Permitting & Modeling Requirements for New Standards – $PM_{2.5}$, NO_2, & SO_2

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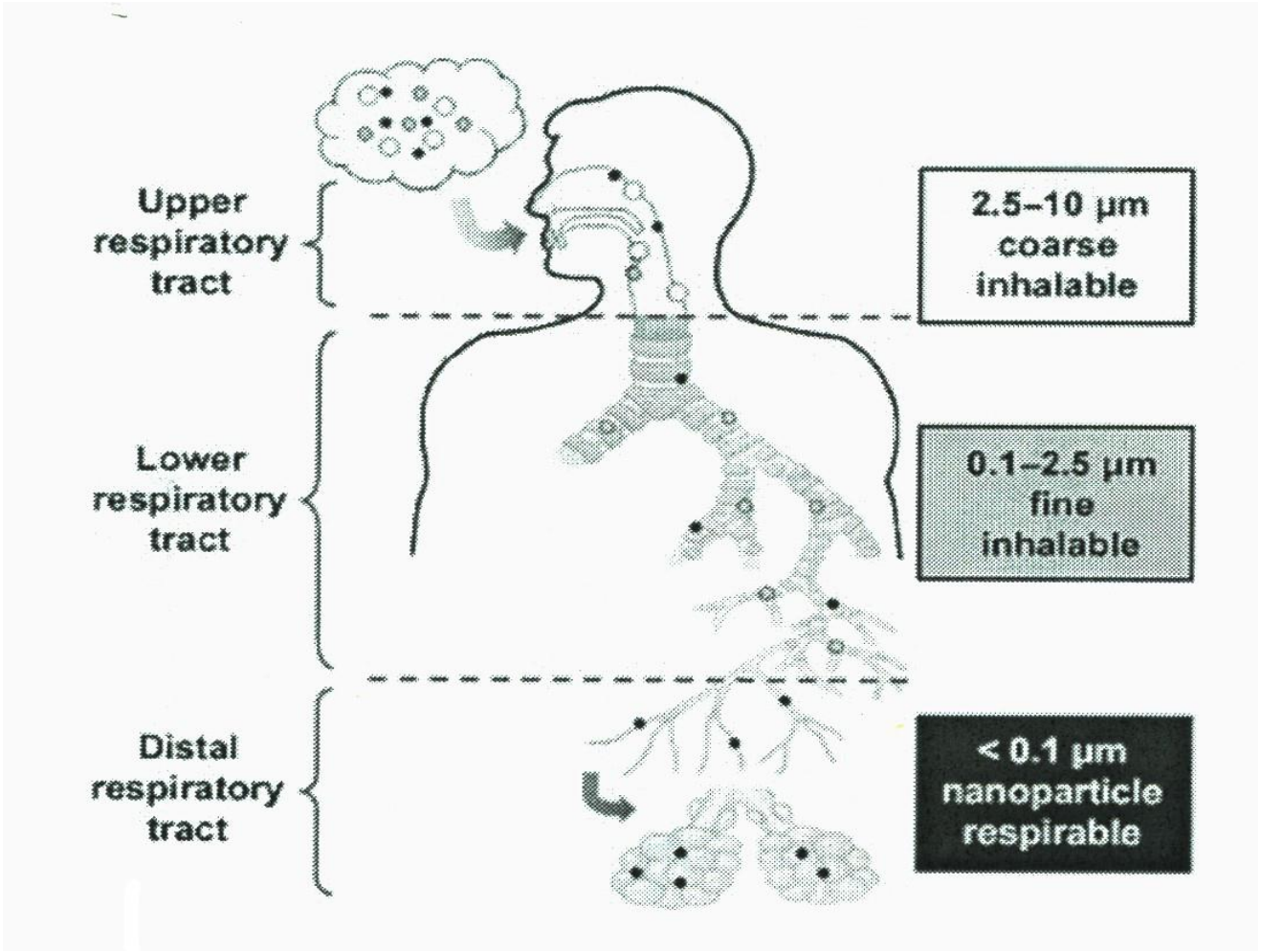
Background Information

- The Clean Air Act requires EPA to set and **revise** National Ambient Air Quality Standards (NAAQS) for certain common and widespread pollutants (criteria pollutants), and provides authority for EPA to **add additional pollutants** (Sections 108 & 109 of the CAA).
- **Every five years**, the Act requires EPA to review scientific data, and determine whether to revise the standards for a pollutant.
- Implementation of these standards are a **joint responsibility** of states and EPA.

Background Information

- In 2006, EPA
  - revised the 24-hr PM2.5 to 35 µg/m^3, and
  - retained the annual PM2.5 standard at 15 µg/m^3
- In 2010, EPA
  - established the 1-hr NO2 = 100 ppb, and
  - established the 1-hr SO2 = 75 ppb
- NDEP Public workshop held in March 2014 to receive comment on Nevada Implementation
- NV SEC approved NV implementation in June, 2014; EPA final approval in October 2014.

Why $PM_{2.5}$, NO2, and SO2?



"...is made up of a number of components, including acids, organic chemicals, metals, and soil or dust particles." - EPA

"Particles less than 2.5 micrometers in diameter ($PM_{2.5}$) are referred to as "fine" particles and are believed to pose the largest health risks. Because of their small size (less than one-seventh the average width of a human hair), fine particles can lodge deeply into the lungs." -EPA

Portion of NAC 445B.22097 affected:

		NEVADA STANDARDS	NATIONAL STANDARDS	
POLLUTANT	AVERAGING TIME	CONCENTRATION	PRIMARY	SECONDARY
Nitrogen dioxide	Annual arithmetic mean	0.053 ppm (100 µg/m³)	53 ppb	Same as primary
	1 hour	**100 ppb**	100 ppb	None
Sulfur dioxide	Annual arithmetic mean	0.030 ppm (80 µg/m³)	0.03 ppm (1971 standard)	None
	24 hours	0.14 ppm (365 µg/m³)	0.14 ppm (1971 standard)	
	3 hours	0.5 ppm (1,300 µg/m³)	None	0.5 ppm
	1 hour	**75 ppb**	75 ppb	None
Particulate matter as $PM_{2.5}$	**Annual arithmetic mean**	**15.0 µg/m³**	15.0 µg/m³	Same as primary
	24 hours	**35 µg/m³**	35 µg/m³	Same as primary

$PM_{2.5}$ in Permit Applications

- Permit application's emissions inventory **must now include $PM_{2.5}$**.
- In the *Emission Units Application Forms*, $PM_{2.5}$ must be recognized as a pollutant for each emission unit with potential-to-emit values in rates of pounds-per-hour (lb/hr) and tons-per-year (tpy). Similarly, $PM_{2.5}$ values must be included in the *Facility-Wide Potential to Emit Tables*.
- As always, please cite the source of your emission factors and do not use PM_{10} emission factors for $PM_{2.5}$, as it will greatly over estimate emissions.

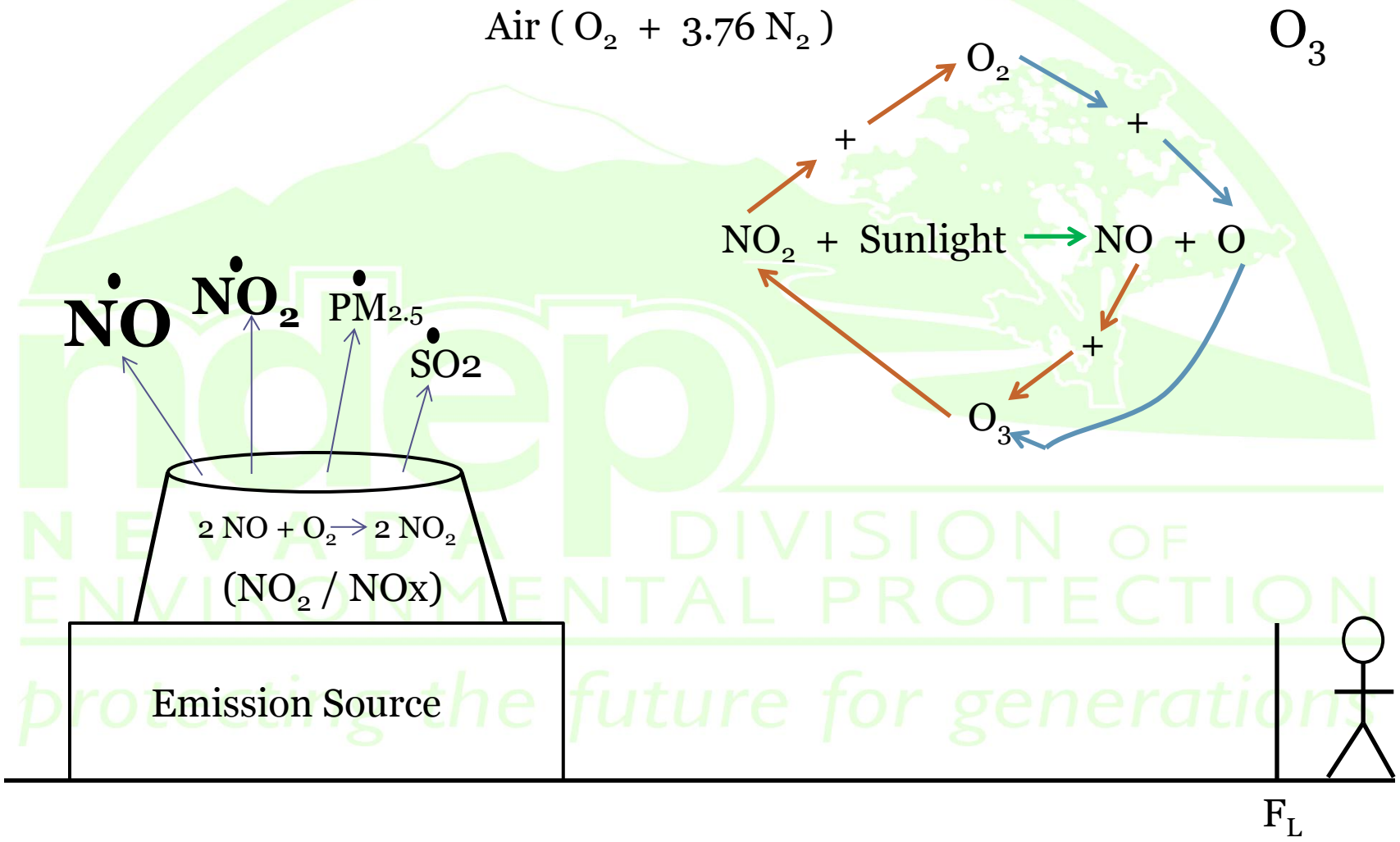
NO_2 and SO_2 in Permit Applications

- Permit application's emissions inventory **will continue to require NO_2 & SO_2.**
- *If you are required to provide an air dispersion model*, please make sure that model runs are performed for all current Nevada Standards *including* the new 1-hour standards (NO_2 & SO_2).
- If you do not meet the assignment threshold (PTE < 40 tpy per pollutant) to provide an air dispersion model, the NDEP will perform this modeling to ensure compliance with those **new 1-hr standards**. (NAC 445B.308 (2))

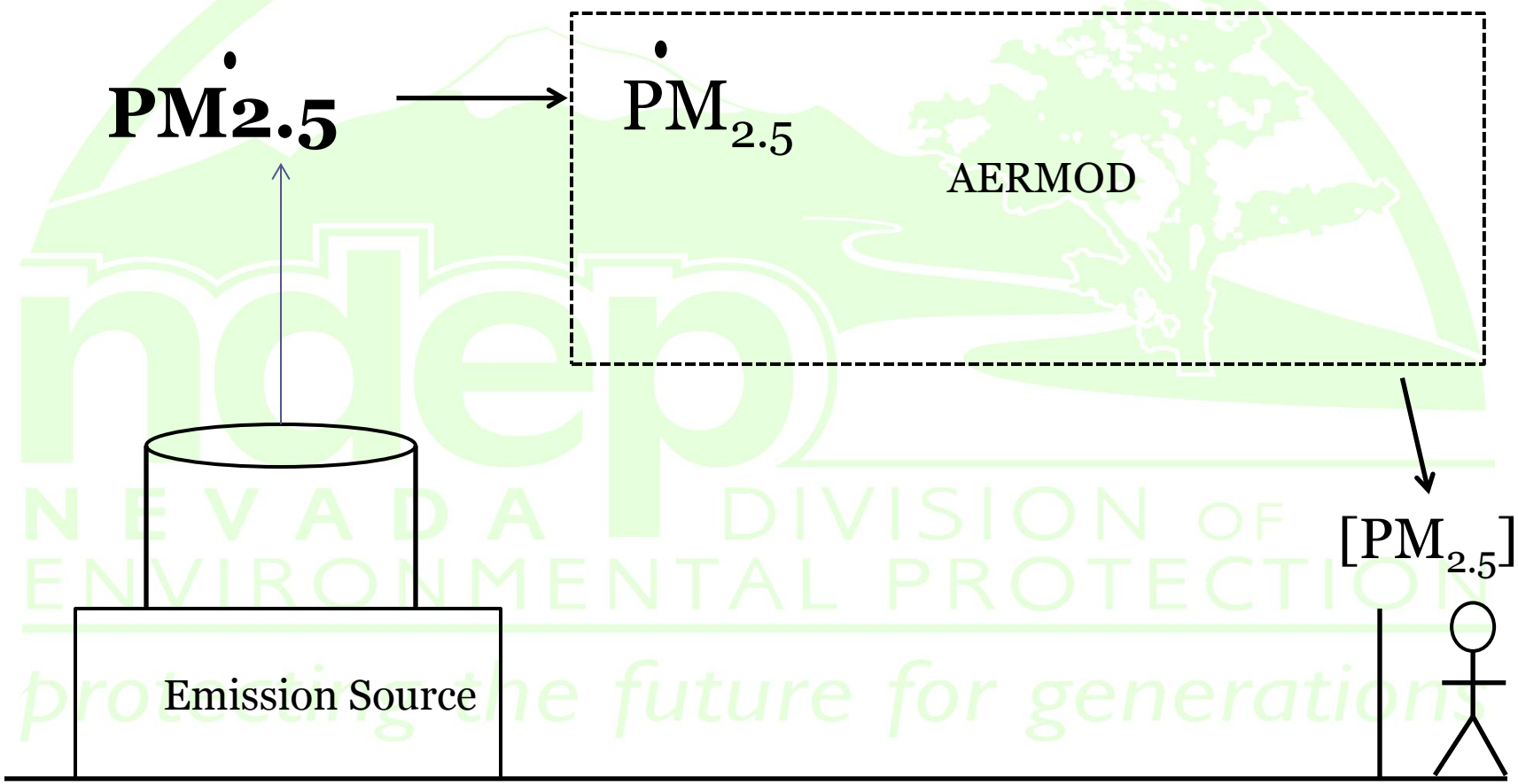
Modeling Requirements

- PM2.5 – *Non-PSD actions* should use the BAPC Guidelines with default AERMOD settings for direct PM2.5. PSD actions must use direct and secondary PM2.5 and should submit a model protocol.
- SO2 – PSD and non-PSD actions should use the BAPC Guidelines with default AERMOD settings.
- EPA has developed guidance memos and are available on our website (www.ndep.nv.gov/bapc)

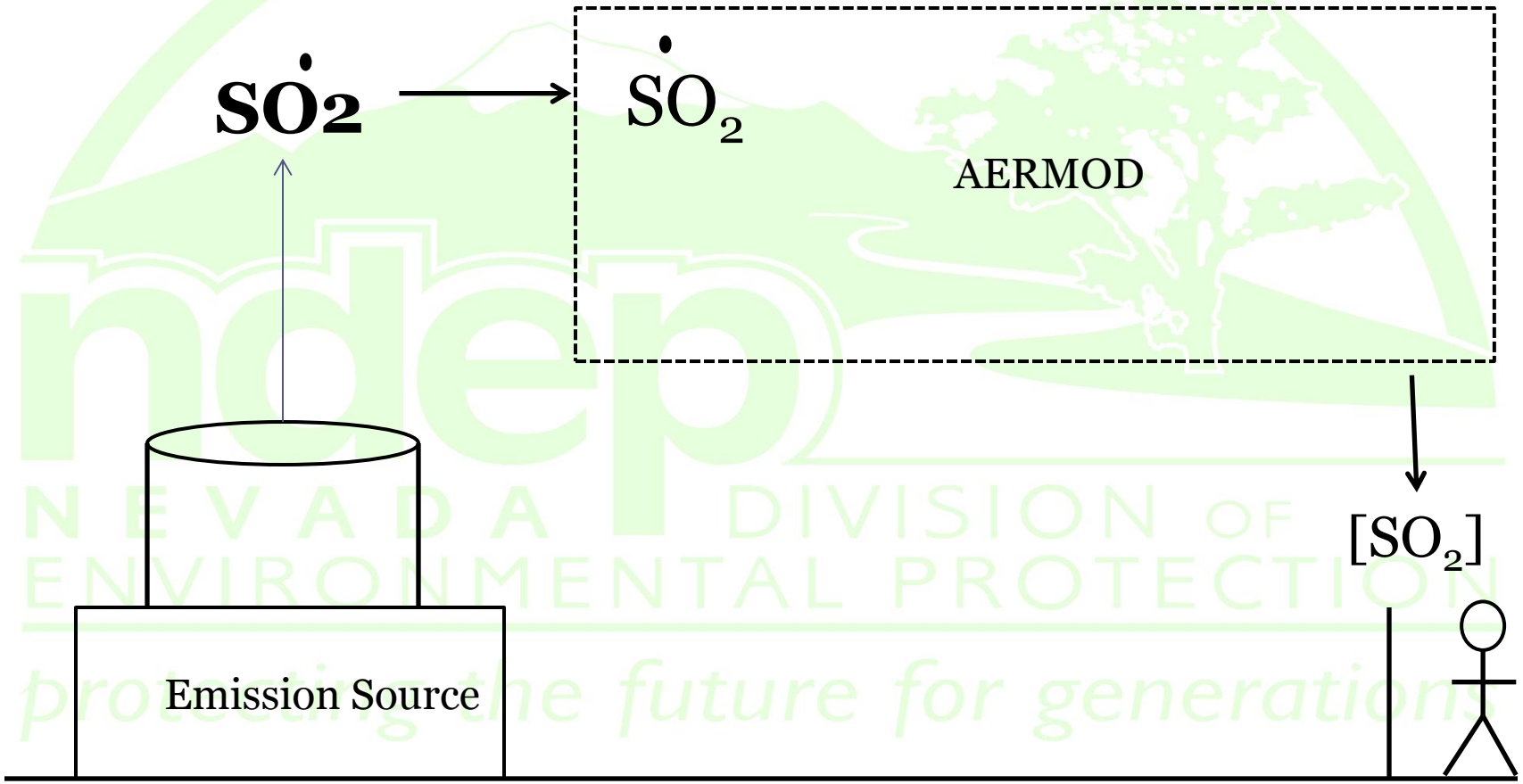
Let's Take A Look



For PM2.5 (non-PSD)

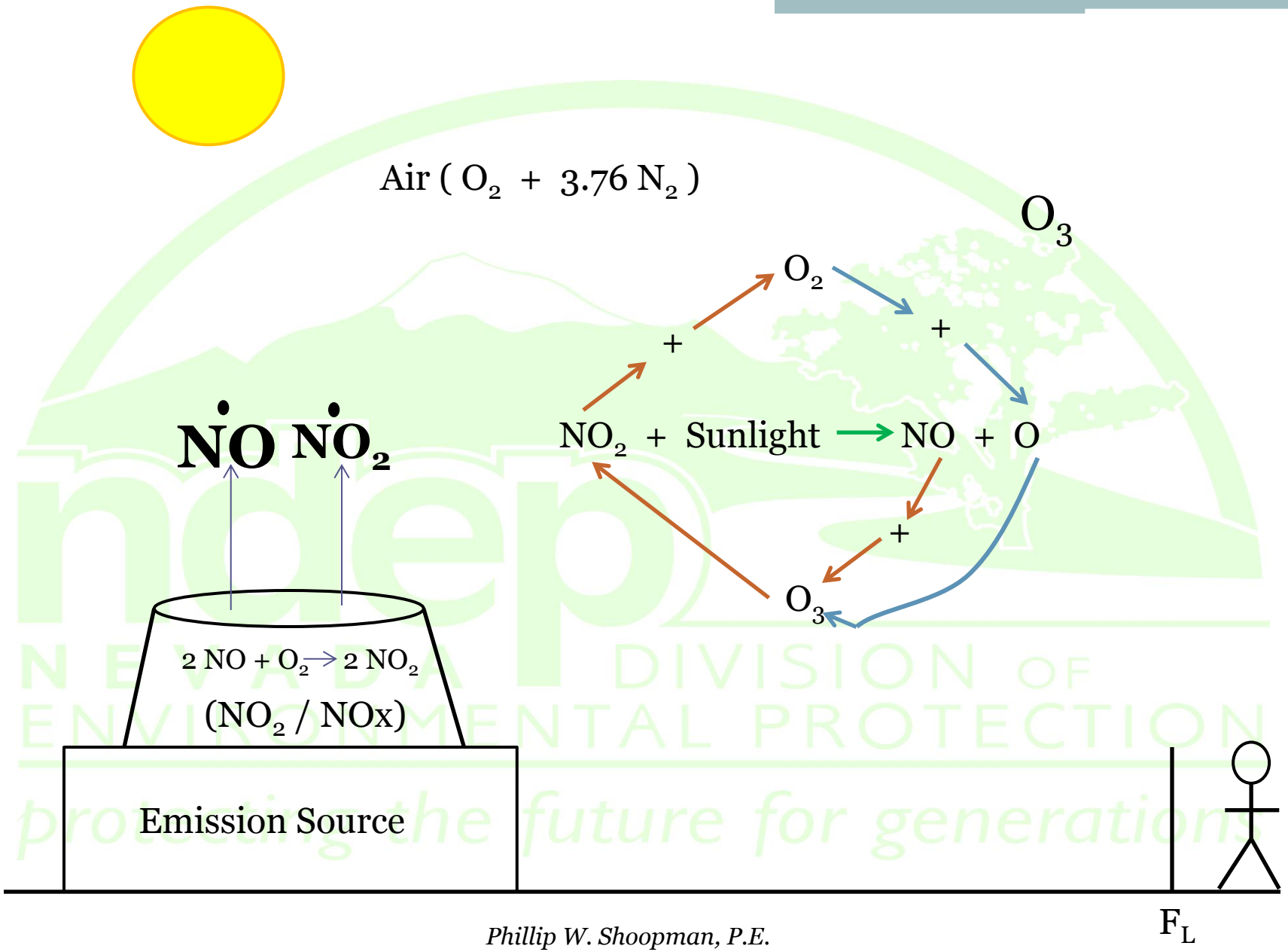


For SO2



Modeling Requirements

- NO2 – EPA has proposed a three-tiered evaluation process for quantifying NO2 mass emission rates for air dispersion modeling.
  - **Tier 1** assumes full conversion of NOx to NO2. That is, the applicant assumes all NOx is emitted in the form of NO2.
  - **Tier 2** employs an empirically-derived conversion ratio (NO2/ NOx), whereby the result from the Tier 1 value is multiplied by 0.80 for the ambient air (known as the 'Ambient Ratio Method'). This tier (2) is available to a source when low-level releases occur with limited plume rise and ozone concentrations are likely to be relatively low. When using a ratio value other than 0.80, the analysis would be considered a Tier 3 evaluation.
  - **Tier 3** represents a general category of "detailed screening methods" which may be considered on a case-by-case basis.



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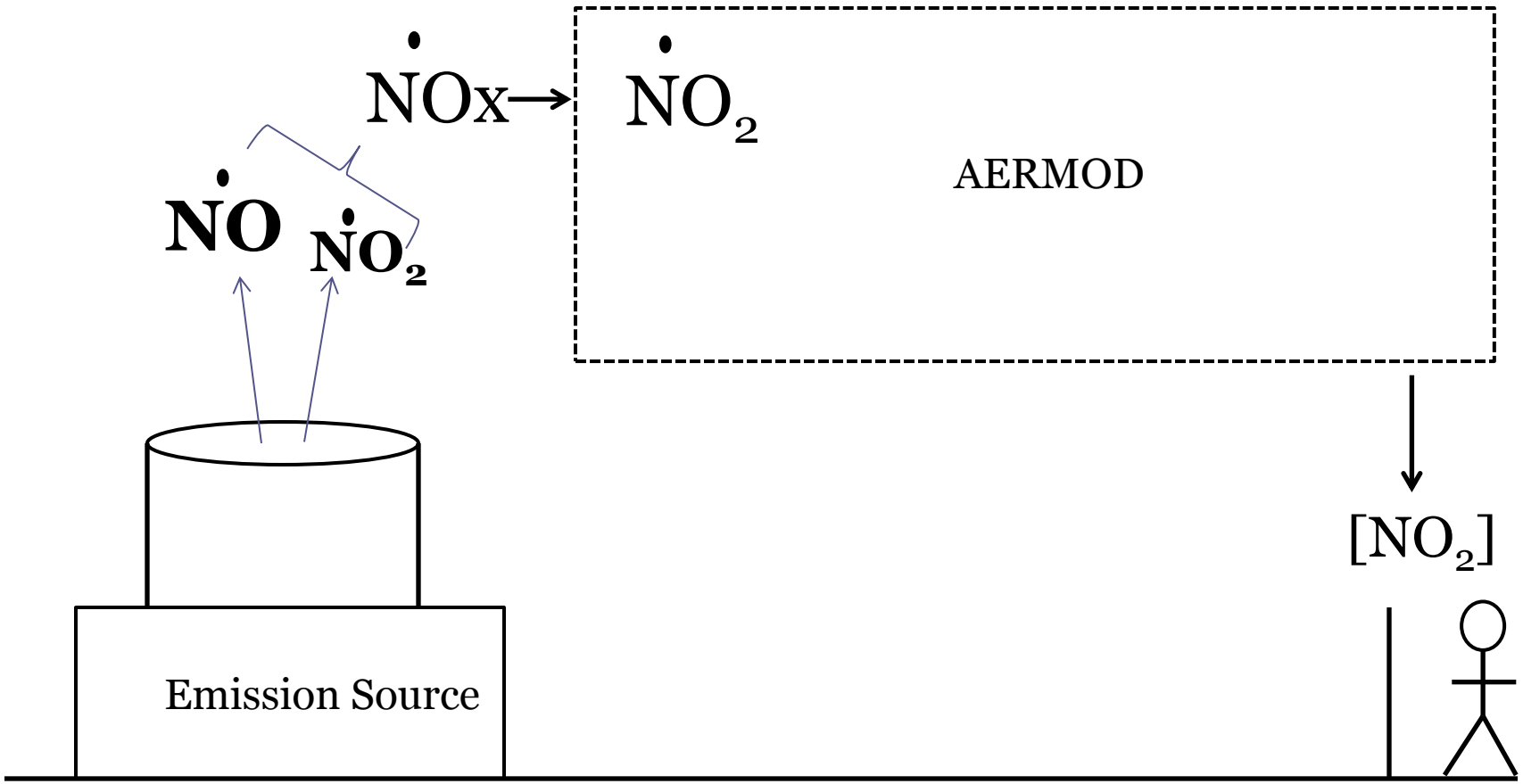
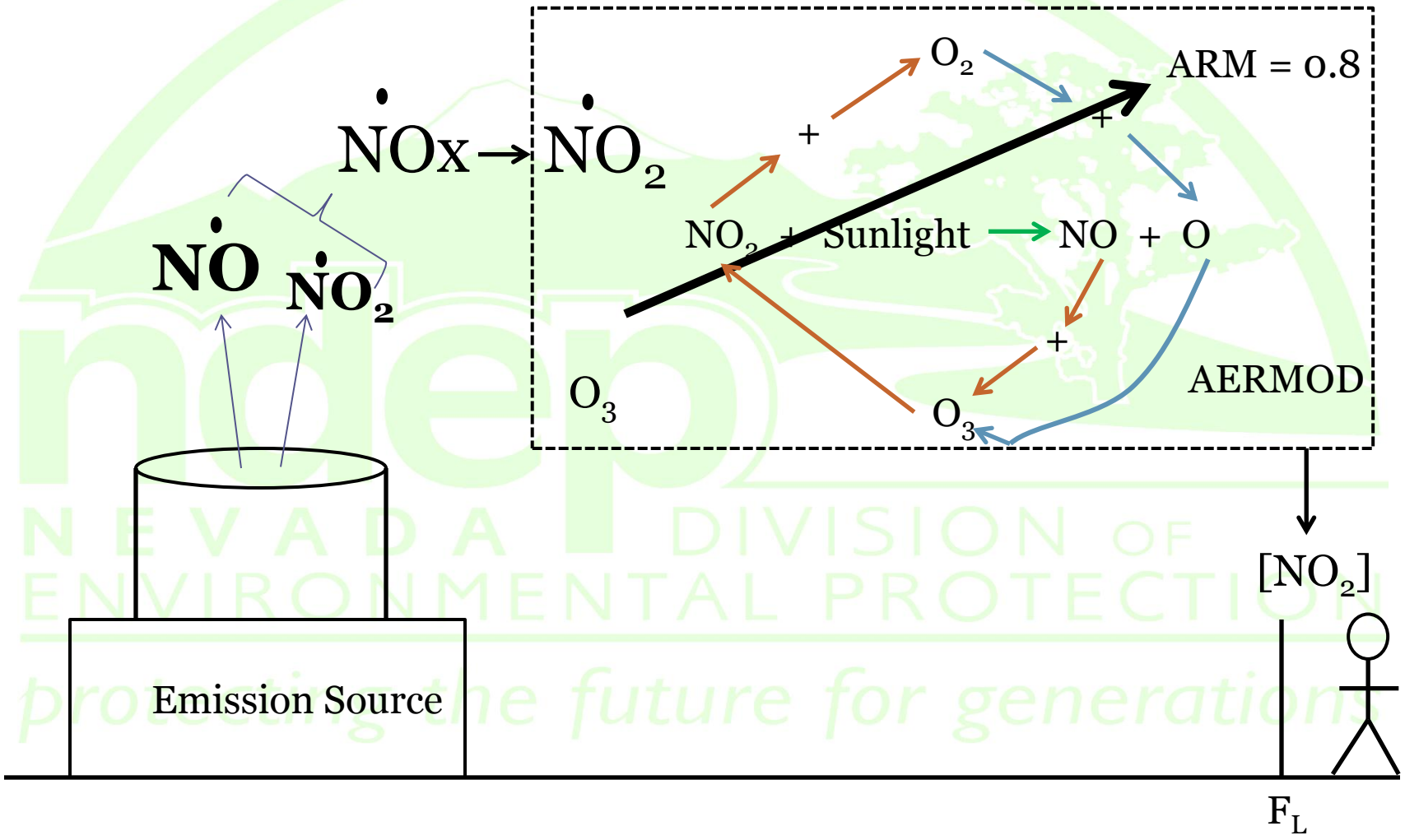
NDEP- BAPC

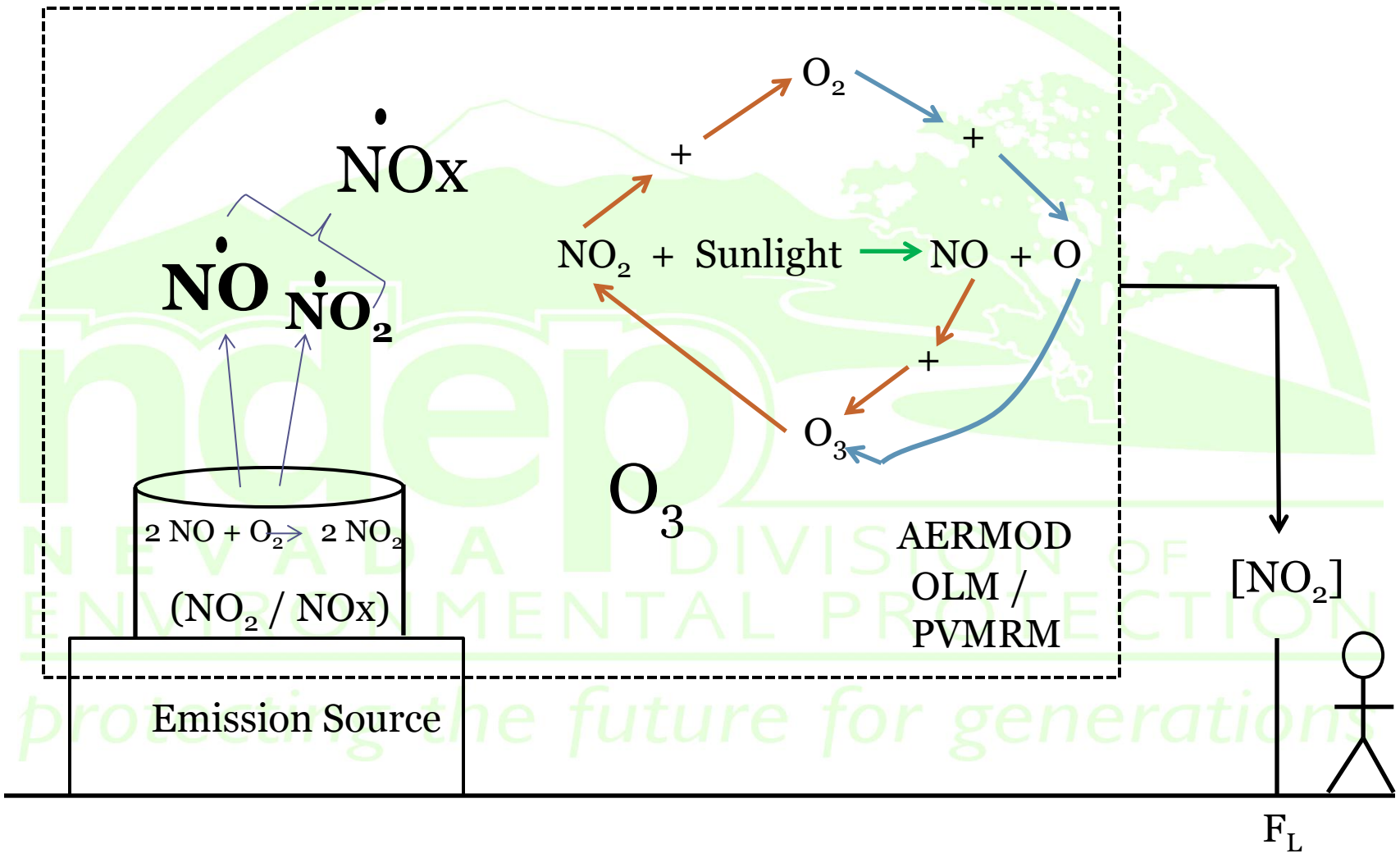
NO2 Tier I


$\dot{N}OX \rightarrow \dot{N}O_2$
AERMOD
$\dot{N}O$ $\dot{N}O_2$
$[NO_2]$
Emission Source

NO2 Tier II



NO2 Tier III



Modeling Requirements

- **Tier 1** approach may be used for all permit applications without additional support documentation with default AERMOD settings.
- **Tier 2** approach will require additional support documentation for all applications. Documentation would include acknowledgement of source-surrounding characteristics that meet applicable assumptions (as noted by the EPA in their June, 2010 memo).
- **Tier 3** approach will require substantial background information, and pre-approval via a model protocol is required.

Permit Emission Limits

- Enforceable permit emission limits will be added to Class I and Class II permits for PM2.5 and NOx where applicable, and may include permit requirements for monitoring, recordkeeping, reporting, and potentially compliance testing (stack tests).

Annual Reporting and Fees

- Facilities that have permits with PM2.5 emission limits **will have to include actual PM2.5 emissions data** in their annual emissions report.
- Pursuant to NAC 445B.327(5) *Class I permit facilities must pay an annual emissions fee for each regulated pollutant* for which a standard is established in NAC 445B.22097 or a National Ambient Air Quality Standard.
- Please note that **carbon monoxide** and **greenhouse gases** are **excluded** by regulation.
- Applicable billable pollutants include: Volatile Organic Compounds (VOCs) as a precursor to Ozone, Nitrogen Oxides (NOx), Sulfur Dioxide (SO2), Particulate Matter as PM10, Particulate Matter as PM2.5, Lead, and Hydrogen Sulfide.
- Class II, III and IV permits do not have “per ton” emissions fees.

Questions?