Budget Facility Fee Explanation for Website

The invoice process and amounts are the same as in 2013.

The oil and gas production contribution is $150,000.00 to the total budget. Production volumes within the zone, reported to the Ministry of Economy, have been tabulated, and the invoiced amount is proportional to your company's percentage of the total production volume.

The facilities emitting and reporting to the NPRI, also contribute $150,000.00 to the proposed operating budget. To determine invoice amounts, all NPRI emissions from within the WYAMZ area were tabulated. Then the following formula was applied to determine a facility's monetary contribution to the air zone based on these NPRI emissions. The formula is:

The Facility Fee = Facility Emissions Units[a]/Total Emissions Units[b] X Total Operating Costs[c]

(i.e. 100 EUs/ 1000EUs X 150,000.00 = $15,000.00)

[a]= sum of your facilities emissions multiplied by relative toxicity values
[b]= sum of entire air management zone emissions multiplied by relative toxicity values
[c]= total operating costs of WYAMZ administration and operations

Therefore, if you are a company that has low emissions or you are a small producer you can expect to receive an invoice between $500.00 and $1000.00. Larger emitters or producers will receive an invoice of $30,000.00-$40,000.00.

There is also a 10% contingency fee. A contingency is necessary since WYAMZ will unlikely be able to collect from everyone, (some companies may be defunct or subsumed by another), so that needs to be accounted for to meet budget.

If you are an emitter and an oil or gas producer you will receive a 3 line invoice consisting of your membership fee, emissions amount and production volume amount. The more emissions or production associated with your organization the more you will be asked to contribute. This is consistent with other air zone associations in western Canada.

ACCOUNTING FOR RELATIVE TOXICITY OF POLLUTANTS IN AN EMISSION INVENTORY

In carrying out an inventory of emissions, it is important to have some quantitative way of recognizing that some pollutants are much more toxic than others. From an engineering pollution control point of view, the "toxicity" of any pollutant is directly proportional to its ambient limit, set by provincial or federal regulations.

To account for the effect of exposure time t_e we only need to know the ability of the atmosphere to dilute our emissions, and not the actual toxic load exponent 'n' in

$$\mathbf{L} = \boldsymbol{\chi}_{\mathbf{a}}^{\mathbf{n}} \mathbf{t}_{\mathbf{e}} \quad \text{.......(1)}$$

where; L is the toxic load and χ_a the ambient concentration. For a fixed constant value of the toxic load, the effect of increasing the exposure time is to lower the harmful threshold χ_a, from (1)

$$\chi_{a1}^{n} t_{e1} = \chi_{a2}^{n} t_{e2}$$

so that

$$\frac{\chi_{a2}}{\chi_{a1}} = \left(\frac{t_{e1}}{t_{e2}}\right)^{1/n} \quad \text{.............(2)}$$

Typical values of the exponent 'n' range from n = 2.0 to 3.5 so that the time exponent ranges from 0.3 to 0.5.

For an emission inventory, we are interested in determining the amount we may emit such that the ambient limit is not exceeded for its specified averaging time. To compare allowable emission levels for different pollutants the effect of averaging time on concentration must be known. The most common relationship used is a power law of the form.

$$\frac{\chi_{a1}}{\chi_{a2}} = \left(\frac{t_{2}}{t_{1}}\right)^{a} \quad \text{.............(3)}$$

Values of the exponent range from a = 0.15 to 0.5, and Alberta Environment recommends a = 0.2.

It is important to keep in mind that while equations (2) and (3) are identical in form, they describe two different processes. Equation (2) describes the nonlinear effects of exposure time on adverse effects, while (3) predicts the effect of increased dispersion caused by longer plume averaging time. For adjusting ambient concentrations we will use (3) with a = 0.2 to adjust published values of allowable ambient concentration to a common averaging time.

Table 1 presents the maximum allowable (or maximum acceptable in the case of federal standards) concentrations corrected to a 3 hour sampling time. The last column shows the allowable mass emission relative to SO_2, and indicates that 20 kg of CO can be emitted with 1 kg of SO_2 and both will be at their ambient concentration limits. These factors can also be used to adjust the emissions from a plant to "equivalent kg of SO_2".

The use of "equivalent" emissions has some important and often questionable assumptions built in.

Some of these are:

1. The effect of each pollutant is independent of the presence of other pollutants, so that SO_2 and NO_2 may together reach their ambient limits with no worse effect than if they were acting alone. While this is probably not true from a scientific point of view, it is an accurate reflection of existing regulations.
2. There are no extraneous effects. For example water vapour is not included as a pollutant; however when it is present the harmful levels of SO_2 and NO_2 are lower because of the formation of H_2SO_4 and HNO_3.
3. The actual toxic load caused by a pollutant is ignored, because these loads from equation (1) are not included in government regulations. However, because the non-linear exponent "n" in equation (1) varies from 2.0 to 3.5 depending on the pollutant, the actual relative toxicity of two pollutants will depend on the exposure time, and will not be constants as implied by the Ambient Emission Ratios given in Table 1.

TABLE 1

Relative Toxicity Factors based on Saskatchewan's Clean Air Regulations, Chapter C-12.1 Reg 1

Air Pollutant	Source of Ambient Standard Emission	Maximum Concentration	Time Period	Computed Maximum Concentration (based on 1 hr)	Relative Toxicity Ratio (based on SO_2 equivalence)
		μg/m^3	hr	μg/m^3	unitless
Sulphur dioxide	Saskatchewan	450	1	450	1.0
Suspended Particulates	Saskatchewan	120	24	227	2.0
Fine Particulates	Saskatchewan	30	24	57	7.9
Carbon monoxide	Saskatchewan	15,000	1	15,000	0.03
Oxidants (O_3)	Saskatchewan	160	1	160	2.8
Hydrogen Sulphide	Saskatchewan	15	1	15	30.0
Nitrogen dioxide	Saskatchewan	400	1	400	1.1
Hydrocarbons	Federal	160	3	199	2.3