

Air Permitting – Lesson 1 – Types of Permits

Course Content

Major Permits

PSD or NSR PERMITS

Facilities meeting the requirements listed below will file a major Prevention of Significant Deterioration (PSD) or New Source Review (NSR) permit application that generally consists of 2 to 6, 8 ½ by 11 inch, three-ring binders that are each 3 to 5 inches thick. The information includes a table of contents, executive summary, text, completed forms, supporting documentation, engineering drawings, computer data, best available control technology (BACT), air model analysis, and checked calculations. Issued permits are generally 10 to 100 pages, 8 ½ x 11 inches.

The requirements for a PSD permit are:

- Planned modification of an existing source or installation of a new source of regulated air pollution emissions that will exceed a *de minimis* level of significance for regulated air pollutants, as listed below in Table A, at a facility already considered a major PSD source, as described in Table B.
- Planned modification of an existing source or installation of a new source of regulated air pollution emissions that will exceed 100 tons per year of a regulated air pollutant at a facility that meets the PSD listed category definition described below in Table B.
- Planned modification of an existing source or installation of a new source of regulated air pollution emissions that will exceed 250 tons per year of a regulated air pollutant or total of all regulated pollutants at a facility that is not a major source or is not listed as a major PSD facility as shown in Table B below.

Table A - Regulated Air Pollutants and *de minimis* Levels of Significance for Major PSD Facilities

REGULATED POLLUTANT	TONS PER YEAR
1. Carbon Monoxide (CO)	100
2. Nitrogen Oxides (NO _x) as (NO + NO ₂)	40
3. Sulfur Oxides as Sulfur Dioxide (SO ₂)	40
4. Particulate Matter (PM)	25
5. Particulate Matter (PM ₁₀)	15
6. Ozone as Volatile Organic Compounds	40

7. Lead	0.6
8. Asbestos	0.007
9. Beryllium	0.0004
10. Mercury	0.1
11. Vinyl Chloride	1
12. Fluorides	3
13. Sulfuric Acid (mist)	7
14. Hydrogen Sulfide (H ₂ S)	10
15. Total Reduced Sulfides (TRS including H ₂ S)	10
16. Municipal Waste Combustors (Capacity over 2,750,000 tons of waste/year or 3,270,000 cubic yards of waste/year)	
17. Municipal Waste Emissions (Non-methane Organic Compounds)	55
18. Municipal Waste Combustor Metals	15
19. Municipal Waste Combustor Acid Gases	40
20. Benzene	Any Emission Rate

Table B - Major PSD Facilities

1. Fossil fuel-fired steam electric plants of more than 250 million Btu per hour heat input
2. Coal cleaning plants with thermal dryers
3. Kraft pulp mills
4. Portland cement plants
5. Primary zinc smelters
6. Iron and steel mill plants
7. Primary aluminum ore reduction plants
8. Primary copper smelters

9. Municipal incinerators capable of charging more than 250 tons of refuse per day
10. Hydrofluoric acid plants
11. Sulfuric acid plants
12. Nitric acid plants
13. Petroleum refineries
14. Lime plants
15. Phosphate rock processing plants
16. Coke oven batteries
17. Sulfur recovery plants
18. Carbon black plants (furnace process)
19. Primary lead smelters
20. Fuel conversion plants
21. Sintering plants
22. Secondary metal production plants
23. Chemical process plants
24. Fossil fuel boilers (or combinations thereof) totaling more than 250 million Btu per hour heat input
25. Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
26. Taconite ore processing plants
27. Glass fiber processing plants
28. Charcoal production plants

TITLE V OPERATING PERMITS

Title V Operating Permits are required for a number of sources with the potential to emit more than 10 tons per year of a single identified hazardous air pollutant (HAP) or more than 25 tons per year for three identified hazardous air pollutants (HAPs), as listed in Table C below or are a specific industrial source designated as a major Title V facility described in Table D below. The EPA identified counties across the United States that were meeting all ambient air criteria (attainment) and the counties that exceeded one or more ambient air criteria at different times of the year that are categorized as severe,

serious, moderate or marginal, unclassified or in attainment. The quantities of regulated pollutants are lower for the serious non-attainment areas to classify a facility as a major source for applicability of Title V permitting as presented in Table E below.

A Title V permit application generally consists of 1 to 6, 8 ½ by 11 inch, three-ring binders that are each 3 to 6 inches thick. Issued permits are generally 10 to 100 pages, 8 ½ x 11 inches. This is the first type of permit in the United States that requires process changes as well as add-on air pollution controls to achieve the maximum achievable control technology (MACT) for reducing hazardous air pollutants (HAP) emissions. For example, substituting a non-HAP ingredient for a HAP ingredient in a cleaning compound is a process change that eliminates a source of HAP emissions. Installing a particulate or dust scrubber on a process vent is an add-on air pollution control. Many states are combining construction permits and Title V permits when the Title V permit criteria is met.

Table C – Original List of Hazardous Air Pollutants from CAAA - 1990

CAS Number	Chemical Name
75070	Acetaldehyde
60355	Acetamide
75058	Acetonitrile
98862	Acetophenone
53963	2-Acetylaminofluorene
107028	Acrolein
79061	Acrylamide
79107	Acrylic acid
107131	Acrylonitrile
107051	Allyl chloride
92671	4-Aminobiphenyl
62533	Aniline
90040	o-Anisidine
1332214	Asbestos
71432	Benzene (including benzene from gasoline)
92875	Benzidine
98077	Benzotrichloride
100447	Benzyl chloride
92524	Biphenyl
117817	Bis(2-ethylhexyl)phthalate (DEHP)
542881	Bis(chloromethyl)ether
75252	Bromoform
106990	1,3-Butadiene

156627	Calcium cyanamide
105602	Caprolactam
133062	Captan
63252	Carbaryl
75150	Carbon disulfide
56235	Carbon tetrachloride
463581	Carbonyl sulfide
120809	Catechol
133904	Chloramben
57749	Chlordane
7782505	Chlorine
79118	Chloroacetic acid
532274	2-Chloroacetophenone
108907	Chlorobenzene
510156	Chlorobenzilate
67663	Chloroform
107302	Chloromethyl methyl ether
126998	Chloroprene
1319773	Cresols/Cresylic acid (isomers and mixture)
95487	o-Cresol
108394	m-Cresol
106445	p-Cresol
98828	Cumene
94757	2,4-D, salts and esters
3547044	DDE
334883	Diazomethane
132649	Dibenzofurans
96128	1,2-Dibromo-3-chloropropane
84742	Dibutylphthalate
106467	1,4-Dichlorobenzene(p)
91941	3,3-Dichlorobenzidene
111444	Dichloroethyl ether (Bis(2-chloroethyl)ether)
542756	1,3-Dichloropropene
62737	Dichlorvos
111422	Diethanolamine
121697	N,N-Diethyl aniline (N,N-Dimethylaniline)
64675	Diethyl sulfate
119904	3,3-Dimethoxybenzidine
60117	Dimethyl aminoazobenzene
119937	3,3'-Dimethyl benzidine

79447	Dimethyl carbamoyl chloride
68122	Dimethyl formamide
57147	1,1-Dimethyl hydrazine
131113	Dimethyl phthalate
77781	Dimethyl sulfate
534521	4,6-Dinitro-o-cresol, and salts
51285	2,4-Dinitrophenol
121142	2,4-Dinitrotoluene
123911	1,4-Dioxane (1,4-Diethyleneoxide)
122667	1,2-Diphenylhydrazine
106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)
106887	1,2-Epoxybutane
140885	Ethyl acrylate
100414	Ethyl benzene
51796	Ethyl carbamate (Urethane)
75003	Ethyl chloride (Chloroethane)
106934	Ethylene dibromide (Dibromoethane)
107062	Ethylene dichloride (1,2-Dichloroethane)
107211	Ethylene glycol
151564	Ethylene imine (Aziridine)
75218	Ethylene oxide
96457	Ethylene thiourea
75343	Ethylidene dichloride (1,1-Dichloroethane)
50000	Formaldehyde
76448	Heptachlor
118741	Hexachlorobenzene
87683	Hexachlorobutadiene
77474	Hexachlorocyclopentadiene
67721	Hexachloroethane
822060	Hexamethylene-1,6-diisocyanate
680319	Hexamethylphosphoramide
110543	Hexane
302012	Hydrazine
7647010	Hydrochloric acid
7664393	Hydrogen fluoride (Hydrofluoric acid)
7783064	Hydrogen sulfide
123319	Hydroquinone
78591	Isophorone
58899	Lindane (all isomers)
108316	Maleic anhydride

67561	Methanol
72435	Methoxychlor
74839	Methyl bromide (Bromomethane)
74873	Methyl chloride (Chloromethane)
71556	Methyl chloroform (1,1,1-Trichloroethane)
78933	Methyl ethyl ketone (2-Butanone)
60344	Methyl hydrazine
74884	Methyl iodide (Iodomethane)
108101	Methyl isobutyl ketone (Hexone)
624839	Methyl isocyanate
80626	Methyl methacrylate
1634044	Methyl tert butyl ether
101144	4,4-Methylene bis(2-chloroaniline)
75092	Methylene chloride (Dichloromethane)
101688	Methylene diphenyl diisocyanate (MDI)
101779	4,4'-Methylenedianiline
91203	Naphthalene
98953	Nitrobenzene
92933	4-Nitrobiphenyl
100027	4-Nitrophenol
79469	2-Nitropropane
684935	N-Nitroso-N-methylurea
62759	N-Nitrosodimethylamine
59892	N-Nitrosomorpholine
56382	Parathion
82688	Pentachloronitrobenzene (Quintobenzene)
87865	Pentachlorophenol
108952	Phenol
106503	p-Phenylenediamine
75445	Phosgene
7803512	Phosphine
7723140	Phosphorus
85449	Phthalic anhydride
1336363	Polychlorinated biphenyls (Aroclors)
1120714	1,3-Propane sultone
57578	beta-Propiolactone
123386	Propionaldehyde
114261	Propoxur (Baygon)
78875	Propylene dichloride (1,2-Dichloropropane)
75569	Propylene oxide

75558	1,2-Propylenimine (2-Methyl aziridine)
91225	Quinoline
106514	Quinone
100425	Styrene
96093	Styrene oxide
1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin
79345	1,1,2,2-Tetrachloroethane
127184	Tetrachloroethylene (Perchloroethylene)
7550450	Titanium tetrachloride
108883	Toluene
95807	2,4-Toluene diamine
584849	2,4-Toluene diisocyanate
95534	o-Toluidine
8001352	Toxaphene (chlorinated camphene)
120821	1,2,4-Trichlorobenzene
79005	1,1,2-Trichloroethane
79016	Trichloroethylene
95954	2,4,5-Trichlorophenol
88062	2,4,6-Trichlorophenol
121448	Triethylamine
1582098	Trifluralin
540841	2,2,4-Trimethylpentane
108054	Vinyl acetate
593602	Vinyl bromide
75014	Vinyl chloride
75354	Vinylidene chloride (1,1-Dichloroethylene)
1330207	Xylenes (isomers and mixture)
95476	o-Xylenes
108383	m-Xylenes
106423	p-Xylenes
0	Antimony Compounds
0	Arsenic Compounds (inorganic including arsine)
0	Beryllium Compounds
0	Cadmium Compounds
0	Chromium Compounds
0	Cobalt Compounds
0	Coke Oven Emissions
0	Cyanide Compounds ¹
0	Glycol ethers ²
0	Lead Compounds

0	Manganese Compounds
0	Mercury Compounds
0	Fine mineral fibers ³
0	Nickel Compounds
0	Polycyclic Organic Matter ⁴
0	Radionuclides (including radon) ⁵
0	Selenium Compounds

NOTE: For all listings above which contain the word "compounds" and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., antimony, arsenic, etc.) as part of that chemical's infrastructure.

1 X'CN where X = H' or any other group where a formal dissociation may occur.

For example KCN or Ca(CN)₂

2 Includes mono- and di- ethers of ethylene glycol, diethylene glycol, and triethylene glycol R-(OCH₂CH₂)_n-OR' where

n = 1, 2, or 3

R = alkyl or aryl groups

R' = R, H, or groups which, when removed, yield glycol ethers with the structure: R-(OCH₂CH₂)_n-OH. Polymers are excluded from the glycol category.

3 Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.

4 Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100 ° C.

5 A type of atom which spontaneously undergoes radioactive decay.

Table D - Major Title V Facilities

1. Asphalt Roofing and Processing
2. Auto/Light Duty Truck (surface coating)
3. Brick, Structural Clay Products
4. Clay Ceramics Manufacturing
5. Chlorine Production
6. Coke Ovens: Pushing, Quenching, and Battery Stacks
7. Combustion Turbines
8. Engine and Rocket Test Cells/Stand

9. Flexible Polyurethane Foam Fabrication
10. Friction Products Manufacturing
11. Hydrochloric Acid Production
12. Hydrochloric Acid Production (with hazardous waste combustion)
13. Industrial/Commercial/Institutional Boilers and Process Heaters
14. Industrial Boilers and Process Heaters (with hazardous waste combustion)
15. Integrated Iron and Steel Manufacturing
16. Iron and Steel Foundries
17. Lime Manufacturing
18. Metal Can (surface coating)
19. Metal Furniture (surface coating)
20. Metal Pipe (asphalt/tar application)
21. Miscellaneous Metal Parts (surface coating)
22. Miscellaneous Organic Chemical Production and Processes (MON)
23. Municipal Solid Waste Landfills
24. Organic Liquids Distribution (non-gasoline)
25. Paper and Other Web Coating
26. Plastic Parts and Products (surface coating)
27. Plywood and Composite Wood Products
28. Primary Magnesium Refining
29. Printing, Coating, and Dyeing of Fabrics
30. Reciprocating Internal Combustion Engines
31. Refractory Manufacturing
32. Reinforced Plastic Composites Production
33. Semiconductor Manufacturing

- 34. Site Remediation
- 35. Taconite Iron Ore Processing
- 36. Wood Building Products (surface coating)

Table E – Regulated Air Pollutants and Major Source Thresholds Depending Upon County Non-attainment Classification

Non-attainment Classification	Major Source Thresholds (tons per year)								
	VOC	NO _x	SO ₂	PM ₁₀	CO	Pb	1 HAP	3 HAPs	Other
Severe	25	25	100	100	100	100	10	25	100
Serious	50	50	100	100	100	100	10	25	100
Marginal or Moderate	100	100	100	100	100	100	10	25	100
Unclassified or Attainment	100	100	100	100	100	100	10	25	100

Medium Permits

Facilities that plan modifications to an existing source or install a new source that exceed certain criteria will file a construction permit application, also known as a “permit-to-install” (PTI) or similar types that are specific to certain states. A construction permit application generally consists of 1 to 3, 8 ½ by 11 inch, three ring binders that are each 2 to 5 inches thick. The information includes a table of contents, executive summary, text, completed state and local forms, supporting documentation, engineering drawings, computer data, and checked calculations. The issued permit is typically 10 to 50 pages, 8 ½ x 11 inches. In many states, any single regulated pollutant that exceeds 100 tons per year, that does not meet PSD criteria, will still require a best available control technology (BACT) analysis and an air model. In this case, the size and number of the application binders and the issued permit documents would be almost the same size as the PSD permitting process. A construction or “permit-to-install” permit application will be required if the emissions from these facilities are below 250 tons per year of a regulated air pollutant or total of 250 tons per year for all regulated air pollutants and the facility category is not listed in Table B. The requirements for this type of permit are different if the facility category is listed in Table B. For these listed facilities, a construction or “permit-to-install” permit application will be required if the emissions from these facilities are below 100 tons per year of a regulated air pollutant or a total of 250 tons per year for all regulated air pollutants and the facility category is

listed in Table A. Many states are combining construction permits and Title V permits when the Title V permit criteria is met.

SYNTHETIC MINOR PERMITS

Impacts facilities with less than 100 tons per year of total regulated air pollutants that do not meet any other criteria of the Title V or PSD permit requirements. The application is much simpler, consisting of several forms, a process description, emissions list, and checked calculations of air emissions. Some states have added conditions for issuing synthetic minor permits to facilities that agree to abide by synthetic minor plant site emission limits (PSELS). At times, these types of permits may be issued as a state-specific minor permit or a general permit to several facilities that have the same classification.

Course Summary

Facilities are required to prepare and file air permit applications for changes to existing emission sources and the installation of new emission sources. Current rules also require compliance of maximum achievable control technology (MACT) rules resulting in the need for air permits to comply with the regulations. Depending upon the type of facility and the estimated emissions on an annual basis, this course will provide the information to determine if a major, medium, or minor permit will be required. The types of environmental permits described include PSD or NSR, Title V Operating, Construction or "Permit-to-Install", and Synthetic Minor permits as representative of the types of requirements to obtain permission for changing air pollution emission levels at a facility.