

The Regulation 419 Alteration of Standards Process – Lessons Learned

AWMAOS: Hamilton Breakfast Series Seminar

<http://www.ene.gov.on.ca/envision/AIR/regulations/localquality.htm>

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Protecting our environment.



Purpose of Presentation

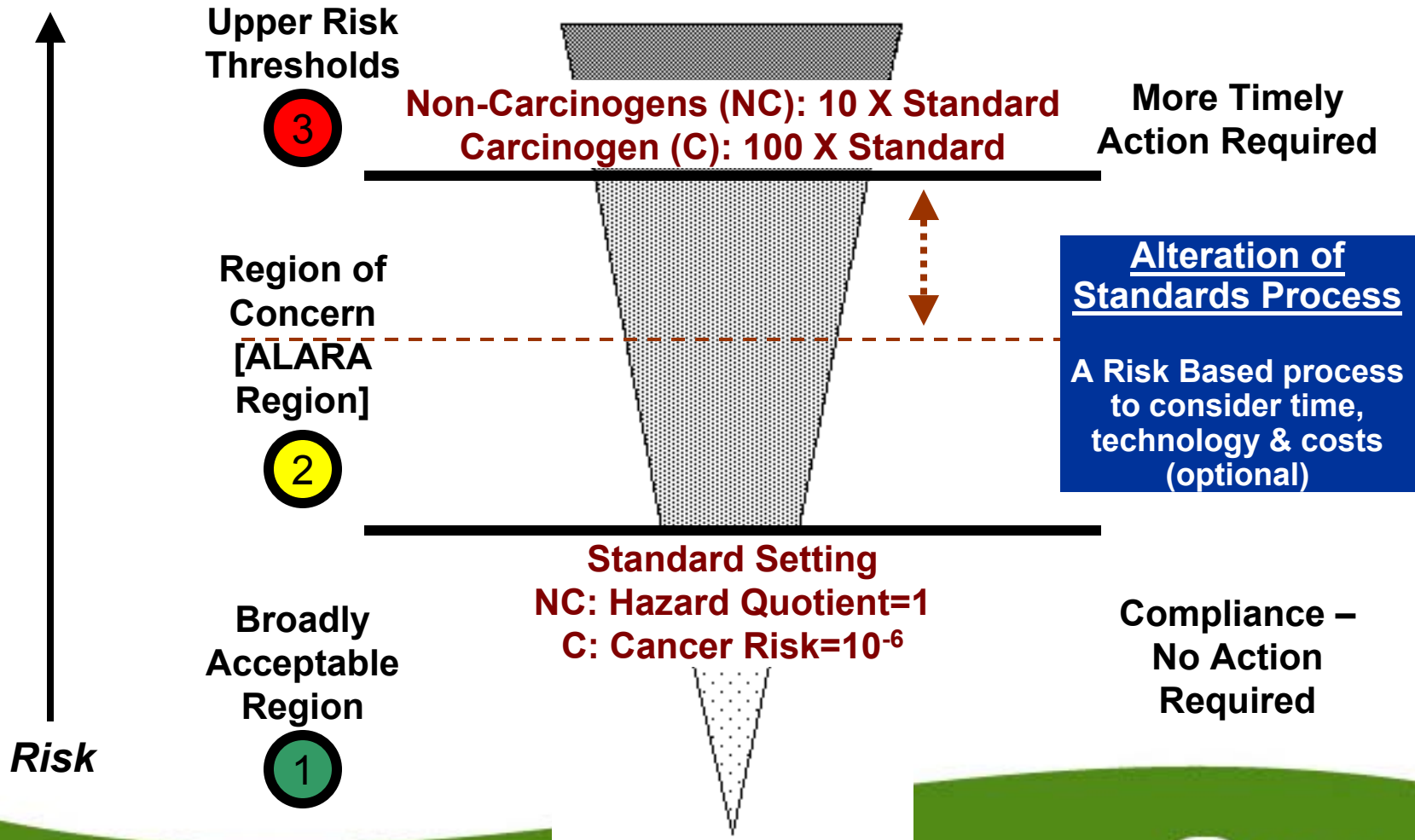
- Overview of the alteration of air standards process.
- Present Lessons Learned from the First Requests for Alteration of Standard... importance of:
 - Community involvement.
 - Information on frequency of exceedance.
 - Combined analysis of monitoring and modelling results.
 - Approaches to assessing technology benchmarking.
 - Approval conditions.

What is the Alteration of Standards Process? (& Why does it Provide Improved Environmental Protection?)

- O. Reg. 419/05 introduced new science-based standards and more accurate/stringent compliance assessment rules and
- The alteration of standards process is intended to facilitate the implementation of these new requirements.
- The alteration of standards process under S. 32 of O. Reg. 419/05, allows for temporary site-specific alteration of a standard(s) as long as:
 - the requests represents the minimum alteration to the standard;
 - levels are not above an “upper risk threshold” level (listed in Schedule 6) at a human receptor; and
 - There is no public interest reason sufficient to require the denial of the request.

Overview of the Reg. 419 Alternate Standards Process

As low as reasonably achievable (ALARA) principle



Steps to the Alteration of Standards Process

- Request from facility must include:
 - ESDM report using more accurate emission estimating and new models;
 - Technology benchmarking report demonstrating most feasible/effective pollution control strategy;
 - Action plan; and
 - Results of a public meeting.
- Ministry review including public consultation (through EBR and generally at least one public meeting to explain the Ministry's decision).

Example: Overview Oxy Vinyls Request

- Oxy Vinyls developed a request for alternate standard that included the following key elements:
 - Held a public meeting on March 5, 2007... neighbours to the facility were invited and a notice of the public meeting was placed in the local newspaper.
 - Submitted an up-dated and comprehensive Emission Summary and Dispersion Modelling (ESDM) Report that uses a combination of dispersion modelling and ambient monitoring to estimate air emissions and predict maximum point of impingement concentrations of vinyl chloride.
 - Submitted a “Technology Benchmarking” Report that compares the facility and proposed pollution abatement measures to best efforts in other jurisdictions and other similar facilities around the world.
 - Submitted an Action Plan.

Example: Overview of Oxy Vinyls Request

- Oxy Vinyls re-submitted request in December 2007 because of a new/reduced property.
- Requested a “break” to complete further ambient monitoring at new property-line locations... this was submitted to the Ministry in the Spring of 2008.

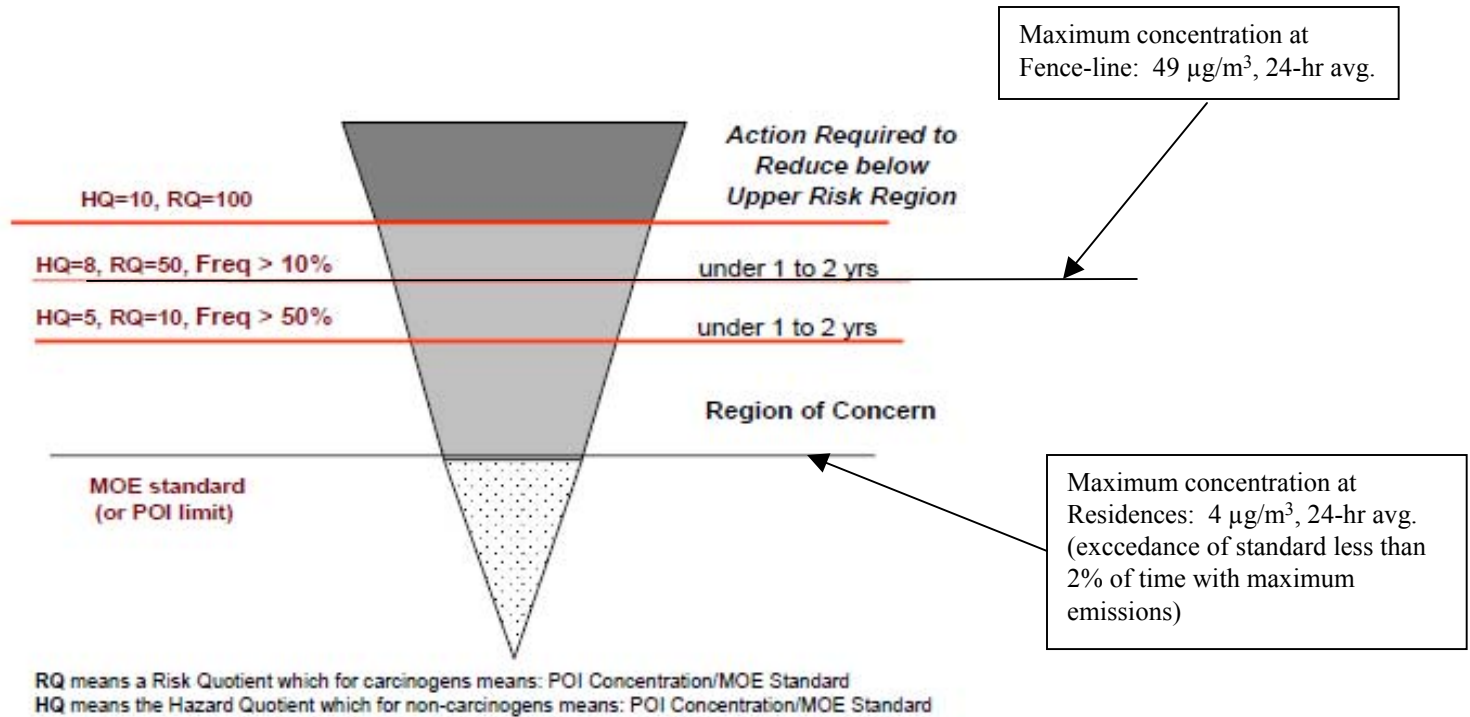
Example: Overview of Oxy Vinyls Request

| | <u>Existing Facility:</u> Original Property-Line | <u>Existing Facility:</u> New Property-Line and More Accurate Emission Rates |
|---|---|---|
| Vinyl Chloride Air Std in Reg 419: | 1 µg/m ³ , 24-Hour Average | |
| Max. Off-Property POI Concentration (Requested Alt. Std.) | 13 µg/m ³ , 24-Hour Average | 49 µg/m ³ , 24-Hour Average |
| Max. Concentration at Nearby Dwellings | 0.8 µg/m ³ , 24-Hour Average | 4 µg/m ³ , 24-Hour Average |
| Frequency of Exceedence at Nearby Dwellings | - | Up to 2% of Time |

Community Involvement

- Key Message: Alteration of standards is not about relaxing the standard but about finding a way to reduce impacts and to strive towards compliance with the new health-based air standards through continuous improvement.
- Community buy-in to this message can require active participation in the assessment of the request and supporting information.
- Lesson Learned: Bring the community in early

Assessing Frequency of Exceedance



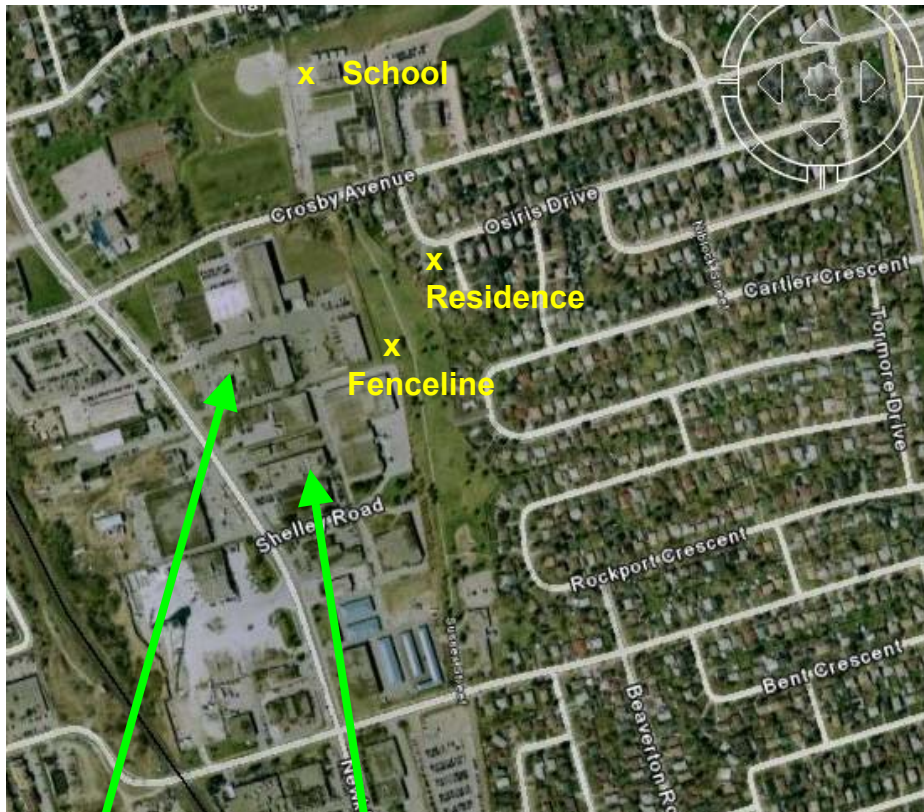
Combined Analysis of Monitoring and Modelling Results

- Combined modelling and monitoring analyses:
 - Provide increased accuracy for in estimating emissions... particularly for sources of fugitive emissions and/or sources where there is significant variability/uncertainty to the emission estimates.
 - Allow assessments of frequency of exceedance and assessment of point of impingement concentrations at multiple receptors where monitors are not located.
 - Facilitates the identification of the most significant contributors to point of impingement concentration.

Combined Analysis of Monitoring and Modelling (CAMM) Results – Key Steps

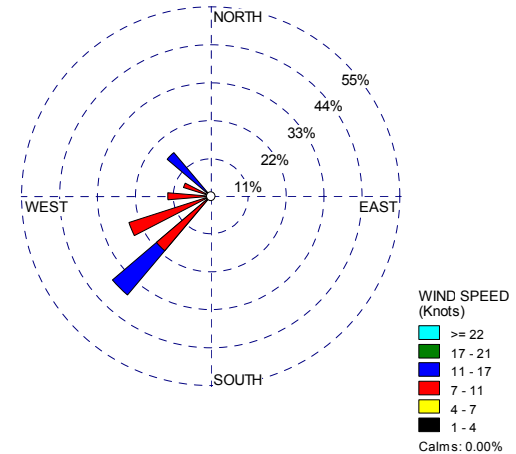
- Qualitatively consider wind direction and speed data relative to operational records.

Tuesday July 9, 2009



North Plant

South Plant



| Monitoring Results for Hexamethyl Chocolate (micrograms per cubic metre, 24-hour average) | | |
|--|-----------|-----------|
| School | Fenceline | Residence |
| 0.01 | 0.90 | 2.82 |
| Both North (47%) and South Plant (53%) in Production | | |

Combined Analysis of Monitoring and Modelling (CAMM) Results – Key Steps

- Tabulate monitoring results and key dispersion modelling parameters.
- Complete “paired” analysis
 - Start with model runs for each monitoring period/day (site specific meteorological data is typically provided by the MOE);

Combined Analysis of Monitoring and Modelling (CAMM) Results – Key Steps

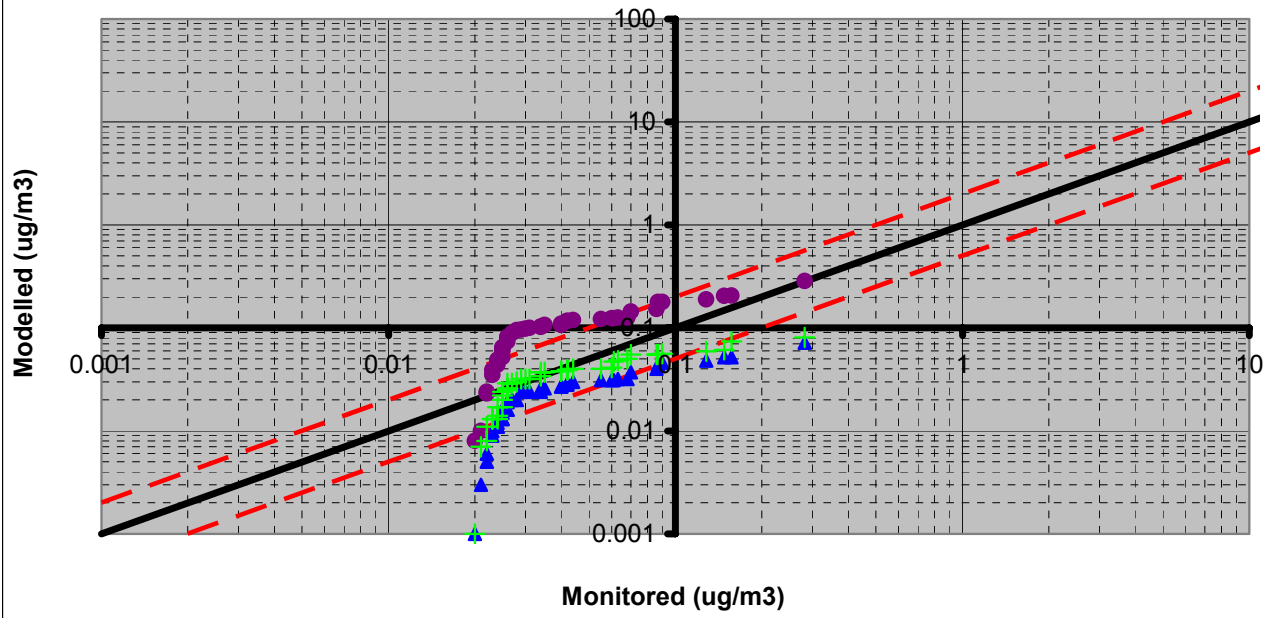
- Re-run models with adjusted emission rates where monitoring and operational data are used to identify the sources where emission rates should be adjusted to best match the modelling results.
- Identify the average emissions and average plus one standard deviation emissions (for the sources where emissions were adjusted).
- Use “average plus one standard deviation” emissions for the most significant source or two in combination with average emissions for the other sources to define the new, more accurate, ESDM report.

Combined Analysis of Monitoring and Modelling (CAMM) Results – Key Steps

- Re-run the new ESDM report emissions against each monitored day and plot (unpaired basis) on a logarithmic graph of monitoring versus modelling results... as a test of the accuracy and/or conservativeness of the final ESDM report.

- + South: 2001 ESDM Report;
North: Jul 2007 ESDM Report
- ▲ South: 2001 ESDM Report;
North: MOE Source Testing
- MOE Combined Analysis for Fugitive Sources

UNPAIRED Comparison for Hexamethyl Chocolate Emissions



Overview of Ministry Review

(& How does it Ensure Best Efforts are Being Employed?)

- Assessment of technical feasibility and minimum alteration necessary:
 - Review of other jurisdictions.
 - Comparison of emission performance to other similar facilities around the world.
 - Contract technical experts to key issues.

Ambient Air Quality Standards

| Ontario | Others |
|--|---|
| <p data-bbox="162 565 755 729"><u>Maximum 24-hour Average</u> 1 ug/m³ (or 0.2 ug/m³, annual average)</p> | <p data-bbox="896 415 1534 519"><u>California, SCAQMD – Rule 1163</u> 26 ug/m³</p> <p data-bbox="977 568 1450 672"><u>Louisiana (guideline)</u> 310 ug/m³, 8-hr average</p> <p data-bbox="962 721 1470 825"><u>Michigan (guideline)</u> 1.1 ug/m³, annual average</p> <p data-bbox="944 873 1483 978"><u>New York (guideline)</u> 0.11 ug/m³, annual average</p> <p data-bbox="967 1026 1464 1130"><u>Texas (guideline)</u> 13 ug/m³, annual average</p> |

Comparison of Ambient Monitoring

- Comparison to 24-Hr Average Ambient Monitoring

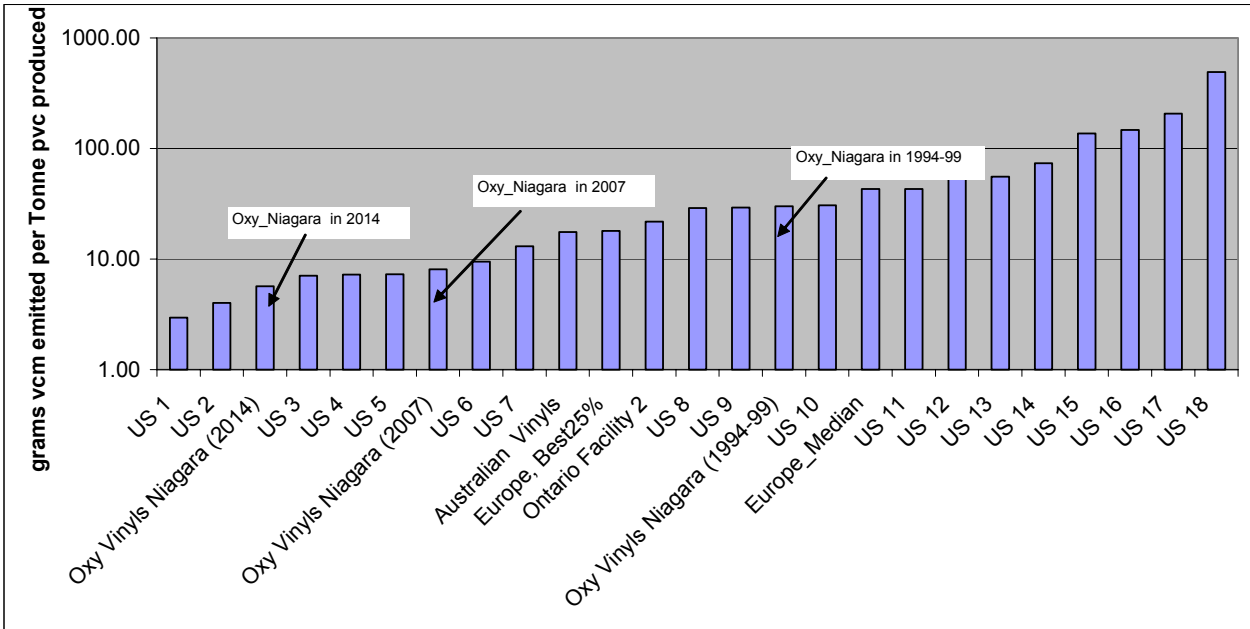
| Oxy Vinyls | Others |
|--|--|
| <p><u>Measurements At Fence-Line</u> (Dec 2007 – March 2008) up to ~6 ug/m³</p> <p><u>Combined Modelling and Monitoring</u> Up to 49 ug/m³</p> <p><u>In Surrounding Communities</u> (300-1000 metres away) Nearest residence: up to 4 ug/m³</p> | <p><u>Australian Vinyls Corp</u> <u>On-Site “Cartridge” Readings:</u> avg of short-term readings - 65 ug/m³</p> <p><u>Westlake PVC Plant in Kentucky</u> <u>In Surrounding Communities</u> (1000 – 2000 metres away) Highest Reading: 7.5 ug/m³ Median Reading: 2 ug/m³</p> |

Process Upsets and Accidental Releases

| Oxy Vinyls | Others |
|--|---|
| <p>Regular maintenance and periodic checks of equipment; leak detection and repair program</p> | <p><u>California, SCAQMD – Rule 1163</u></p> <p>A number of provision including requirement to direct emergency relief valve discharges to control device or receiving vessel</p> <p><u>Europe</u></p> <p>Requirements related to instrumentation control and related systems</p> <p><u>Australian Vinyls</u></p> <p>Australian Vinyls implements an incident reporting and record-keeping system</p> |

Overall Performance (grams/Tonne product)

Figure 5-1c: Comparison of Normalized TOTAL Vinyl Chloride Emissions (grams VCM emitted/Tonne PVC produced) - Logarithmic Scale



Expert Reports

- Expert Reports... Improvements Identified for
 - Vinyl chloride unloading area;
 - Piping network leak detection and repair;
 - Possible use of enclosures

Overview of Approval

- Definitions
- Alternate Vinyl Chloride Standard for Oxy Vinyls
- Grounds for Approval
- Conditions
 - Not to Exceed Concentrations at Specified Receptors
 - Further Investigation and Submission of Reports
 - Environmental Management System and Community Engagement Plan
 - Continuous Improvement Assessment Report
 - Stripping Column/Driers Assessment Report
 - Process Upsets and Accidental Releases Assessment Report
 - Two Part Fugitive Emissions Assessments Report
- Expiry... 8 years.
- Copy of approval can be obtained from this link to the EBR Decision Posting:

<http://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTAwMjlz&statusId=MTU4Mzcz&language=en>

Re-Cap of Lessons Learned

- Community involvement... should start early in the process.
- Combined analysis of monitoring and modelling results is an important tool to improve the accuracy of the assessment.
- Information on frequency of exceedance provides important context.
- Technology benchmarking assists in demonstrating best efforts... a key public expectation.
- Approval conditions allow for site specific customization and promote continuous improvement.