Department of Environmental Quality
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For assistance, call the
Air Permit Hotline - 1-877-5PERMIT

Department of Environmental Quality - Air Quality Division
Preapplication Meeting Package

EMISSIONS INVENTORIES (EI)

Requirements

Applicants/consultants are expected to read and understand the regulations and to follow instructions.

When applying for a Permit to Construct (PTC), applicants are required to include facility-wide Potential to Emit (PTE) (Tables 1, 2, 3, and 4), Hazardous Air Pollutants (HAP) PTE (Table 5), and Toxic Air Pollutants (TAP) PTE (Tables 6 and 7) in their EI spreadsheet. A PTC is usually required for construction of a new facility, modification to an existing facility, and compliance by an existing facility without a permit.

Use the same emission unit name throughout the application (i.e., in air pollution control equipment forms and for modeling purposes).

The application must **show in detail all calculations** used to develop the EI and include the following:

- An electronic copy of the spreadsheet (i.e., Excel file).
- All calculations including calculation formulas.
- Clear statements on all assumptions relied upon in estimating emissions.
- Documentation of emissions factors used to estimate emissions. If the emissions factor documentation (such as an AP-42 emissions factor from the US Environmental Protection Agency) is readily available to DEQ, a simple reference to the emissions factor suffices. If the emissions factor documentation is not readily available to DEQ, the applicant must submit the documentation with the application. Ask DEQ if you are uncertain. Documentation may consist of manufacturer guarantees, research conducted by trade organizations, published emission factors, and source test results. If multiple factors are applicable to a given operation, note why the factor used is the most representative.
- Copies of manufacturer guarantees upon which emissions inventories are based.
- Best available emission information (see DEQ Guidance on Emissions Data Hierarchy).
- Source test report, if source tests are used as the basis for emissions estimates. If the source test report is on file with DEQ, provide the date the source test was submitted, name of the facility, and the emission unit tested. Source data from similar emissions units may be considered reliable if a clear description of why the sources are similar is provided. Similar sources are those that the applicant has shown serve a similar function, use similar raw materials, and have similar processing rates.

Fugitive emissions of New Source Review (NSR) regulated air pollutants from the source categories listed below must be included in the emission inventory.

Listed Source Categories for Inclusion of Fugitive Emissions

- Coal cleaning plants (with thermal dryers)
- Kraft pulp mills
- Portland cement plants
- Primary zinc smelters
- Iron and steel mills
- Primary aluminum ore reduction plants
- Primary copper smelters
- Municipal incinerators -250 T/day of refuse
- Hydrofluoric, sulfuric, or nitric acid plants
- Petroleum refineries
- Lime plants
- Carbon black plants (furnace process)
- Primary lead smelters
- Fuel conversion plants
- Sintering plants
- Secondary metal production plants
- Chemical process plants (excluding ethanol plants by natural fermentation).
- Fossil-fuel fired boilers totaling more than 250 MMBtu/hr
- Petroleum storage and transfer units with total capacity of 300,000 barrels
- Taconite ore processing plants
- Glass fiber processing plants
- Charcoal production plants

- Phosphate rock processing plants
- Coke oven batteries
- Sulfur recovery plants
- Fossil fuel-fired steam electric plants greater than 250 MMBtu/hr)
- Categories regulated by NSPS or NESHAP prior to 8/7/80

For TAP EI, applicants must demonstrate preconstruction compliance with TAP standards prescribed in Section 210 of the Rules for the Control of Air Pollution in Idaho. To assist applicants, a TAP completeness checklist is available on DEQ's website at http://www.deq.idaho.gov/media/576565-ptc_checklist_tap_completeness.docx.

Potential to Emit (PTE)

IDAPA 58.01.01 defines PTE as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions do not count in determining the potential to emit of a facility or stationary source.

Uncontrolled PTE

Based on the definition of PTE, uncontrolled PTE is defined as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall **not** be treated as part of its design since the limitation or the effect it would have on emissions is **not** state or federally enforceable.

The uncontrolled PTE is used to determine if a facility is a "Synthetic Minor" source of emissions. Synthetic Minor sources are facilities that have an uncontrolled PTE for regulated air pollutants or HAP above the applicable Major Source threshold without permit limits.

Emissions Inventory Examples

Sample illustrations on how to calculate facility-wide PTE, HAP PTE, and TAP EI are provided in the following sections. Due to the complexity of the regulations, it is not practical to provide examples to cover all scenarios.

PTE calculation example

A new boiler has a heat input rate of 100 MMBtu/hr and will burn sawmill wood waste, operate 50 weeks per year, and use an Electrostatic Precipitator (ESP) with 99% control efficiency to control $PM_{2.5}$ emissions.

The applicant applies for a permit to limit the boiler to operate 50 weeks per year and to require the boiler to use ESP with 99% control efficiency to control $PM_{2.5}$ emissions.

- **New boiler uncontrolled PTE for $PM_{2.5}$ emissions**

  (100 MMBtu/hr) x (0.5 lb/MMBtu, $PM_{2.5}$ emissions factor, uncontrolled[1]) x (8,760 hr/yr) x (1 T/2000 lb) = 219 T/yr

- **New boiler PTE for $PM_{2.5}$ emissions**

  (100 MMBtu/hr) x (0.5 lb/MMBtu, $PM_{2.5}$ emissions factor, uncontrolled[1]) x (1-99%) x (8,760 hr/yr) x (50 wk /52 wk) x (1 T/2000 lb) = 2.1 T/yr

[1] Reference EPA AP-42, Section 1.6, Table 1.6-1, rev. 9/03.

HAP PTE calculation example

An applicant applies for a permit for a new spray booth. The new spray booth is proposed to use three spray guns each with a rated capacity of 5 gal/hr and to use one paint with a density of 7 lb/gal. According to Safety Data Sheet (SDS, formerly MSDS) of the paint, Composition/Information on Ingredients section, the paint has 40 wt% of Xylene and 40 wt% of Benzene. These are HAPs, according to Clean Air Act Amendments of 1990 List of Hazardous Air Pollutants. The gun will be used 7 hrs/day, 5 days/wk, and 52 wks/yr. The applicant proposes to use an oxidizer with 90% of control efficiency to control the HAP emissions.

- **Uncontrolled HAP PTE**
  - The uncontrolled PTE of Xylene emissions from the new spray booth is calculated as:

    (3 spray guns) x (5 gal/hr) x (7 lb/gal) x (40% Xylene [2]) x (8,760 hrs/yr) / (2000 lb/T) = 184.0 T/yr
  - The PTE of Benzene emissions from the new spray booth is calculated as:

    (3 spray guns) x (5 gal/hr) x (7 lb/gal) x (40% Benzene [2]) x (8,760 hr/yr)/ (2000 lb/T) = 184.0 T/yr
  - The total uncontrolled HAP PTE from the new spray booth is 184.0 T/yr of Xylene + 184.0 T/yr of Benzene = 368.0 T/yr.

[2] Reference Safety Data Sheet (SDS), Composition/Information on Ingredients, weight percentages (wt%) of Xylene and Benzene.

- **HAP PTE**
  - The PTE of Xylene emissions from the new spray booth is calculated as:

    (3 spray guns) x (5 gal/hr) x (7 lb/gal) x (40% Xylene) x (8 hrs/day) x (5 days/wk) x (52 weeks/yr) x (1-90%) / (2000 lb/T) = 4.4 T/yr
  - The PTE of Benzene emissions from the new spray booth is calculated as:

    (3 spray guns) x (5 gal/hr) x (7 lb/gal) x (40% Benzene) x (8 hrs/day) x (5 days/wk) x (52 wks/yr) x (1-90%)/ (2000 lb/T) = 4.4 T/yr
  - The total HAP PTE from the new spray booth is 4.4 T/yr of Xylene + 4.4 T/yr of Benzene = 8.8 T/yr.

TAP calculation and compliance example

For non-carcinogenic TAP listed in IDAPA 58.01.01.585, hourly emissions are based on 24-hr average because non-carcinogenic TAP standards are based on 24-hr average.

For carcinogenic TAP listed in IDAPA 58.01.01.586, emissions are based on annual (8,760 hrs) average because carcinogenic TAP standards are based annual average.

An applicant applies for a permit for a new spray booth only. The new spray booth is proposed to use one spray gun with a rated capacity of 5 gal/hr and one paint with a density of 7 lb/gal. According to Safety Data Sheet (SDS), Composition/Information on Ingredients, the paint has 40 wt% of Xylene and 40 wt% of Benzene. The gun will be used 8 hrs/day, 5 days/wk, and 52 wks/yr.

- **Non-carcinogenic TAP**

  Because Xylene is a non-carcinogenic TAP as listed under IDAPA 58.01.01.585, its hourly emissions rate is calculated on 24-hour average as follows:

  (5 gal/hr, gun capacity) x (7 lb/gal, paint density) x (40 wt% of Xylene) x (5 hrs/day, proposed to-be-permitted operating hours) / (24 hrs/day, the averaging time by the Rules for the Control of Air Pollution in Idaho) = 2.9 lb/hr.

  Because 2.9 lb/hr, based on 24-hr average, is less than the screening emissions level (EL) of 29 lb/hr for Xylene, the facility has demonstrated compliance with the standard for Xylene.

- **Carcinogenic TAP**

  Because Benzene is a carcinogenic TAP listed under IDAPA 58.01.01.586, its hourly emissions rate is calculated on annual average as follows:

  (5 gal/hr, gun capacity) x (7 lb/gal, paint density) x (40 wt% of Benzene) x [(5 hrs/day) x (5 days/wk) x (52 wks/yr), proposed to-be-permitted operating hours] / (8,760 hours/yr, the averaging time by the Rules for the Control of Air Pollution in Idaho) = 2.07 lb/hr.

  Because 2.07 lb/hr, based on annual average, is greater than the screening emissions level (EL) of 8.0×10^{-4} lb/hr for Benzene as listed under IDAPA 58.01.01.586, the facility is required to perform a dispersion model to demonstrate that the Benzene ambient concentration is less than or equal to 1.2×10^{-1} µg/m^3 for Benzene.

  In such case, the facility needs to complete modeling EI prescribed in the Idaho Modeling Guideline.

Tables

Table 1 POST PROJECT UNCONTROLLED FACILITY-WIDE PTE FOR REGULATED AIR POLLUTANTS [a]

	$PM_{10}/PM_{2.5}$	SO_2	NOx	CO	VOC	Greenhouse Gas (CO_2e)
Source	**T/yr**	**T/yr**	**T/yr**	**T/yr**	**T/yr**	**T/yr**
Point Sources						
Emissions Unit #1	0.00	0.00	0.00	0.00	0.00	0.00
Emissions Unit #2	0.00	0.00	0.00	0.00	0.00	0.00
Emissions Unit #3	0.00	0.00	0.00	0.00	0.00	0.00
Total, Point Sources	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Fugitive Sources [a]						
Source	**$PM_{10}/PM_{2.5}$ T/yr**	**SO_2 T/yr**	**NOx T/yr**	**CO T/yr**	**VOC T/yr**	**CO_2e T/yr**
Emissions Unit #1	0.00	0.00	0.00	0.00	0.00	0.00
Emissions Unit #2	0.00	0.00	0.00	0.00	0.00	0.00
Emissions Unit #3	0.00	0.00	0.00	0.00	0.00	0.00
Emissions Unit #4	0.00	0.00	0.00	0.00	0.00	0.00
Total, Fugitive Sources	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

a) Including fugitive emissions in the PTE is mandatory if they are required by federal law.

Table 2 POST PROJECT FACILITY-WIDE PTE FOR REGULATED AIR POLLUTANTS [a]

	$PM_{10}/PM_{2.5}$	SO_2	NOx	CO	VOC	Greenhouse Gas (CO_2e)
Source	**T/yr**	**T/yr**	**T/yr**	**T/yr**	**T/yr**	**T/yr**
Emissions unit #1	0.00	0.00	0.00	0.00	0.00	0.00
Emissions unit #2	0.00	0.00	0.00	0.00	0.00	0.00
Emissions unit #3	0.00	0.00	0.00	0.00	0.00	0.00
Emissions unit #4	0.00	0.00	0.00	0.00	0.00	0.00
Emissions unit #5	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Totals	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

a) Including fugitive emissions in the PTE is mandatory if they are required by federal law.

Table 3 PRE-PROJECT FACILITY-WIDE PTE FOR REGULATED AIR POLLUTANTS [a, b]

	$PM_{10}/PM_{2.5}$	SO_2	NOx	CO	VOC	Greenhouse Gas (CO_2e)
Source	**T/yr**	**T/yr**	**T/yr**	**T/yr**	**T/yr**	**T/yr**
Emissions unit #1	0.00	0.00	0.00	0.00	0.00	0.00
Emissions unit #2	0.00	0.00	0.00	0.00	0.00	0.00
Emissions unit #3	0.00	0.00	0.00	0.00	0.00	0.00
Emissions unit #4	0.00	0.00	0.00	0.00	0.00	0.00
Emissions unit #7	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Totals	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

a) Including fugitive emissions in the PTE is mandatory if they are required by federal law.

b) Pre-project PTE is zero for new facility construction or an existing facility without a permit.

Table 4 CHANGES IN PTE FOR REGULATED AIR POLLUTANTS [a]

	$PM_{10}/PM_{2.5}$	SO_2	NOx	CO	VOC	Greenhouse Gas (CO_2e)
	T/yr	**T/yr**	**T/yr**	**T/yr**	**T/yr**	**T/yr**
Pre-project PTE minus fugitive emissions	0.00	0.00	0.00	0.00	0.00	0.00
Post project PTE minus fugitive emissions	0.00	0.00	0.00	0.00	0.00	0.00
Changes in Potential to Emit	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

a) Not to include fugitive emissions.

Table 5 HAP UNCONTROLLED PTE AND PTE COMPARED TO THE MAJOR SOURCE THRESHOLDS

HAP Pollutant	Uncontrolled PTE (T/yr)	PTE (T/yr)	Major Source Thresholds (T/yr)	Uncontrolled PTE Exceeds the Major Source Threshold and PTE Exceeds the Major Source Threshold?
List the HAP here	X.XX	X.XX	10	Yes/No
List the HAP here	X.XX	X.XX	10	Yes/No
List the HAP here	X.XX	X.XX	10	Yes/No
List the HAP here	X.XX	X.XX	10	Yes/No
List the HAP here	X.XX	X.XX	10	Yes/No
Total	**0.00**	**0.00**	**25**	Yes/No

Table 6 PRE- AND POST PROJECT PTE FOR NON-CARCINOGENIC TAP [a]

Non-Carcinogenic Toxic Air Pollutants	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
XXX *{585 TAP}*	0.00E-03	0.00E-03	0.0000	XXX	Yes/No
XXX *{585 TAP}*	0.00E-03	0.00E-03	0.0000	XXX	Yes/No
XXX *{585 TAP}*	0.00E-03	0.00E-03	0.0000	XXX	Yes/No
XXX *{585 TAP}*	0.00E-03	0.00E-03	0.0000	XXX	Yes/No
XXX *{585 TAP}*	0.00E-03	0.00E-03	0.0000	XXX	Yes/No
XXX *{585 TAP}*	0.00E-03	0.00E-03	0.0000	XXX	Yes/No

a) Pre-project average emissions are the existing allowable emission rates. Post-project average emissions are the new proposed emission rates.

Table 7 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR CARCINOGENIC TAP [a, b]

Carcinogenic Toxic Air Pollutants	Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
XXX ***{586 TAP}***	0.00E-03	0.00E-03	0.0000	XXX	Yes/No
XXX ***{586 TAP}***	0.00E-03	0.00E-03	0.0000	XXX	Yes/No
XXX ***{586 TAP}***	0.00E-03	0.00E-03	0.0000	XXX	Yes/No
XXX ***{586 TAP}***	0.00E-03	0.00E-03	0.0000	XXX	Yes/No
XXX ***{586 TAP}***	0.00E-03	0.00E-03	0.0000	XXX	Yes/No

a) Pre-project average emissions are the existing allowable emission rates. Post-project average emissions are the new proposed emission rates.
b) Polycyclic Organic Matter (POM) is considered one TAP comprised of benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene. The total is compared to benzo(a)pyrene.