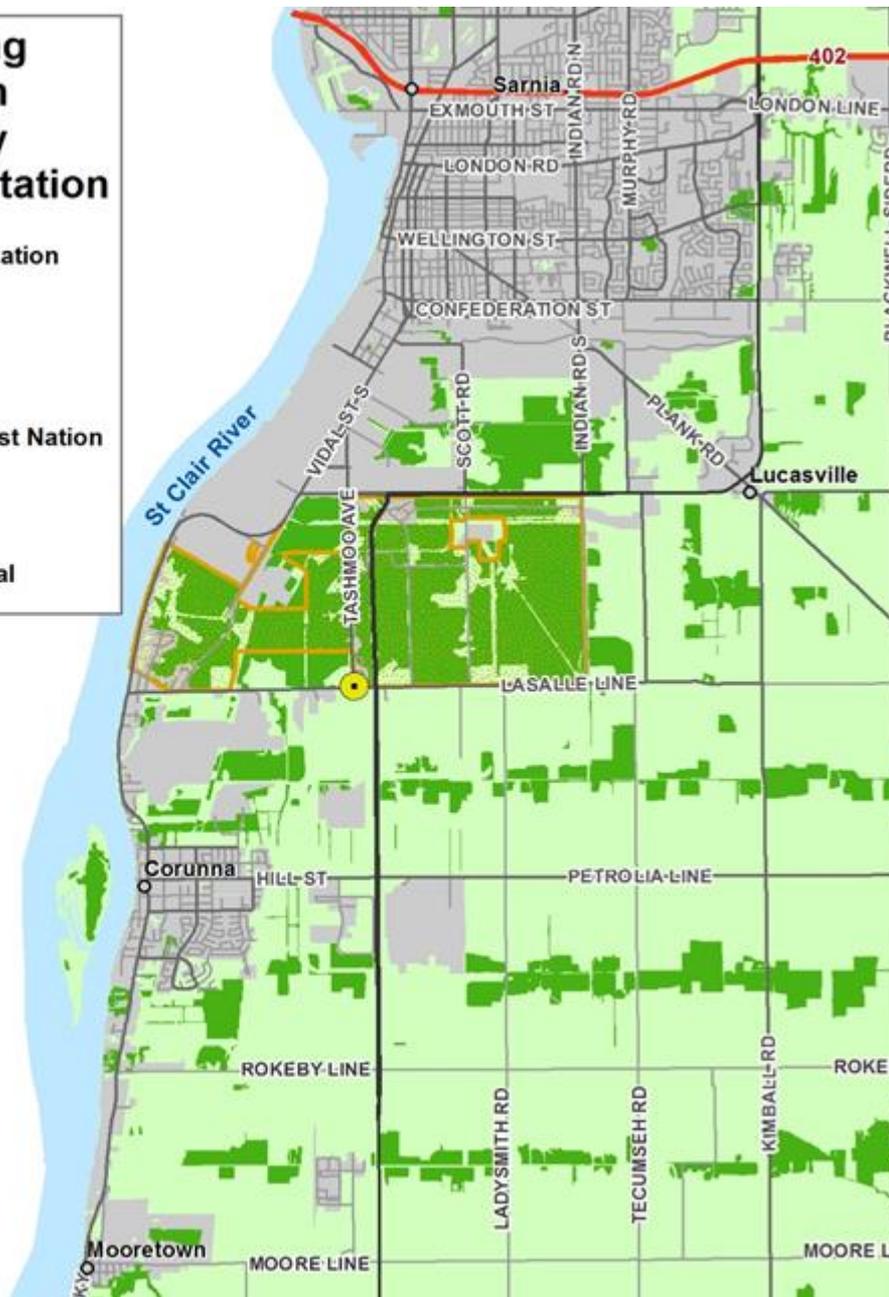
Benzene and
1,3-butadiene

Periodically:

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Aamjiwnaang First Nation Community Air Monitoring Station

-  Air Monitoring Station
-  Freeway
-  Highway
-  Main Roads
-  Aamjiwnaang First Nation
-  Wooded Areas
-  Open Area
-  City and Industrial



Thank-you!

Questions?

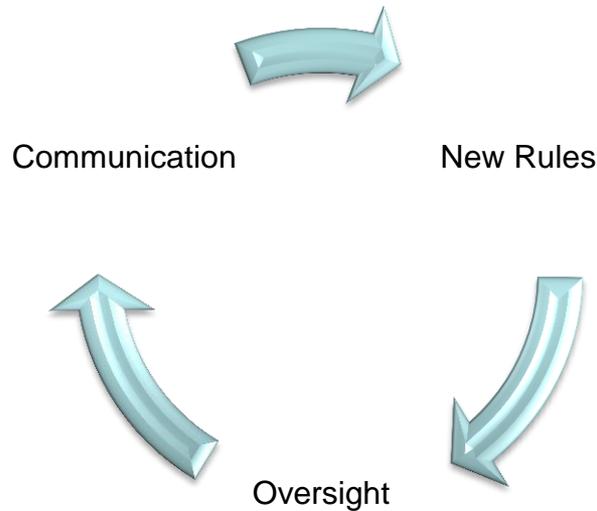


**Sarnia Action Plan
to Drive Improvements in Air Quality:
Update**

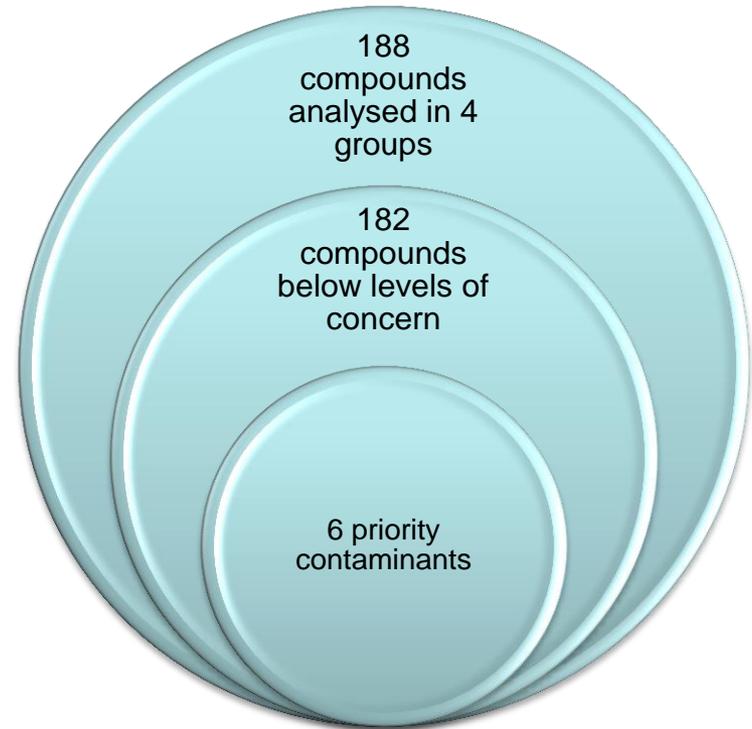
Aamjiwnaang First Nation – April 2016

Sarnia Action Plan

- 3 Part Action Plan for Sarnia - based on community input and information from monitoring and engineering assessments



Improve Air Quality
↑ **Transparency**



- Benzene
- 1-3 butadiene
- Benzo[a]pyrene
- Sulphur compounds
- Ozone
- Fine particulate

Sarnia Action Plan – Oversight



In addition to our ongoing inspection, enforcement, and monitoring efforts the ministry is committed to:

- **New inspections** - targeting key sources of priority contaminants at major facilities
 - 2015/16 - targeted storage tanks and loading area vapour recovery systems
 - 2016/17 – targeting wastewater treatments units along with additional storage tanks and vapour recovery systems
- **Providing enhanced incident notifications**
 - Implemented pilot incident notification procedure September 2015 - Aamjiwnaang First Nation Emergency Planner provided with information email and updates for posting on Facebook

Sarnia Action Plan – Oversight



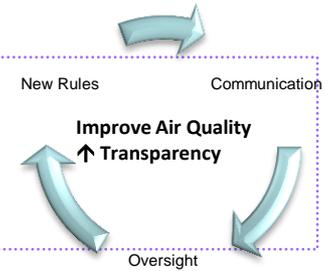
- **Increased air monitoring**

- MOECC air monitoring van conducting monthly monitoring at established locations within Aamjiwnaang First Nation.
- MOECC examining opportunities to enhance local air monitoring capabilities for VOCs through use of air sample collection canisters by District staff.
- Pilot project underway using new technology for monitoring emissions of NO_x, SO₂, benzene and other VOCs, to improve understanding of industrial emission sources.
- Two working groups established to evaluate technologies to assist in implementation of new fugitive air emission monitoring requirements – monitoring at property line and monitoring as part of industry leak detection and repair programs.

- **Conducting source assessments**

- Six Sarnia area companies conducted combined air monitoring and modelling studies to improve understanding of fugitive emissions of priority contaminants from their facilities.
- Information obtained from assessments being used in development of proposed technical standards for petroleum refining and petro-chemical sectors, which will drive reductions in air emissions.

Sarnia Action Plan – Oversight



- **Establishment of Community Advisory Group**
 - Community advisory panel established - **Clean Air Sarnia and Area** - met three times since September 2015 to develop a strategy for modernizing air monitoring and sharing air quality information
 - Elements of strategy include:
 - partnership with industry, First Nations, community, and government
 - improving existing ambient air quality monitoring network (i.e., technology and location).
 - considering how new technologies for air monitoring could improve the network (e.g., fence-line monitoring).
 - development of website that provides on-line, real-time public reporting of government and industry monitoring data. Site will also include an educational component.
 - aiming to have website completed by early 2017

Sarnia Action Plan – Oversight



- **Addressing Sulphur Compounds**

- requiring compliance modelling after acid gas flaring events (i.e. flaring of sulphur compounds)
- submission of updated air emission modelling reports by industry
- submission of flare survey information by industry
- development of new air standard for sulphur dioxide
- strengthening and clarifying direction for facilities during transitional operating conditions such as start-ups, shut downs and process upsets.
- creating flare minimization plans
- conducting technology benchmarking (comparison to other jurisdictions best practices)

Sarnia Action Plan – Better Communication

In-depth discussions with Environment Staff, Environment Committee, Band Council and Chief

To explore ideas and barriers to achieving optimal two-way communication.

Community Circle with Elders, Mothers, Youth and Community

To explore the range of options available to achieve optimal two-way communication.

On-line and in-person survey of community members

To determine community priorities for achieving optimal, two-way communication.

New ideas for enhanced communication between Aamjiwnaang First Nation and Ministry

Sarnia Action Plan – New Rules



- **New compliance standards** - Point of Impingement (POI) compliance standards in July 2016 driving site specific performance.
- **Best available technology** - for pollution control and lower emissions through Technical Standards for refining and petrochemical sectors.
- **New framework** – for controlling emissions. Ministry supporting the Federal Government in the development of base-level industrial emission requirements (BLIERs) and Canadian Ambient Air Quality Standard Standard (CAAQS) for sulphur dioxide (SO₂).
- **Air Zone Delineation** – March 9th – Ontario announced decision to delineate its air zones consistent with policy proposal posted June 22, 2015. Key feature of Air Quality Management System (AQMS), a flexible cross-Canada framework developed through Canadian Council of Ministers for the Environment (CCME) for improving air quality. Important for reporting on achievements of Canadian Ambient Air Quality Standards (CAAQS), and taking appropriate action towards CAAQS attainment

Questions?