

Intel's Air Permit Major vs Minor

What is required in monitoring and reporting?

Sarah Chavez

Intel

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Intel's Air Permit

- Previous Permit (Major) - 325-M-8R1 – Issued February 28, 1997
- Current Permit (Minor) – 325-M-9 – Issued March 3, 2000

Requirements - Emissions Monitoring and Reporting

(all information submitted to NMED)

325-M-8R1 (major)

325-M-9 (minor)

Excess emissions reporting for thermal oxidizers	Excess emissions reporting for thermal oxidizers <i>and scrubbers</i>
<p>Quarterly Report</p> <ul style="list-style-type: none"> • Calculated hourly VOC emissions • VOC emissions (<i>mass balance</i>) • Particulate emissions 	<p>Quarterly Report</p> <ul style="list-style-type: none"> • <i>Calculated Hourly VOC Requirement removed</i> • VOC emissions (<i>emission factors</i>) • Particulate emissions • <i>NOx/CO emissions</i> • <i>Individual and total HAP emissions</i> • <i>TAP potential emissions</i> • <i>Boiler/RTO fuel usage</i> • <i>Emergency Generator runtime</i> • <i>Compliance test results summary</i> • <i>Production level</i> • <i>VOC, HAP, and TAP chemical purchases</i>
<i>Monthly</i> Boiler Emission Report for NOx and CO	<i>Requirement Removed - Monthly boiler emissions included in quarterly NOx and CO emissions report</i>
	Annual boiler emission factor update
Compliance test reports	Compliance test reports

Requirements - Boiler Testing

(all information submitted to NMED)

325-M-8R1 (major)

325-M-9 (minor)

Initial testing for NO _x and CO at all lever positions of any new 1250 BHP boiler	Initial testing for NO _x and CO at all lever positions of any new 1250 BHP boiler
Annual NO _x and CO testing of <i>two to three</i> 1250 BHP boilers at all lever positions (10), <i>all other</i> 1250 BHP boilers tested at single position	Annual NO _x and CO testing of <i>one</i> 1250 BHP boiler at all lever positions and <i>one</i> 1250 BHP boiler at a single lever position
	Initial VOC testing of two boilers (500 BHP and 1250 BHP)
	Initial NO _x /CO testing on two 500 BHP boilers

Requirements - Thermal Oxidizer Testing

(all information submitted to NMED)

325-M-8R1 (major)

325-M-9 (minor)

Initial testing and then every two years for NO _x /CO	<i>Requirement Removed - data captured during quarterly FTIR testing</i>
Initial testing for particulate matter for two units	<i>Requirement Removed – completed</i>
Initial inlet/outlet VOC testing using FID	<i>Requirement Removed</i>
<i>Quarterly testing for one year and then every two years</i> for VOCs using FID	<i>Quarterly</i> testing for VOCs using FID for <i>336 hours</i>
	Quarterly testing for VOCs using FTIR for eight hours at the beginning, middle and end of FID test period
	Per NMED request, inlet/outlet testing for each unit for one year using FID
	Per NMED request, testing of each unit during a PM for one year using FID and FTIR

Requirements - Scrubber Testing

(all information submitted to NMED)

325-M-8R1 (major)

325-M-9 (minor)

<p>Testing every <i>two years</i> on all scrubbers for <i>hydrochloric acid, hydrofluoric acid, sulfuric acid, nitric acid, and acetic acid</i></p>	<p><i>Annual</i> testing for <i>HAPs</i> on all scrubbers for eight hours each</p>
	<p>Initial stack testing for HAPs calculated using sink equation</p>
	<p>Per NMED request, report all TAPs identified during annual HAPs testing</p>
	<p>Per NMED request, inlet/outlet testing of a representative number of scrubbers</p>

Additional Information

VOC Emissions Calculations

Major vs Minor Permit Requirements

- Mass Balance
 - Chemical purchased – chemical disposed of = VOC emissions
- Emission Factors

Chemical Use

Fuel Use x Emission Factor = Emissions

Hours Operated

- Emissions measured directly from the individual tool to develop emission factors
- Each process has a specific recipe that is used for each step of the process and each recipe specifies the amount of chemical used per wafer run
- See CEWG Feb 2006 presentation @
<http://www.intel.com/community/newmexico/cewg.htm> for full details on emission factors

VOCs

- VOCs defined by EPA
 - Condition 4.A – “A volatile organic compound (VOC) is an air contaminant that has been defined as a volatile organic compound pursuant to 40CFR 51.100(s). Solvent VOCs include non-HAP solvents and organic HAPs.”

VOCs (cont.)

40 CFR 51.100(s) http://a257.g.akamaitech.net/7/257/2422/01jul20061500/edocket.access.gpo.gov/cfr_2006/julqtr/40cfr51.100.htm

- (s) Volatile organic compounds (VOC) means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. (1) This includes any such organic compound other than the following, which have been determined to have negligible photochemical reactivity: methane; ethane; methylene chloride (dichloromethane); 1,1,1-trichloroethane (methyl chloroform); 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113); trichlorofluoromethane (CFC-11); dichlorodifluoromethane (CFC-12); chlorodifluoromethane (HCFC-22); trifluoromethane (HFC-23); 1,2-dichloro 1,1,2,2-tetrafluoroethane (CFC-114); chloropentafluoroethane (CFC-115); 1,1,1-trifluoro 2,2-dichloroethane (HCFC-123); 1,1,1,2-tetrafluoroethane (HFC-134a); 1,1-dichloro 1-fluoroethane (HCFC-141b); 1-chloro 1,1-difluoroethane (HCFC-142b); 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124); pentafluoroethane (HFC-125); 1,1,2,2-tetrafluoroethane (HFC-134); 1,1,1-trifluoroethane (HFC-143a); 1,1-difluoroethane (HFC-152a); parachlorobenzotrifluoride (PCBTF); cyclic, branched, or linear completely methylated siloxanes; acetone; perchloroethylene (tetrachloroethylene); 3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca); 1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb); 1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC 43-10mee); difluoromethane (HFC-32); ethylfluoride (HFC-161); 1,1,1,3,3,3-hexafluoropropane (HFC-236fa); 1,1,2,2,3-pentafluoropropane (HFC-245ca); 1,1,2,3,3-pentafluoropropane (HFC-245ea); 1,1,1,2,3-pentafluoropropane (HFC-245eb); 1,1,1,3,3-pentafluoropropane (HFC-245fa); 1,1,1,2,3,3-hexafluoropropane (HFC-236ea); 1,1,1,3,3-pentafluorobutane (HFC-365mf); chlorofluoromethane (HCFC-31); 1-chloro-1-fluoroethane (HCFC-151a); 1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a); 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-butane (C4F9OCH3 or HFE-7100); 2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-heptafluoropropane ((CF3)2CFCF2OCH3); 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane (C4F9OC2H5 or HFE-7200); 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane ((CF3)2CFCF2OC2H5); methyl acetate, [[Page 133]] 1,1,1,2,2,3,3-heptafluoro-3-methoxy-propane (n-C3F7OCH3, HFE-7000), 3-ethoxy-1,1,1,2,3,4,4,5,5,6,6,6-dodecafluoro-2-(trifluoromethyl) hexane (HFE-7500), 1,1,1,2,3,3,3-heptafluoropropane (HFC 227ea), and methyl formate (HCOOCH3), and perfluorocarbon compounds which fall into these classes: (i) Cyclic, branched, or linear, completely fluorinated alkanes; (ii) Cyclic, branched, or linear, completely fluorinated ethers with no unsaturations; (iii) Cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and (iv) Sulfur containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine. (2) For purposes of determining compliance with emissions limits, VOC will be measured by the test methods in the approved State implementation plan (SIP) or 40 CFR part 60, appendix A, as applicable. Where such a method also measures compounds with negligible photochemical reactivity, these negligibility-reactive compounds may be excluded as VOC if the amount of such compounds is accurately quantified, and such exclusion is approved by the enforcement authority. (3) As a precondition to excluding these compounds as VOC or at any time thereafter, the enforcement authority may require an owner or operator to provide monitoring or testing methods and results demonstrating, to the satisfaction of the enforcement authority, the amount of negligibly-reactive compounds in the source's emissions. (4) For purposes of Federal enforcement for a specific source, the EPA shall use the test methods specified in the applicable EPA-approved SIP, in a permit issued pursuant to a program approved or promulgated under title V of the Act, or under 40 CFR part 51, subpart I or appendix S, or under 40 CFR parts 52 or 60. The EPA shall not be bound by any State determination as to appropriate methods for testing or monitoring negligibly-reactive compounds if such determination is not reflected in any of the above provisions. (5) The following compound(s) are VOC for purposes of all recordkeeping, emissions reporting, photochemical dispersion modeling and inventory requirements which apply to VOC and shall be uniquely identified in emission reports, but are not VOC for purposes of VOC emissions limitations or VOC content requirements: t-butyl acetate. (6) For the purposes of determining compliance with California's aerosol coatings reactivity-based regulation, (as described in the California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 8.5, Article 3), any organic compound in the volatile portion of an aerosol coating is counted towards that product's reactivity-based limit. Therefore, the compounds identified in paragraph (s) of this section as negligibly reactive and excluded from EPA's definition of VOCs are to be counted towards a product's reactivity limit for the purposes of determining compliance with California's aerosol coatings reactivity-based regulation.

HAPs List – Permit 32-M-9 Appendix X

CAS#	Chemical Name	CAS#	Chemical Name
79345	1,1,2,2-Tetrachloroethane	107062	Ethylene dichloride (1,2-Dichloroethane)
79005	1,1,2-Trichloroethane	107211	Ethylene glycol
120821	1,2,4-Trichlorobenzene	75218	Ethylene oxide
106990	1,3-Butadiene	75343	Ethylidene dichloride (1,1-Dichloroethane)
1120714	1,3-Propane sultone	50000	Formaldehyde
106467	1,4-Dichlorobenzene(p)	118741	Hexachlorobenzene
540841	2,2,4-Trimethylpentane	87683	Hexachlorobutadiene
92933	4-Nitrobiphenyl	77474	Hexachlorocyclopentadiene
100027	4-Nitrophenol	67721	Hexachloroethane
75058	Acetonitrile	110543	Hexane
79107	Acrylic acid	7647010	Hydrochloric acid
62533	Aniline	7664393	Hydrogen fluoride (Hydrofluoric acid)
71432	Benzene (including benzene from gasoline)	108316	Maleic anhydride
75252	Bromoform	108394	m-Cresol
56235	Carbon tetrachloride	67561	Methanol
7782505	Chlorine	74839	Methyl bromide (Bromomethane)
67663	Chloroform	74873	Methyl chloride (Chloromethane)
1319773	Cresols/Cresylic acid (isomers and mixture)	71556	Methyl chloroform (1,1,1-Trichloroethane)
60117	Dimethyl aminoazobenzene	78933	Methyl ethyl ketone (2-Butanone)
131113	Dimethyl phthalate		
75003	Ethyl chloride (Chloroethane)		

HAPs List – Permit 325-M-9 Appendix X

(cont.)

CAS#	Chemical Name	CAS#	Chemical Name
74884	Methyl iodide (Iodomethane)	75569	Propylene oxide
108101	Methyl isobutyl ketone (Hexone)	106423	p-Xylenes
80626	Methyl methacrylate	100425	Styrene
1634044	Methyl tert butyl ether	96093	Styrene oxide
75092	Methylene chloride (Dichloromethane)	7550450	Titanium tetrachloride
108383	m-Xylenes	108883	Toluene
121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	79016	Trichloroethylene
91203	Naphthalene	121448	Triethylamine
98953	Nitrobenzene	108054	Vinyl acetate
684935	N-Nitroso-N-methylurea	75354	Vinylidene chloride
95487	o-Cresol	1330207	Xylenes (isomers and mixture)
95476	o-Xylenes		Antimony Compounds
106445	p-Cresol		Arsenic Compounds
108952	Phenol		Chromium Compounds
75445	Phosgene		Cobalt Compounds
7803512	Phosphine		Cyanide Compounds
7723140	Phosphorus		Glycol Ethers
85449	Phthalic anhydride		Lead Compounds
78875	Propylene dichloride (1,2Dichloropropane)		Manganese Compounds
			Mercury Compounds
			Nickel Compounds
			Polycyclic Organic Matter
			Selenium Compounds

TAPs List – 20 NMAC 2.72.502

- See attached handout (12 pages)