

An Interim Ambient Air Quality Objective for Sulphur Dioxide (SO₂)


in Metro Vancouver



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Outline

- Background
 - Intentions Paper
 - Rationale for Considering an Interim Sulphur Dioxide Objective
 - Review Process
 - Literature review
 - Proposed interim objective
 - Achievability analyses
 - Consultation Process
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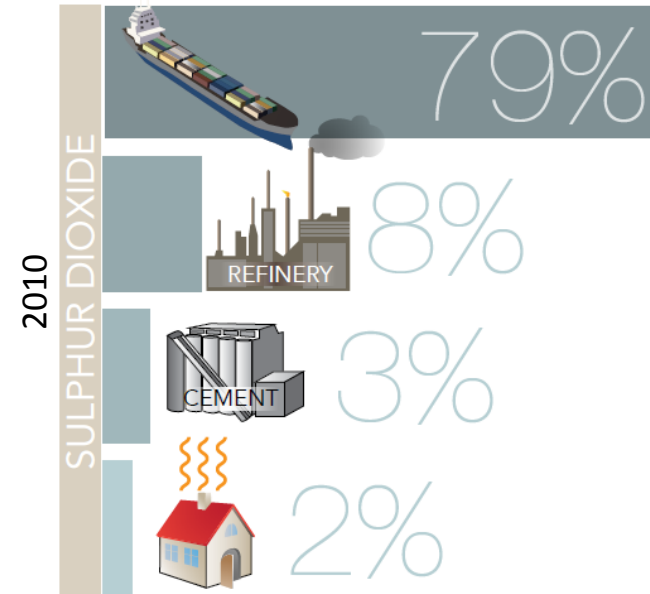
Background

- What is sulphur dioxide?
 - compound with the formula SO_2
- a colourless gas that smells like burnt matches
- emitted when fossil fuels containing sulphur are burned



Background

- What are the largest sources of SO_2 in Metro Vancouver and the FVRD?



- Why is SO_2 a concern?



Exposure to high SO_2 levels can aggravate asthma and increase respiratory symptoms



Acidifies soil and surface water, damages crops, trees, structures and property

Background

- What is an ambient air quality objective?
 - A concentration “limit” for a given pollutant in outdoor air
 - Non-statutory
 - Used for episode management (e.g., public air quality advisories/alerts, operational changes)
 - Used to assess air quality and guide management decisions, including those related to environmental assessments and authorizations
 - Not legally required, unless referenced in a regulation or authorization

Rationale for an Interim SO₂ Objective

- New health evidence
- 2011 Integrated Air Quality and Greenhouse Gas Management Plan – *Continuous Improvement*
- More stringent guidelines/standards adopted by:



World Health
Organization

(2005)

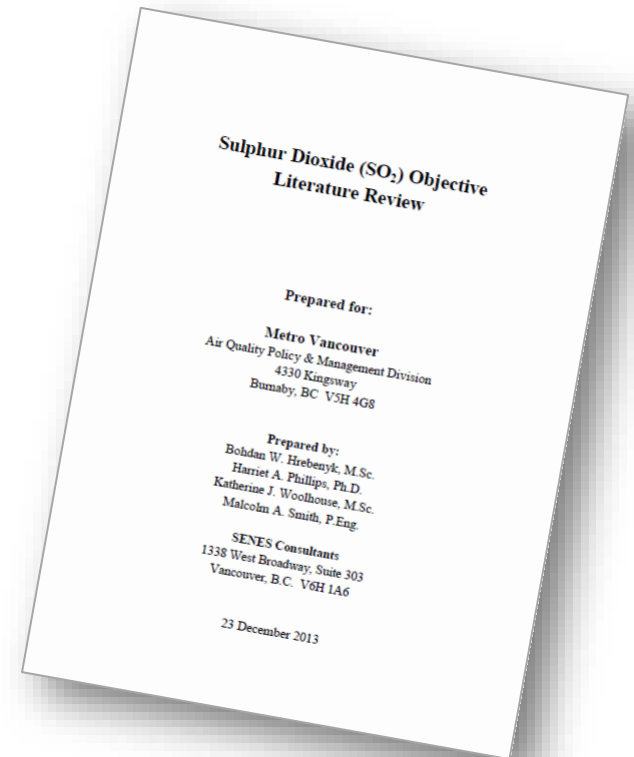


(2010)

- Canadian standards currently under review
- In October 2014, BC adopted *interim* objectives for SO₂ and NO₂ for new or significantly modified discharges

SO₂ Literature Review

- **Health evidence**
 - Our short-term objective should be more stringent
- **Other jurisdictions**
 - US EPA *1-hour* SO₂ National Ambient Air Quality Standard
 - 75 ppb*
(99th percentile of 1-hour daily maximum concentrations, averaged over 3 years)



* parts per billion (75 molecules of SO₂ for every billion molecules of air)

Proposed MV Interim SO₂ Objective

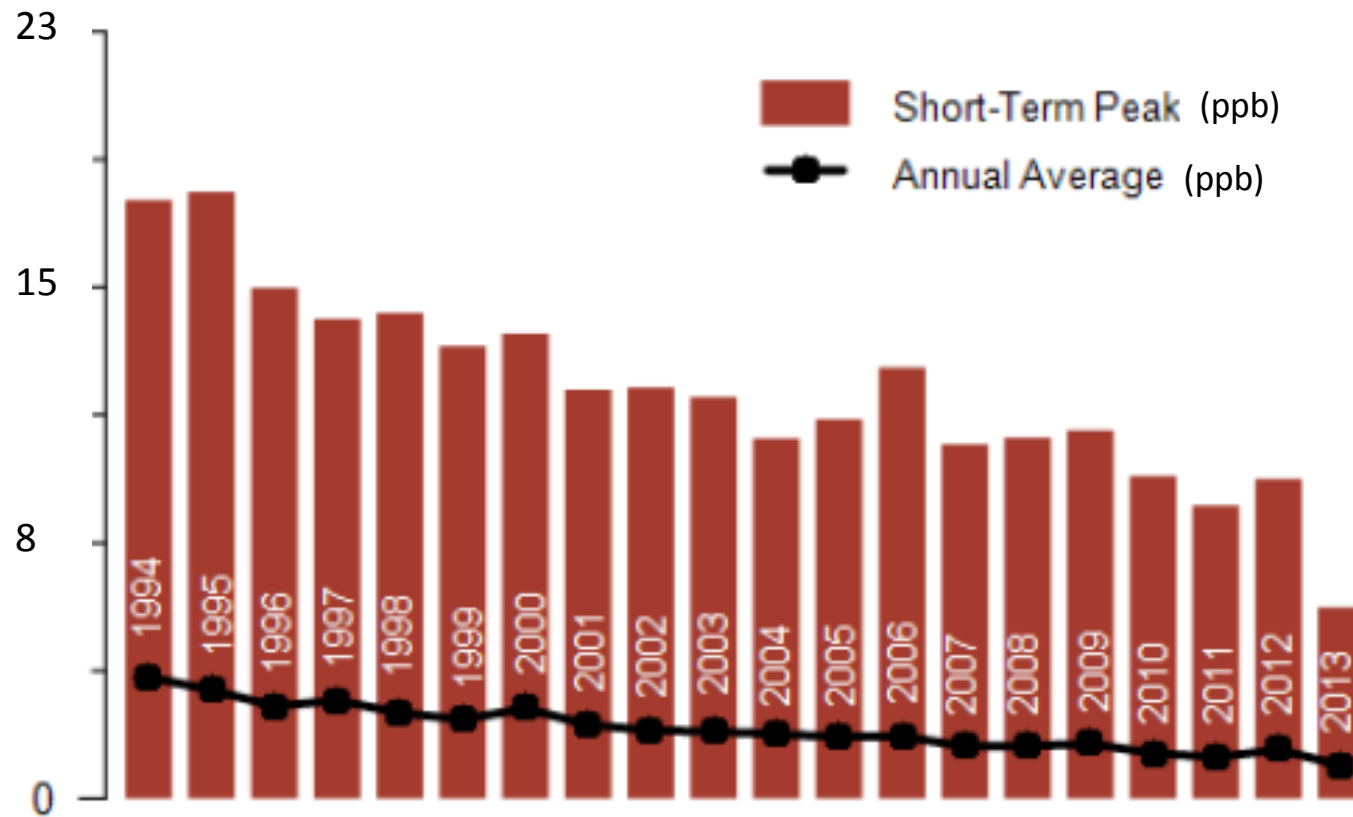
MV Existing Objective	US EPA standard	BC Interim Objective	MV Proposed Interim Objective
174 ppb	75 ppb	75 ppb	75 ppb
1-hour average Not to be exceeded	99 th percentile of 1-hour daily maximum Averaged over 3 years	99 th percentile of 1-hour daily maximum Averaged over 1 year <i>Only applicable to new or significantly modified sources</i>	1-hour average Not to be exceeded

The proposed MV interim SO₂ objective is:

- More protective of health in a densely populated region
- More practical for episode management
- Simpler to report
- Easier for the public to understand

Achievability – Past Trends

- Regional SO₂ levels are decreasing



Source:
2013 Lower Fraser Valley Annual Air Quality Report

Achievability – Exceedances

Table 1 Exceedances of Metro Vancouver's Current and Proposed Interim Sulphur Dioxide Objectives (2009 to 2013)

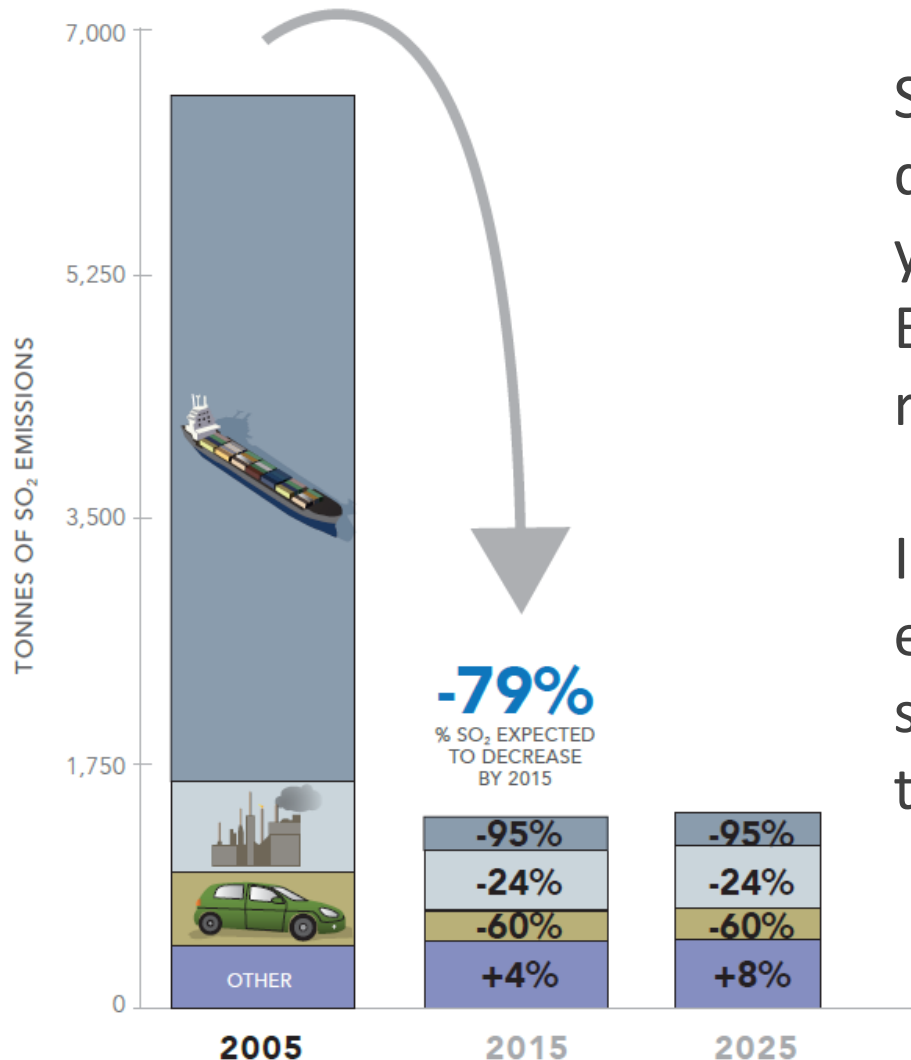
Averaging period	Objective	Exceedances per year					Station
		2009	2010	2011	2012	2013	
1-hour	174 ppb (current)	1	0	0	0	2	All 3 at T23 Burnaby Capitol Hill

Achievability – Exceedances

Table 1 Exceedances of Metro Vancouver’s Current and Proposed Interim Sulphur Dioxide Objectives (2009 to 2013)

Averaging period	Objective	Exceedances per year					Station
		2009	2010	2011	2012	2013	
1-hour	174 ppb (current)	1	0	0	0	2	All 3 at T23 Burnaby Capitol Hill
1-hour	75 ppb (proposed interim)	20	1	0	3	15	39 at T23 Burnaby Capitol Hill
		0	2	0	0	2	4 at T9 Port Moody
		0	0	1	1	0	2 at T24 North Burnaby
		2	-	-	0	0	2 at T1 Downtown Vancouver

Achievability - Future Emissions



Percent change from 2005 emission levels. (Negative values indicate a decrease.)

SO₂ emissions expected to decrease significantly by this year, mostly due to marine Emission Control Area requirements.

In 2015, the refinery is expected to become the single largest source of SO₂ in the Metro Vancouver region.

Source:
Regional Emission Inventory and Forecast

Achievability - Preliminary Modelling

- MV and Port Metro Vancouver hired RWDI Air to model all sources in Burrard Inlet area
- Predictions:
 - SO₂ levels are expected to decrease considerably in the Burrard Inlet area due to marine Emission Control Area requirements
 - Some exceedances of the proposed interim 1-hour objective still predicted from time to time
 - However, due to several simplifying assumptions we believe these predictions are underestimates

Achievability

- Additional source-specific modelling needed to determine achievability with greater certainty
- Without additional emission reductions, the proposed interim SO₂ objective may not be achievable everywhere in the region

Consultation Process

- 2 small group meetings – January 22nd and 27th
 - Federal and provincial authorities, municipalities, industry reps, NGOs, local health authorities
- Webinar – January 23rd (now online)
- Presentations
 - Regional Engineers Advisory Committee – December 5th
 - Lower Fraser Valley Air Quality Coordinating Committee – December 9th
 - Technical meeting with Chevron staff – December 18th
 - BC Marine Vessel Air Quality Working Group – January 26th
 - Chevron Community Advisory Panel – February 5th
- Feedback deadline is **Friday, February 13th, 2015**

After Consultation

- Review feedback
- Summarize comments into a staff report
- Metro Vancouver's Climate Action Committee
 - Staff report to the March 26th meeting
- Metro Vancouver Board
 - Staff report to the April 17th meeting

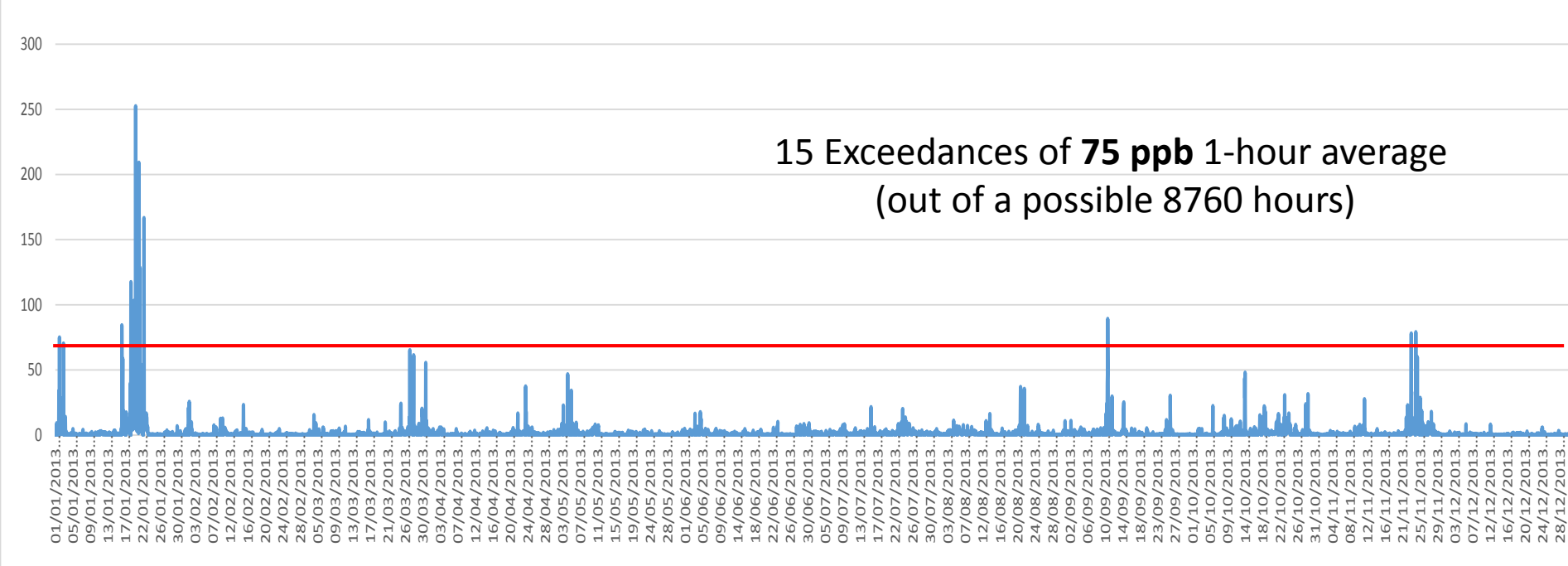
Summary

- Metro Vancouver is seeking your feedback on an interim SO₂ objective that:
 - Is consistent with the principle of continuous improvement
 - Is in line with US EPA standard and BC interim objective, but more protective
 - Better protects the health of Metro Vancouver residents
- Metro Vancouver will consider the Canadian SO₂ standards after they have been adopted by CCME
- The feedback deadline is **Friday, February 13th, 2015**
- For more information www.metrovancouver.org/air

Extra slides

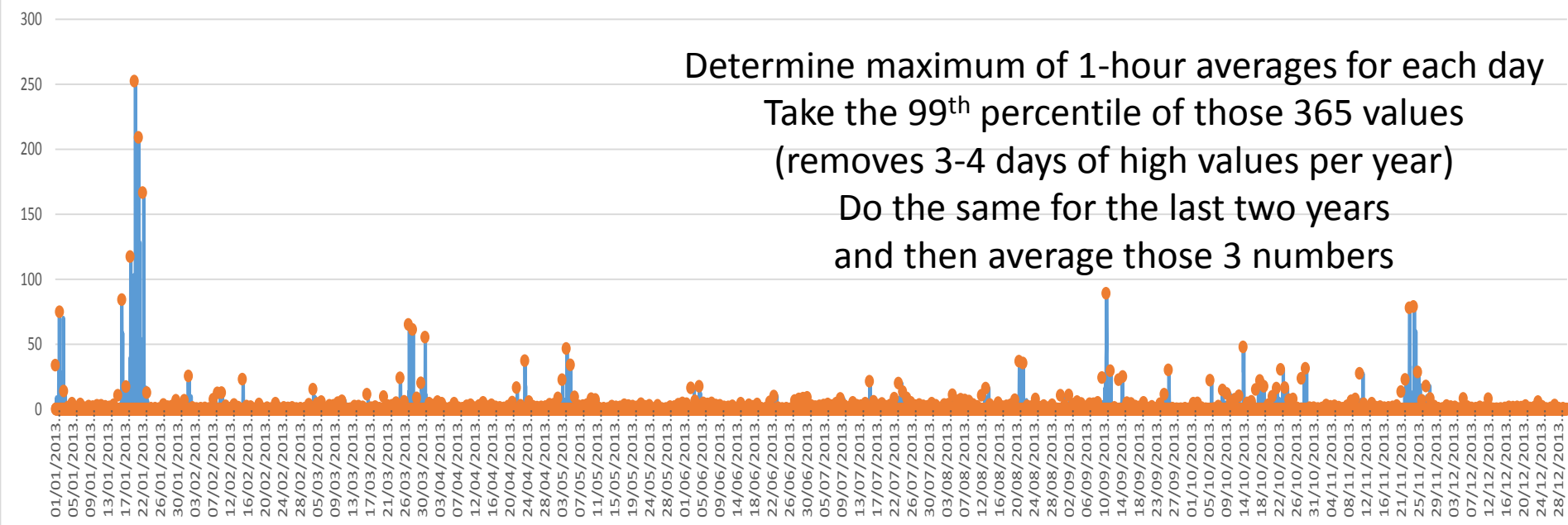
Determining Exceedances – MV Proposed

1-hour average SO₂ at Burnaby-Capitol Hill Station - 2013



Determining Exceedances – US EPA

1-hour Daily Maximum SO₂ at Burnaby-Capitol Hill Station - 2013



99 th percentile (ppb)	Year
99.5	2013
69.4	2012
54.5	2011

Average = **74.4 ppb**
No exceedance