INFORMATICS TEAM

1 September 2000

Ms. Jo Jean Mullen
AFCEE/ERD
3207 North Road
Building 532
Brooks AFB, Texas 78235-5363

Subject: Review Comments for Title V Nonapplicability Determination, Camp Stanley Storage Activity, Boerne, Texas

Reference: Contract Number F41624-98-D-8509, Task Order 34
Deliverable 3401.1608

Dear Ms. Mullen:

In partial fulfillment of the referenced contract, Task Order 34, the Informatics Team reviewed the subject document. The Title V Nonapplicability Determination document for Camp Stanley Storage Activity in Boerne, Texas was reviewed for technical accuracy, clarity, technical content, and consistency. In general, the document is very well organized and appears to adequately discuss the applicability or nonapplicability of Title V to the facility.

A "spot check" of emissions calculations for all sources discussed in the document revealed no errors. Each emission source is clearly addressed and the regulation or regulations which pertain to it are described in detail and referenced in Section 3. The Potential to Emit (PTE) for each emission source is discussed and the calculations used to derive the source's PTE are easy to follow and justifiable. Technically, the document is complete and sound. The document would benefit from an editorial review to rectify such minor items as a missing closed parenthesis and ensuring that all acronyms used in the text are defined first before being used and also included in the list of acronyms and abbreviations.

Please contact me by telephone at 210-804-4331 or e-mail at itjulieroberts@earthlink.net if you have any questions or need additional information regarding this deliverable.

Sincerely,

Julie Roberts

Julie Roberts
Environmental Protection Specialist

cc: AFCEE/ERC (Ms. Carol McCollum)
311 HSW/PKV (Mr. Ralph Urias)
AFCEE/MSCD (Ms. Ingra Haynes)
Informatics File

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July 14, 2000

Brian Murphy
Camp Stanley Storage Activity
25800 Ralph Fair Road
Boerne, TX 78015-4800

Subject: Title V Nonapplicability Determination
Camp Stanley Storage Activity, Texas
Contract F11623-94-D0024, Delivery Order RL83, Task 12
Parsons ES Job 736071

Dear Brian:

I have enclosed my analysis of Camp Stanley's Title V assessment based on current estimates of potential to emit (PTE). These emission estimates reflect the reasonable anticipated maximums for the facility. As such, the PTE levels do not exceed current Title V thresholds and Title V requirements are not triggered.

In order to make these levels of emissions federally enforceable, the enclosed forms PI-8, OP-CRE2, and OP-CRE1 will have to be signed by the Responsible Official (LTC Dean C. Schmelling) and maintained on-site. According to the "TNRCC Potential to Emit Guidance Document" these documents are not required to be submitted to the TNRCC. However, they must be available for inspection during normal business hours.

I have enclosed one copy of the document for AFCEE as well as your copy. The remaining 12 copies will be submitted at the time of the next Environmental Encyclopedia update.

Please call me at 512-719-6821 if you have questions or comments.

Sincerely,

Tony St. Clair, P.E.
RL83 Task Manager

xc: Jo Jean Mullen, AFCEE
Julie Burdey, Parsons ES - Austin

Title V Nonapplicabililty Determination
Camp Stanley Storage Activity

Prepared for

Camp Stanley Storage Activity
Boerne, Texas

Contract F11623-94-D-0024, Order RL83

July 2000

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ACRONYMS AND ABBREVIATIONS

AO	Agreed orders
AP-42	EPA Compilation of Air Pollutant Emission Factors
Btu	British thermal unit
CI	Compression ignition
CO	Carbon monoxide
CSSA	Camp Stanley Storage Activity
FCAA	Federal Clean Air Act
FOP	Federal Operating Permit
HAP	Hazardous air pollutant
hr/yr	Hour per year
IC	Internal combustion
ITR	Injection timing retard
KW	Kilowatt
lb/hp	Pounds per horse power
N_2	Nitrogen
NO_x	Nitrogen oxides
NSR	New source review
OP-CRE1	Certified Registration of Emission Form for Potential to Emit
OP-CRE2	Registration of Emissions for Referenced Preconstruction Authorizations
PCC	Precombustion chamber
PI-8	Certification of Enforceable Emission Limits
PM	Particulate matter
PTE	Potential to emit
RO	Responsible Official
RRAD	Red River Army Depot
SI	Spark ignition
SO_2	Sulfur dioxide
SO_3	Sulfur trioxide
SO_x	Sulfur oxide
TAC	Texas Administrative Code
TNRCC	Texas Natural Resource Conservation Commission
TOC	Total organic compound
VOC	Volatile organic compound

SECTION 1
OPERATING PERMIT PROGRAM APPLICABILITY

INTRODUCTION

The Federal Operating Permit (FOP) is a federally mandated permitting requirement under the Federal Clean Air Act Amendments Section 502(d) [FCAA § 502(d)]. In Texas, the FOP Program is implemented under Title 30 Texas Administrative Code Chapter 122 (30 TAC § 122). According to 30 TAC § 122.130, owners or operators of major source sites and certain affected source-specific sites are required to obtain a FOP. The definition for a major source is included under 30 TAC § 122.10 and is dependent on the location of the site.

Camp Stanley Storage Activity (CSSA), Boerne, Texas is a subinstallation of the Red River Army Depot (RRAD), located in Texarkana, Texas. The primary mission of CSSA is receipt, storage, and issuance of ordnance, as well as quality assurance testing and maintenance of military weapons and ammunition. CSSA is located in northwestern Bexar County, approximately 19 miles northwest of downtown San Antonio.

Bexar County is an unclassified or attainment area for all criteria pollutants (NO_X, CO, SO_2, PM_{10}, TSP, volatile organic compound [VOC], and Pb). As such, the major source threshold level for all criteria pollutants is 100 tons per year. In addition, 10 tons per year of any individual hazardous air pollutant (HAP) or 25 tons per year of all HAPs combined are also major source thresholds. To determine if a site is a major source, the site's "potential to emit" (PTE) is compared to the major source threshold levels on a pollutant-by-pollutant (or HAP) basis. If the site's PTE exceeds any one of these thresholds, it will need to meet stringent air quality regulations, and apply for and receive an operating (Title V) permit. — define

POTENTIAL TO EMIT AND FEDERAL ENFORCEABILITY

The PTE of a site can be difficult to determine depending upon the authorization status of the emission units (e.g. permitted, exempted, or grandfathered). In general the PTE is defined as the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design or configuration. The definition further states that any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restriction on hours of operation or on the type of material combusted, stored, or processed shall be treated as a part of its design if the limitation is **enforceable by the EPA** (e.g., preconstruction authorization or

regulatory requirement). Specific guidance concerning PTE is given in Texas Natural Resource Conservation Commission (TNRCC) document entitled "Potential to Emit – TNRCC Title 30 Texas Administrative Code Chapter 122 Guidance Document," December 1998 (Appendix A).

define before use

Prior to 30 TAC § 122 and pursuant to the federal definition, enforceable limitations could only be implemented through NSR preconstruction authorizations (permits, standard permits, exemptions, and registration of emissions provided for under 30 TAC §§ 106 and 116), other TNRCC regulations, site-specific state implementation plan (SIP) revisions, TNRCC Agreed Orders (AO), and other TNRCC orders. However, the submittal of 30 TAC § 122.122 for incorporation into the Texas SIP provides a new mechanism for stationary sources without any other enforceable emission rates (grandfather sources and possibly others) to limit their PTE through a certified registration. The certified registration of emissions, provided for in 30 TAC § 122.122, allows sources (without any other available mechanism to limit emissions) a means to limit their site's PTE below all major source thresholds, thereby not requiring the source to obtain a FOP.

As stated in Table II-1 of the TNRCC Guidance (Appendix A), the site's PTE determination basis depends upon the new source review (NSR) authorization status. If a NSR permit exists for the source then the permitted annual allowable emission rates are used as the PTE. For sources exempt from NSR permitting, the sources may be registered using the TNRCC Form PI-8 (Certification of Enforceable Emission Limits) or OP-CRE2 (Registration of Emissions for Referenced Preconstruction Authorizations), and the annual emission rates as appropriately calculated added for all applicable emission units. For grandfathered units, the PTE is the annual emission rate resulting from the maximum physical and operational design or configuration without consideration for any air pollution control equipment, unless the control equipment is required by regulation (e.g., 30 TAC § 115.112 and 30 TAC § 117.205[d]). These emissions may be made federally enforceable by using Form OP-CRE1 (Certified Registration of Emission Form for Potential to Emit).

SUMMARY OF CSSA EMISSIONS

The following Table 1-1 provides a summary of air emissions at CSSA. The first section of the table shows sources that are currently permitted under Permit No. 29466. The emissions shown in the table are maximum allowable emissions from the permit (Appendix B) and, as such, already represent federally enforceable limits. Certification is provided on Form OP-CRE2. WHAT?

→ Section 2

Table 1-1
Emissions Summary from Camp Stanley Storage Activity (tons/yr)

Name	EPN	NO_X	CO	SO_2	PM_{10}	VOC[a]	Authorization Status
PERMITTED SOURCES							
Volatile Corrosion Inhibitor; Solvent Vat 1	1	N/A	N/A	N/A	N/A	1.28	Permit No. 29466
Solvent Vats 2 and 3	2	N/A	N/A	N/A	N/A	0.58	Permit No. 29466
Solvent Vat 4	3	N/A	N/A	N/A	N/A	0.48	Permit No. 29466
Fingerprint Remover Tank	4	N/A	N/A	N/A	N/A	0.53	Permit No. 29466
Solvent Recovery Tank	5	N/A	N/A	N/A	N/A	0.18	Permit No. 29466
REGISTERED EXEMPTION SOURCES							
Paint Booth Bldg 200	6	N/A	N/A	N/A	0.00015	0.19	Exemption No. 32407; Supercedes No. 29755
Paint Booth Bldg 27	7	N/A	N/A	N/A	0.012	2.80	Exemption No. 32406; Supercedes No. 29517
B-3 Soil Vapor Extraction System		N/A	N/A	N/A	N/A	6.68	Exemption No. 32405
GRANDFATHERED OR EXEMPT SOURCES							
Standby Generator Radio Tower		0.36	0.07	0.04	0.04	3.04E-02	Exempt (§106.511)
Standby Generator Bldg 1		0.36	0.07	0.04	0.04	3.05E-02	Exempt (§106.511)
Standby Generator Bldg 36		0.36	0.07	0.04	0.04	3.04E-02	Exempt (§106.511)
Standby Generator Bldg 99		7.49	1.62	0.50	0.54	6.09E-01	Exempt (§106.511)
Boiler (Diesel) Bldg 46		0.05	0.01	0.11	0.01	1.61E-03	Exempt (§106.183)
Boiler (Diesel) Bldg 201		0.06	0.01	0.13	0.01	1.97E-03	Exempt (§106.183)
Boiler (NG) Bldg 89-1		0.14	0.12	8.24E-04	0.01	7.96E-03	Exempt (§106.183)
Boiler (NG) Bldg 89-2		0.14	0.12	8.24E-04	0.01	7.96E-03	Exempt (§106.183)
Vehicle Refueling Tank[b]		N/A	N/A	N/A	N/A	1.16	Exempt (§106.478)
Light Oil Tank		N/A	N/A	N/A	N/A	1.10E-03	Exempt (§106.432)
Gun Bluing Shop[c]		N/A	N/A	N/A	N/A	N/A	Exempt (§106.375)
Wastewater Treatment Plant[d]		N/A	N/A	N/A	N/A	N/A	Exempt (§106.532)
Various Steel/Bead Abrasive Cleaners[e]		N/A	N/A	N/A	N/A	N/A	Exempt (§106.452)
Gun Room[f]		N/A	N/A	N/A	0.22	N/A	Grandfathered (1962)
TOTAL		8.96	2.09	0.86	0.93	14.60	

[a]Emissions of VOC from storage of diesel fuel are included if source utilizes firing of diesel oil.
[b]Emissions from storage tanks are calculated via EPA TANKS v4.07.
[c]Uses inorganic solvents only; emissions are negligible.
[d]No Stripping of VOCs is conducted at this facility.
[e]Units contain integral vacuum dust collection system.
[f]Based on 98% capture of 11 tons per year sand lost (estimated material balance at maximum testing load).

Following the permitted sources is a list of previously registered exempt sources. These sources were registered with the TNRCC Table PI-7 in three submittals; Exemption Numbers 32407 (Paint Booth 200), 32406 (Paint Booth 27), and 32405 (B-3 SVE System). (It appears that the paint booth exemptions were duplicated; the above cited references the latest version of the exemption registration.) The annual emission rates shown in these exemptions are supported by emission calculations in the exemption packages (Appendix C) and, as such, are federally enforceable when certified via Form OP-CRE2.

Finally, the remaining sources at CSSA are either grandfathered or other sources that currently may be exempt from NSR authorization. In these cases the column entitled "Authorization Status" shows which specific exemption citation covers the affected emission unit. Calculations for emissions, using representations that can be made federally enforceable, are provided following this section. These rates are federally enforceable when certified via either Form OP-CRE2 (for exempted sources) or OP-CRE1 (for grandfathered sources).

TITLE V APPLICABILITY

Examination of Emissions Summary Table 1-1 reveals that for all pollutants the federally enforceable potential to emit air emissions at CSSA is much less than the major source threshold levels of 100 tons per year. Furthermore, although the VOCs are not speciated, the largest single component is 4.8 tons per year of TCE (Exemption Number 32405), which is less than the 10 tons per year threshold for an individual HAP. Therefore, only 9.8 tons per year of VOCs remain, and even if it all consisted of a single HAP (which it in fact ***does not***), the major source threshold of 10 tons per year would not be exceeded.

Since no major source threshold level is exceeded, based on the site's total federally enforceable potential to emit emissions levels, CSSA is not currently required to obtain a FOP. Note that 30 TAC § 122.122 does not require owners or operators to submit documentation of nonapplicability to the TNRCC. However, all certified registrations (Forms PI-8, OP-CRE1, and OP-CRE2) and NSR permits must be kept on site or at an accessible designated location and be made available for inspection during regular business hours upon request by the EPA, the TNRCC, or any other air pollution control agency having jurisdiction. In addition, all records demonstrating ongoing compliance with the represented emission limits must also be kept on site or at an accessible designated location and made available for inspection during regular business hours.

SECTION 2
FEDERAL ENFORCEABILITY AND CERTIFICATION

PERMITS

Permit No. 29466 was issued by the TNRCC on February 15, 1996 and subsequently altered on April 4, 1996. (The alteration only removed specific material usage limitations and did not change the original maximum allowable emission rates). The permit includes various cold solvent cleaning facilities located in Building 90. Only emissions of VOC are emitted from these units with a total VOC emission rate of 3.05 tons per year. A copy of the permit is provided in Appendix B. Since these sources were authorized through a NSR permit, the maximum allowable emission rates in the permit already represents the potential to emit for these sources, and are federally enforceable. Certification is provided on Form OP-CRE2, Section VII, Enforceable Maximum Emission Rate Data and Reference List.

REGISTERED EXEMPTIONS

The following exemptions have been registered with the TNRCC via Form PI-7 (Registration Form for Exemptions):

Exemption Reference	Description	Approval Date
32405	B-3 SVE System	February 22, 1999
32406	Building 27 Paint Booth	May 2, 1999
32407	Building 200 Paint Booth	May 2, 1999

Certification is provided on Form OP-CRE2, Section VII, Enforceable Maximum Emission Rate Data and Reference List. This information is also being provided on Form PI-8 (Special Certification Form for and Standard Permits) in order to make the represented emission rates federally enforceable.

Exemptions

EXEMPTIONS NOT REGISTERED

The majority of sources at CSSA emits small quantities of various pollutants and can be exempted from NSR under various sections of 30 TAC § 106. Table 1-1 shows which

specific section applies to each source. In Section 3 of this document calculations are shown for each source type. In order to estimate the potential to emit values, representations have been made (e.g. number of yearly operating hours) which become federally enforceable. Records must be maintained to demonstrate that these representations are being met, or the emissions must be re-calculated appropriately.

Certification is provided on Form OP-CRE2, Section VII, Enforceable Maximum Emission Rate Data and Reference List. This information is also being provided on Form PI-8 (Special Certification Form for and Standard Permits) in order to make the represented emission rates federally enforceable.

GRANDFATHERED

One source, the gun room (Building 90), is grandfathered due to its early construction date of 1962 (prior to promulgation of applicable air regulations). Records are maintained summarizing the rounds fired, and these records show that usage is essentially constant or decreasing slightly over time (i.e., grandfathered rates are not being exceeded). Emissions estimation for this source is very difficult because no emission factors exist for this type of source and a material balance is not practicable. However, based on various data sources a very conservative (on the high side) estimate is based on 11 tons per year of sand lost. Assuming 98% control, which is typical for cyclone type controls, gives an estimated air emissions of 0.22 tons per year.

Ultimately the exact level of emissions for this source is academic because using the above value, the total particulate emission rate for the entire site is only 0.93 tons per year (Table 1-1). Since the source is not ~~a~~ deemed a "major" until emissions exceed 100 tons per year, the gun room could theoretically be allowed to emit up to 99 tons per year before Title V would be triggered. However, the value provided in Table 1-1 is the best engineering estimate available at this time. Certification is provided on Form OP-CRE1, Section VI Maximum Emissions Rate Data.

TNRCC FORMS

Th following forms are provided to certify emissions estimation and to provide federal enforceability. They must be signed by a Responsible Official (RO) and must be maintained on site or at an accessible designated location and made available for inspection during regular business hours.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

SPECIAL CERTIFICATION FORM FOR EXEMPTIONS (Chapter 106)
AND STANDARD PERMITS (Chapter 116) - FORM PI-8

Note: This form should be used to establish enforceable allowable emission rates which are below those allowed by Chapter 106 or Chapter 116, Section 116.610.

I. Company Name Department of the Army, Camp Stanley
(Corporation, Company, Government Agency, Firm, etc.)

Mailing Address 25800 Ralph Fair Road Boerne, TX 78006

Individual Authorized to Act for Applicant: Name LTC Dean C. Schmelling Title Post Commander

Address Same as above Telephone (210) 221-7461
FAX # (210) 221-7488

II. LOCATION OF FACILITY:

Name of Plant or Site Department of the Army, Camp Stanley Name of Facility Camp Stanley Storage Activity

Street Address 25800 Ralph Fair Road

Nearest City Boerne Zip Code 78006 County Bexar Latitude 29° 40' 35"
Longitude 98° 37' 52"

Does the company (including subsidiaries and parent companies) employ 100 or fewer persons? [ ]-YES [X]-NO

SITE REQUIREMENTS: Include a plot plan of the property drawn to scale that shows the location of plant boundaries, plant equipment, the exempted facility location, and the immediate surrounding area.
PREVIOUSLY SUBMITTED WITH PERMIT 29466.

III. TYPE OF FACILITY:

A. Exemption or Standard Permit Section Number(s) See Addendum Account ID BG - 0041 - S

B. Associated or Previous Special Exemption or Permit Number(s) None

C. Operating Schedule 24 Hours/day 7 Days/week 52 Weeks/year [X] Continuous or _____ Hours/year

D. Start of Construction Existing (Date) Start of Operation In operation (Date)

E. [ ] New Source [ ] Modification of Existing Source [X] Certification of Existing Source

IV. PROCESS DESCRIPTION: Submit a summary which describes the construction, process, operation, and compliance of the facility. The description must be in sufficient detail to indicate how the facility conforms to the specified exemption or standard permit and verifies the maximum emission rates indicated below.

V. MAXIMUM EMISSIONS RATE DATA: Submit documentation which demonstrates the basis for each Emission Point Number's maximum emission rates represented below, including fugitives (calculations, emission factors, equipment capacity, sampling, monitoring, etc.)

Emission Point Number	Name of Source	Name of Air Contaminant	Emission Rate of Each Air Contaminant			
			Maximum lb/hr		Actual tons/yr	
			Gaseous	Particulate	Gaseous	Particulate
SEE ADDENDUM						

Any additional data required should be shown on an attached sheet.

VI. If required, was a copy of this certification sent to the TNRCC New Source Review Permits Division and the TNRCC Regional Office: [ ] Yes [ ] No
Date: _____

TNRCC, Office of Permitting, Air Permits Division (MC-162), PO Box 13087, Austin, TX 78711-3087, Telephone (512) 239-1250

VII. I, LTC Dean C. Schmelling, Post Commander
(Name) (Title)
state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I also certify that the maximum emission rates listed on this certification reflect the maximum anticipated emissions due to the operation of this facility. To the best of my knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption or standard permit. The facility will operate in compliance with all Regulations of the Texas Natural Resource Conservation Commission and with Federal Environmental Protection Agency Regulations governing air pollution.

DATE _____ SIGNATURE _____

Form PI-8 ADDENDUM
Emissions Summary from Camp Stanley Storage Activity (tons/yr)

Name	EPN	NO_X	CO	SO_2	PM_{10}	VOC[a]	Authorization Status
PERMITTED SOURCES							
Volatile Corrosion Inhibitor; Solvent Vat 1	1	N/A	N/A	N/A	N/A	1.28	Permit No. 29466
Solvent Vats 2 and 3	2	N/A	N/A	N/A	N/A	0.58	Permit No. 29466
Solvent Vat 4	3	N/A	N/A	N/A	N/A	0.48	Permit No. 29466
Fingerprint Remover Tank	4	N/A	N/A	N/A	N/A	0.53	Permit No. 29466
Solvent Recovery Tank	5	N/A	N/A	N/A	N/A	0.18	Permit No. 29466
REGISTERED EXEMPTION SOURCES							
Paint Booth Bldg 200	6	N/A	N/A	N/A	0.00015	0.19	Exemption No. 32407; Supercedes No. 29755
Paint Booth Bldg 27	7	N/A	N/A	N/A	0.012	2.80	Exemption No. 32406; Supercedes No. 29517
B-3 Soil Vapor Extraction System		N/A	N/A	N/A	N/A	6.68	Exemption No. 32405
GRANDFATHERED OR EXEMPT SOURCES							
Standby Generator Radio Tower		0.36	0.07	0.04	0.04	3.04E-02	Exempt (§106.511)
Standby Generator Bldg 1		0.36	0.07	0.04	0.04	3.05E-02	Exempt (§106.511)
Standby Generator Bldg 36		0.36	0.07	0.04	0.04	3.04E-02	Exempt (§106.511)
Standby Generator Bldg 99		7.49	1.62	0.50	0.54	6.09E-01	Exempt (§106.511)
Boiler (Diesel) Bldg 46		0.05	0.01	0.11	0.01	1.61E-03	Exempt (§106.183)
Boiler (Diesel) Bldg 201		0.06	0.01	0.13	0.01	1.97E-03	Exempt (§106.183)
Boiler (NG) Bldg 89-1		0.14	0.12	8.24E-04	0.01	7.96E-03	Exempt (§106.183)
Boiler (NG) Bldg 89-2		0.14	0.12	8.24E-04	0.01	7.96E-03	Exempt (§106.183)
Vehicle Refueling Tank[b]		N/A	N/A	N/A	N/A	1.16	Exempt (§106.478)
Light Oil Tank		N/A	N/A	N/A	N/A	1.10E-03	Exempt (§106.432)
Gun Bluing Shop[c]		N/A	N/A	N/A	N/A	N/A	Exempt (§106.375)
Wastewater Treatment Plant[d]		N/A	N/A	N/A	N/A	N/A	Exempt (§106.532)
Various Steel/Bead Abrasive Cleaners[e]		N/A	N/A	N/A	N/A	N/A	Exempt (§106.452)
Gun Room[f]		N/A	N/A	N/A	0.22	N/A	Grandfathered (1962)
TOTAL		8.96	2.09	0.86	0.93	14.60	

[a]Emissions of VOC from storage of diesel fuel are included if source utilizes firing of diesel oil.
[b]Emissions from storage tanks are calculated via EPA TANKS v4.07.
[c]Uses inorganic solvents only; emissions are negligible.
[d]No Stripping of VOCs is conducted at this facility.
[e]Units contain integral vacuum dust collection system.
[f]Based on 98% capture of 11 tons per year sand lost (estimated material balance at maximum testing load).

TNRCC

Form OP-CRE2 (Page 1)
Certified Registration of Emissions for Referenced Preconstruction Authorizations Federal Operating Permit Program

I. COMPANY IDENTIFYING INFORMATION

A. Company Name: Department of the Army, Camp Stanley		
B. Telephone: 210-221-7461	C. Fax: 210-221-7488	
D. Mailing Address: 25800 Ralph Fair Road		
City: Boerne	State: TX	Zip Code: 78006

II. RESPONSIBLE OFFICIAL (RO) IDENTIFYING INFORMATION

A. Responsible Official Name: (X Mr. __Mrs. __Ms. __Dr.) LTC Dean C. Schmelling		
B. Responsible Official Title: Post Commander		
C. Telephone: 210-221-7461	D. Fax: 210-221-7488	
E. Mailing Address: 25800 Ralph Fair Road		
City: Boerne	State: TX	Zip Code: 78006

III. SITE INFORMATION

A. Plant/Site Name: Department of the Army, Camp Stanley				
B. Street Address: 25800 Ralph Fair Road				
C. Nearest City: Boerne			D. Zip Code: 78006	
E. County: Bexar			F. Primary SIC: 9711	
G. Primary TNRCC Account No.:	BG-0041-S			
H. Additional TNRCC Account No(s).:				
I. Latitude (nearest second): 29° 40' 35"		J. Longitude (nearest second): 98° 37' 52"		
K. UTM Zone:	L. UTM East (Meters):		M. UTM North (Meters):	

IV. PLOT PLAN

Attach a plot plan (to scale) of the property showing the location of plant boundaries, plant equipment, and the immediate surrounding area.

V. PROCESS DESCRIPTION

Attach a summary which describes the referenced processes and operations at the site. The description must be in sufficient detail to indicate how the facility will verify all reasonably anticipated maximum potential emission rates referenced below.

Form OP-CRE2 (Page 2)
Certified Registration of Emissions for Referenced Preconstruction Authorizations Federal Operating Permit Program

TNRCC

VI. NONENFORCEABLE MAXIMUM EMISSION RATE DATA AND REFERENCE LIST *(Form PI-7)*

Attach documentation which demonstrates the basis for a reasonably anticipated maximum emission rate for each emission point represented below, including fugitives, if the source belongs to one of the 27 source categories listed in Title 30 Texas Administrative Code §122.10 (30 TAC §122.10). Fugitive emissions of hazardous air pollutants as listed in the Federal Clean Air Act §112(b) must also be included. This includes calculations, emission factors, equipment capacity, fuel consumption rate, sampling, monitoring, etc. All maximum emission rate estimations must use methods approved by the Texas Natural Resource Conservation Commission (TNRCC).

All representations referenced by this registration of emissions with regard to emissions shall become conditions upon which all referenced facilities shall operate. The registration of emissions shall include documentation on the basis of emission rates, and that the maximum emission rates listed on the registration reflect the reasonably anticipated maximums for operation of the referenced facilities.

The reference list shall contain all Form PI-7 exemption registrations which are to be included in this certified registration. A reference number shall identify each referenced Form PI-7. The reference number shall be either the registration number issued by the TNRCC (exemption registration number) or a company assigned number. All reference numbers listed below must be present on, and correspond with, all Form PI-'s certified by this registration. If additional space is needed, use OP-CRE2 Extension A.

Reference Number	Exemption Identifier	Construction Date	Reference Number	Exemption Identifier	Construction Date
32405	Ex-68	4/11/96			
32406	Ex-75	4/11/96			
32407	Ex-75	4/11/96			

VII. ENFORCEABLE MAXIMUM EMISSION RATE DATA AND REFERENCE LIST (Form PI-8 and 30 TAC Chapters 106 and 116)

The reference list shall contain all special certification forms for exemptions subject to 30 TAC §106.6 (Form PI-8) and 30 TAC Chapter 116 permits which are to be included in this registration. The reference number shall identify each referenced authorization. A reference number shall be either the registration number issued by the TNRCC (exemption registration number or permit number) or a company assigned number. All reference numbers listed below must be present on, and correspond with, all preconstruction authorizations (e.g., PI-8 and 30 TAC Chapter 116 permit) certified by this registration. If additional space is needed, use Form OP-CRE2 Extension B.

Reference Number	Preconstruction Authorization	Construction Date	Reference Number	Preconstruction Authorization	Construction Date
29466	29466	4/4/96		Ex-106.478	7/7/00
	Ex-106.54	7/7/00		Ex-106.432	7/7/00
	Ex-106.183	7/7/00		Ex-106.375	7/7/00

TNRCC

Form OP-CRE2 (Page 3)
Certified Registration of Emissions for Referenced Preconstruction Authorizations Federal Operating Permit Program

VIII. CERTIFICATION BY RESPONSIBLE OFFICIAL

All representations in this registration of emissions with regard to emissions shall become conditions upon which all referenced facilities shall operate. The referenced facilities will satisfy the conditions and limitations of the indicated preconstruction authorizations. The referenced facilities will operate in compliance with all regulations of the TNRCC and with the U.S. Environmental Protection Agency regulations governing air pollution. It shall be unlawful to vary from such representation, unless the affected referenced preconstruction authorizations or certified registrations and this registration are first revised. This registration of emissions shall include documentation on the basis of emission rates, the certification below that the maximum emission rates referenced in this registration reflects the reasonably anticipated maximums for operation of all referenced facilities, and records demonstrating compliance with the indicated preconstruction authorizations. All referenced preconstruction authorizations shall be incorporated by reference into this certified registration.

I, LTC Dean C. Schmelling, certify that, based on information and belief formed after reasonable inquiry, the
(Name printed or typed)

statements and information above and contained in the attached document(s), dated 7/7/00, are true, accurate,
(Documentation Date)

and complete.

Signature: _____ Signature Date: _____

Title: Post Commander

Form OP-CRE2 Extension A
Certified Registration of Emissions for
Referenced Preconstruction Authorizations
Federal Operating Permit Program

TNRCC

VI. NONENFORCEABLE MAXIMUM EMISSION RATE DATA AND REFERENCE LIST (Form PI-7)

The reference list shall contain all Form PI-7 exemption registrations which are to be included in this certified registration. The reference number shall identify each referenced Form PI-7. A reference number shall be either the registration number issued by the TNRCC (exemption registration number) or a company assigned number. All reference numbers listed below must be present on, and correspond with, all Form PI-7s certified by this registration.

Reference Number	Exemption Identifier	Construction Date	Reference Number	Exemption Identifier	Construction Date

Form OP-CRE2 Extension B
Certified Registration of Emissions for Referenced Preconstruction Authorizations
Federal Operating Permit Program

TNRCC

VII. ENFORCEABLE MAXIMUM EMISSION RATE DATA AND REFERENCE LIST (Form PI-8 and New Source Review Permits)

The reference list shall contain all special certification forms for exemptions subject to 30 TAC §106.6 (Form PI-8) and 30 TAC Chapter 116 permits which are to be included in this registration. The reference number shall identify each referenced authorization. A reference number shall be either the registration number issued by the TNRCC (exemption registration number or permit number) or a company assigned number. All reference numbers listed below must be present on, and correspond with, all preconstruction authorizations (e.g., PI-8 and 30 TAC Chapter 116 permit) certified by this registration.

Reference Number	Preconstruction Authorization	Construction Date	Reference Number	Preconstruction Authorization	Construction Date
	Ex-532	7/7/00			
	Ex-452	7/7/00			

Form OP-CRE1 (Page 1)
Certified Registration of Emissions for Potential to Emit
(Title 30 Texas Administrative Code § 122.122)
Federal Operating Permit Program

TNRCC

I. COMPANY IDENTIFYING INFORMATION		
A. Company Name: Department of the Army, Camp Stanley		
B. Telephone: 210-221-7461	C. Fax: 210-221-7488	
D. Mailing Address: 25800 Ralph Fair Road		
City: Boerne	State: TX	Zip Code: 78006

II. RESPONSIBLE OFFICIAL IDENTIFYING INFORMATION		
A. Responsible Official Name: (X Mr. __Mrs. __Ms. __Dr.) LTC Dean C. Schmelling		
B. Responsible Official Title: Post Commander		
C. Telephone: 210-221-7461	D. Fax: 210-221-7488	
E. Mailing Address: 25800 Ralph Fair Road		
City: Boerne	State: TX	Zip Code: 78006

III. SITE INFORMATION				
A. Plant/Site Name: Department of the Army, Camp Stanley				
B. Street Address: 25800 Ralph Fair Road				
C. Nearest City: Boerne			D. Zip Code: 78006	
E. County: Bexar			F. Primary SIC: 9711	
G. Primary TNRCC Account No.:	BG-0041-S			
H. Additional TNRCC Account No(s).:				
I. Latitude (nearest second): 29° 40' 35"		J. Longitude (nearest second): 98° 37' 52"		
K. UTM Zone:	L. UTM East (meters):		M: UTM North (meters):	

IV. PLOT PLAN
Attach a plot plan to scale of the property showing the location of plant boundaries, plant equipment, and the immediately surrounding area.

V. PROCESS DESCRIPTION
Attach a summary which describes the processes and operations at the site. The description must be in sufficient detail to indicate how the facility will verify the reasonably anticipated maximum potential emission rates indicated below.

TNRCC

Form OP-CRE1 (Page 2)
Certified Registration of Emissions for Potential to Emit
(Title 30 Texas Administrative Code § 122.122)
Federal Operating Permit Program

VI. MAXIMUM EMISSIONS RATE DATA

Attach documentation which demonstrates the basis for each emission point number's reasonably anticipated maximum emission rates represented below including fugitives if the source belongs to one of the 27 source categories listed in Title 30 Texas Administrative Code § 122.10 [30 TAC § 122.10(8)(c)]. Fugitive emissions of hazardous air pollutants as listed in the Federal Clean Air Act § 112(b) must also be included. This includes calculations, emission factors, equipment capacity, fuel consumption rate, sampling, monitoring, etc.

All representations in this registration of emissions, with regard to emissions, shall become conditions upon which the stationary source shall operate. The registration of emissions shall include documentation on the basis of emission rates, and that the maximum emission rates listed on the registration reflect the reasonably anticipated maximums for operation of the stationary source. In order to qualify for registrations of emissions, the maximum emission rates listed in the registration must be less than those rates defined for a major source in 30 TAC § 122.10 (relating to General Definitions). Use Form OP-CRE1 Extension, if additional space is necessary.

Emission Point No.	Source Name	Air Contaminant Name	Air Contaminant Maximum Emission Rates	
			Pounds/Hour	Tons/Year
	Gun Room	Particulate	0.05 (avg)	0.22

VII. DEMONSTRATION OF COMPLIANCE

The maximum emission rates listed on the registration shall reflect the reasonably anticipated maximums for operation of the stationary source. The certified registration of emissions and records demonstrating compliance with the registration must be maintained on site or at an accessible designated location. This information shall be provided, upon request, during regular business hours to representatives of the Texas Natural Resource Conservation Commission (TNRCC) or any air pollution control agency having jurisdiction.

TNRCC

Form OP-CRE1 (Page 3)
Certified Registration of Emissions
for Potential to Emit
(Title 30 Texas Administrative Code § 122.122)
Federal Operating Permit Program

VIII. CERTIFICATION BY RESPONSIBLE OFFICIAL

All representations in this registration of emissions with regard to emissions shall become conditions upon which the stationary source shall operate. It shall be unlawful for any person to vary from such representation unless the registration is first revised. This registration of emissions shall include documentation of the basis of emission rates and the certification below, in accordance with Title 30 Texas Administrative Code § 122.165 (relating to Certification of a Responsible Official), that the maximum emission rates listed on the registration reflect the reasonably anticipated maximums for operation of the stationary source.

I, LTC Dean C. Schmelling, certify that, based on information and belief formed after reasonable inquiry, the
(Name printed or typed)

statements and information above and contained in the attached document(s), dated 7/7/00, are true, accurate,
(Documentation Date)

and complete.

Signature: _____ ***Signature Date:*** _____

Title: ***Post Commander***

TNRCC

Form OP-CRE1 Extension
Certified Registration of Emissions
for Potential to Emit
(Title 30 Texas Administrative Code § 122.122)
Federal Operating Permit Program

VI. MAXIMUM EMISSIONS RATE DATA *(continued)*				
Emission Point No.	Source Name	Air Contaminant Name	Air Contaminant Maximum Emission Rates	
			Pounds/Hour	Tons/Year

SECTION 3
EMISSIONS CALCULATIONS AND SUPPORTING DOCUMENTATION

This section summarizes the other exempt or grandfathered emission sources at CSSA and the calculation techniques used for the estimations. For each source type, supporting documentation, such as the EPA Compilation of Air Pollutant Emission Factors (AP-42) or equivalent, is provided as supporting documentation. Also, for sources that are exempt from permitting, the applicable section from 30 TAC § 106 is provided for reference. It is important to maintain records that support individual exemption requirements, such as number of operating hours per year for some sources.

All emissions were estimated based on the best information available at this time. Raw data for each source was obtained through various means including TNRCC file review and on-site visitation and interview with CSSA environmental personnel on February 7, 2000. If the conditions represented in this documentation change, the emissions estimation should be changed accordingly so that the non-applicability status can be supported at all times.

PORTABLE AND EMERGENCY ENGINES AND TURBINES

There are four internal combustion engines used for electric backup at CSSA; servicing the radio tower, Building 1, Building 36, and Building 99. These generators use diesel oil (#2) as the fuel source. Emissions were estimated based on Section 3.3 Gasoline and Diesel Industrial Engines of EPA AP-42 based on a maximum of 720 annual operating hours. Pollutants emitted from these sources include NO_X, CO, SO_2, PM_{10}, and various VOCs.

In addition to the VOCs that are emitted through the combustion process, the storage of diesel fuel in the onboard tank also generates VOC emissions through the evaporative and breathing processes. These (and all other tank losses) emissions were estimated using the EPA's TANKS program. These emissions will be present even if the sources are not actually fired, due to the presence of semi-volatile material (diesel) being stored.

These sources are exempt from permitting based on 30 TAC § 106.511 provided that the maximum annual operating hours does not exceed 10% of the normal annual schedule of the primary equipment. (Other requirements also exist; refer to the actual exemption citation provided for specifics.)

Diesel Generator and Associated Storage Tank

Power Rating: 25.0 KW
33.5 hp
Yearly Hours: 720 hr/yr

Pollutant	Emission Factor (1) (lb/hp-hr)	Emission Rates (lb/hr)	Emission Rates (tons/yr)
NO_X	0.031	1.0	0.36
CO	6.68E-03	0.2	0.07
SO_X	2.05E-03	0.1	0.04
PM_{10}	2.20E-03	0.1	0.04
CO_2	1.15	38.5	13.86
Aldehydes	4.63E-04	0.0	0.00
TOC			
Exhaust	2.47E-03	8.27E-02	2.98E-02
Evaporative	0	0.00E+00	0.00E+00
Crankcase	4.41E-05	1.48E-03	5.33E-04
Refueling	0	0.00E+00	0.00E+00
Tank	EPA TANKS (2)	N/A	3.50E-05
TOTAL TOC		8.42E-02	3.04E-02

(1) Emission factors for combustion taken from AP-42 (10/96), Section 3.3 Gasoline and Diesel Industrial Engines.
(2) Emissions from storage tanks are calculated via EPA TANKS v4.07.

Diesel Generator and Associated Storage Tank

Power Rating: 25.0 KW
33.5 hp
Yearly Hours: 720 hr/yr

Pollutant	Emission Factor (1) (lb/hp-hr)	Emission Rates (lb/hr)	Emission Rates (tons/yr)
NO_X	0.031	1.0	0.36
CO	6.68E-03	0.2	0.07
SO_X	2.05E-03	0.1	0.04
PM_{10}	2.20E-03	0.1	0.04
CO_2	1.15	38.5	13.86
Aldehydes	4.63E-04	0.0	0.00
TOC			
Exhaust	2.47E-03	8.27E-02	2.98E-02
Evaporative	0	0.00E+00	0.00E+00
Crankcase	4.41E-05	1.48E-03	5.33E-04
Refueling	0	0.00E+00	0.00E+00
Tank	EPA TANKS (2)	N/A	1.80E-04
TOTAL TOC		8.42E-02	3.05E-02

(1) Emission factors for combustion taken from AP-42 (10/96), Section 3.3 Gasoline and Diesel Industrial Engines.
(2) Emissions from storage tanks are calculated via EPA TANKS v4.07.

Diesel Generator and Associated Storage Tank

Power Rating: 25.0 KW
33.5 hp
Yearly Hours: 720 hr/yr

Pollutant	Emission Factor (1) (lb/hp-hr)	Emission Rates (lb/hr)	Emission Rates (tons/yr)
NO_X	0.031	1.0	0.36
CO	6.68E-03	0.2	0.07
SO_X	2.05E-03	0.1	0.04
PM_{10}	2.20E-03	0.1	0.04
CO_2	1.15	38.5	13.86
Aldehydes	4.63E-04	0.0	0.00
TOC			
Exhaust	2.47E-03	8.27E-02	2.98E-02
Evaporative	0	0.00E+00	0.00E+00
Crankcase	4.41E-05	1.48E-03	5.33E-04
Refueling	0	0.00E+00	0.00E+00
Tank	EPA TANKS (2)	N/A	7.00E-05
TOTAL TOC		8.42E-02	3.04E-02

(1) Emission factors for combustion taken from AP-42 (10/96), Section 3.3 Gasoline and Diesel Industrial Engines.
(2) Emissions from storage tanks are calculated via EPA TANKS v4.07.

Diesel Generator and Associated Storage Tank

Power Rating: 500.0 KW
670.5 hp
Yearly Hours: 720 hr/yr

Pollutant	Emission Factor (1) (lb/hp-hr)	Emission Rates (lb/hr)	Emission Rates (tons/yr)
NO_X	0.031	20.8	7.49
CO	6.68E-03	4.5	1.62
SO_X	2.05E-03	1.4	0.50
PM_{10}	2.20E-03	1.5	0.54
CO_2	1.15	771.1	277.60
Aldehydes	4.63E-04	0.3	0.11
TOC			
Exhaust	2.47E-03	1.66E+00	5.98E-01
Evaporative	0	0.00E+00	0.00E+00
Crankcase	4.41E-05	2.96E-02	1.07E-02
Refueling	0	0.00E+00	0.00E+00
Tank	EPA TANKS (2)	N/A	9.50E-05
TOTAL TOC		1.69E+00	6.09E-01

(1) Emission factors for combustion taken from AP-42 (10/96), Section 3.3 Gasoline and Diesel Industrial Engines.
(2) Emissions from storage tanks are calculated via EPA TANKS v4.07.

AP-42 DOCUMENTATION

3.3 Gasoline And Diesel Industrial Engines

3.3.1 General

The engine category addressed by this section covers a wide variety of industrial applications of both gasoline and diesel internal combustion (IC) engines such as aerial lifts, fork lifts, mobile refrigeration units, generators, pumps, industrial sweepers/scrubbers, material handling equipment (such as conveyors), and portable well-drilling equipment. The three primary fuels for reciprocating IC engines are gasoline, diesel fuel oil (No.2), and natural gas. Gasoline is used primarily for mobile and portable engines. Diesel fuel oil is the most versatile fuel and is used in IC engines of all sizes. The rated power of these engines covers a rather substantial range, up to 250 horsepower (hp) for gasoline engines and up to 600 hp for diesel engines. (Diesel engines greater than 600 hp are covered in Section 3.4, "Large Stationary Diesel And All Stationary Dual-fuel Engines".) Understandably, substantial differences in engine duty cycles exist. It was necessary, therefore, to make reasonable assumptions concerning usage in order to formulate some of the emission factors.

3.3.2 Process Description

All reciprocating IC engines operate by the same basic process. A combustible mixture is first compressed in a small volume between the head of a piston and its surrounding cylinder. The mixture is then ignited, and the resulting high-pressure products of combustion push the piston through the cylinder. This movement is converted from linear to rotary motion by a crankshaft. The piston returns, pushing out exhaust gases, and the cycle is repeated.

There are 2 methods used for stationary reciprocating IC engines: compression ignition (CI) and spark ignition (SI). This section deals with both types of reciprocating IC engines. All diesel-fueled engines are compression ignited, and all gasoline-fueled engines are spark ignited.

In CI engines, combustion air is first compression heated in the cylinder, and diesel fuel oil is then injected into the hot air. Ignition is spontaneous because the air temperature is above the autoignition temperature of the fuel. SI engines initiate combustion by the spark of an electrical discharge. Usually the fuel is mixed with the air in a carburetor (for gasoline) or at the intake valve (for natural gas), but occasionally the fuel is injected into the compressed air in the cylinder.

CI engines usually operate at a higher compression ratio (ratio of cylinder volume when the piston is at the bottom of its stroke to the volume when it is at the top) than SI engines because fuel is not present during compression; hence there is no danger of premature autoignition. Since engine thermal efficiency rises with increasing pressure ratio (and pressure ratio varies directly with compression ratio), CI engines are more efficient than SI engines. This increased efficiency is gained at the expense of poorer response to load changes and a heavier structure to withstand the higher pressures.[1]

3.3.3 Emissions

Most of the pollutants from IC engines are emitted through the exhaust. However, some total organic compounds (TOC) escape from the crankcase as a result of blowby (gases that are vented from the oil pan after they have escaped from the cylinder past the piston rings) and from the fuel tank and carburetor because of evaporation. Nearly all of the TOCs from diesel CI engines enter the

atmosphere from the exhaust. Evaporative losses are insignificant in diesel engines due to the low volatility of diesel fuels.

The primary pollutants from internal combustion engines are oxides of nitrogen (NO_x), total organic compounds (TOC), carbon monoxide (CO), and particulates, which include both visible (smoke) and nonvisible emissions. Nitrogen oxide formation is directly related to high pressures and temperatures during the combustion process and to the nitrogen content, if any, of the fuel. The other pollutants, HC, CO, and smoke, are primarily the result of incomplete combustion. Ash and metallic additives in the fuel also contribute to the particulate content of the exhaust. Sulfur oxides (SO_x) also appear in the exhaust from IC engines. The sulfur compounds, mainly sulfur dioxide (SO_2), are directly related to the sulfur content of the fuel.[2]

3.3.3.1 Nitrogen Oxides -

Nitrogen oxide formation occurs by two fundamentally different mechanisms. The predominant mechanism with internal combustion engines is thermal NO_x which arises from the thermal dissociation and subsequent reaction of nitrogen (N_2) and oxygen (O_2) molecules in the combustion air. Most thermal NO_x is formed in the high-temperature region of the flame from dissociated molecular nitrogen in the combustion air. Some NO_x, called prompt NO_x, is formed in the early part of the flame from reaction of nitrogen intermediary species, and HC radicals in the flame. The second mechanism, fuel NO_x, stems from the evolution and reaction of fuel-bound nitrogen compounds with oxygen. Gasoline, and most distillate oils have no chemically-bound fuel N_2 and essentially all NO_x formed is thermal NO_x.

3.3.3.2 Total Organic Compounds -

The pollutants commonly classified as hydrocarbons are composed of a wide variety of organic compounds and are discharged into the atmosphere when some of the fuel remains unburned or is only partially burned during the combustion process. Most unburned hydrocarbon emissions result from fuel droplets that were transported or injected into the quench layer during combustion. This is the region immediately adjacent to the combustion chamber surfaces, where heat transfer outward through the cylinder walls causes the mixture temperatures to be too low to support combustion.

Partially burned hydrocarbons can occur because of poor air and fuel homogeneity due to incomplete mixing, before or during combustion; incorrect air/fuel ratios in the cylinder during combustion due to maladjustment of the engine fuel system; excessively large fuel droplets (diesel engines); and low cylinder temperature due to excessive cooling (quenching) through the walls or early cooling of the gases by expansion of the combustion volume caused by piston motion before combustion is completed.[2]

3.3.3.3 Carbon Monoxide -

Carbon monoxide is a colorless, odorless, relatively inert gas formed as an intermediate combustion product that appears in the exhaust when the reaction of CO to CO_2 cannot proceed to completion. This situation occurs if there is a lack of available oxygen near the hydrocarbon (fuel) molecule during combustion, if the gas temperature is too low, or if the residence time in the cylinder is too short. The oxidation rate of CO is limited by reaction kinetics and, as a consequence, can be accelerated only to a certain extent by improvements in air and fuel mixing during the combustion process.[2-3]

3.3.3.4 Smoke and Particulate Matter -

White, blue, and black smoke may be emitted from IC engines. Liquid particulates appear as white smoke in the exhaust during an engine cold start, idling, or low load operation. These are formed in the quench layer adjacent to the cylinder walls, where the temperature is not high enough to ignite the fuel. Blue smoke is emitted when lubricating oil leaks, often past worn piston rings, into the combustion chamber and is partially burned. Proper maintenance is the most effective method of preventing blue smoke emissions from all types of IC engines. The primary constituent of black smoke is agglomerated carbon particles (soot) formed in regions of the combustion mixtures that are oxygen deficient.[2]

3.3.3.5 Sulfur Oxides -

Sulfur oxides emissions are a function of only the sulfur content in the fuel rather than any combustion variables. In fact, during the combustion process, essentially all the sulfur in the fuel is oxidized to SO_2. The oxidation of SO_2 gives sulfur trioxide (SO_3), which reacts with water to give sulfuric acid (H_2SO_4), a contributor to acid precipitation. Sulfuric acid reacts with basic substances to give sulfates, which are fine particulates that contribute to PM-10 and visibility reduction. Sulfur oxide emissions also contribute to corrosion of the engine parts.[2-3]

3.3.4 Control Technologies

Control measures to date are primarily directed at limiting NO_x and CO emissions since they are the primary pollutants from these engines. From a NO_x control viewpoint, the most important distinction between different engine models and types of reciprocating engines is whether they are rich-burn or lean-burn. Rich-burn engines have an air-to-fuel ratio operating range that is near stoichiometric or fuel-rich of stoichiometric and as a result the exhaust gas has little or no excess oxygen. A lean-burn engine has an air-to-fuel operating range that is fuel-lean of stoichiometric; therefore, the exhaust from these engines is characterized by medium to high levels of O_2. The most common NO_x control technique for diesel and dual-fuel engines focuses on modifying the combustion process. However, selective catalytic reduction (SCR) and nonselective catalytic reduction (NSCR) which are post-combustion techniques are becoming available. Controls for CO have been partly adapted from mobile sources.[4]

Combustion modifications include injection timing retard (ITR), preignition chamber combustion (PCC), air-to-fuel ratio adjustments, and derating. Injection of fuel into the cylinder of a CI engine initiates the combustion process. Retarding the timing of the diesel fuel injection causes the combustion process to occur later in the power stroke when the piston is in the downward motion and combustion chamber volume is increasing. By increasing the volume, the combustion temperature and pressure are lowered, thereby lowering NO_x formation. ITR reduces NO_x from all diesel engines; however, the effectiveness is specific to each engine model. The amount of NO_x reduction with ITR diminishes with increasing levels of retard.[4]

Improved swirl patterns promote thorough air and fuel mixing and may include a precombustion chamber (PCC). A PCC is an antechamber that ignites a fuel-rich mixture that propagates to the main combustion chamber. The high exit velocity from the PCC results in improved mixing and complete combustion of the lean air/fuel mixture which lowers combustion temperature, thereby reducing NO_x emissions.[4]

The air-to-fuel ratio for each cylinder can be adjusted by controlling the amount of fuel that enters each cylinder. At air-to-fuel ratios less than stoichiometric (fuel-rich), combustion occurs under conditions of insufficient oxygen which causes NO_x to decrease because of lower oxygen and lower temperatures. Derating involves restricting the engine operation to lower than normal levels of power production for the given application. Derating reduces cylinder pressures and temperatures, thereby lowering NO_x formation rates.[4]

SCR is an add-on NO_x control placed in the exhaust stream following the engine and involves injecting ammonia (NH_3) into the flue gas. The NH_3 reacts with NO_x in the presence of a catalyst to form water and nitrogen. The effectiveness of SCR depends on fuel quality and engine duty cycle (load fluctuations). Contaminants in the fuel may poison or mask the catalyst surface causing a reduction or termination in catalyst activity. Load fluctuations can cause variations in exhaust temperature and NO_x concentration which can create problems with the effectiveness of the SCR system.[4]

NSCR is often referred to as a three-way conversion catalyst system because the catalyst reactor simultaneously reduces NO_x, CO, and HC and involves placing a catalyst in the exhaust stream of the engine. The reaction requires that the O_2 levels be kept low and that the engine be operated at fuel-rich air-to-fuel ratios.[4]

The most accurate method for calculating such emissions is on the basis of "brake-specific" emission factors (pounds per horsepower-hour [lb/hp-hr]). Emissions are the product of the brake-specific emission factor, the usage in hours, the rated power available, and the load factor (the power actually used divided by the power available). However, for emission inventory purposes, it is often easier to assess this activity on the basis of fuel used.

Once reasonable usage and duty cycles for this category were ascertained, emission values were aggregated to arrive at the factors for criteria and organic pollutants presented. Factors in Table 3.3-1 are in pounds per million British thermal unit (lb/MMBtu). Emission data for a specific design type were weighted according to estimated material share for industrial engines. The emission factors in these tables, because of their aggregate nature, are most appropriately applied to a population of industrial engines rather than to an individual power plant. Table 3.3-2 shows unweighted speciated organic compound and air toxic emission factors based upon only 2 engines. Their inclusion in this section is intended for rough order-of-magnitude estimates only.

Table 3.3-3 summarizes whether the various diesel emission reduction technologies (some of which may be applicable to gasoline engines) will generally increase or decrease the selected parameter. These technologies are categorized into fuel modifications, engine modifications, and exhaust after-treatments. Current data are insufficient to quantify the results of the modifications. Table 3.3-3 provides general information on the trends of changes on selected parameters.

3.3.5 Updates Since the Fifth Edition

The Fifth Edition was released in January 1995. Revisions to this section since that date are summarized below. For further detail, consult the memoranda describing each supplement or the background report for this section. These and other documents can be found on the CHIEF electronic bulletin board (919-541-5742), or on the new EFIG home page (http://www.epa.gov/oar/oaqps/efig/).

Supplement A, February 1996

No changes.

Supplement B, October 1996

- Text was revised concerning emissions and controls.
- The CO_2 emission factor was adjusted to reflect 98.5 percent conversion efficiency.

Table 3.3-1. EMISSION FACTORS FOR UNCONTROLLED GASOLINE AND DIESEL INDUSTRIAL ENGINES[a]

Pollutant	Gasoline Fuel (SCC 2-02-003-01, 2-03-003-01)		Diesel Fuel (SCC 2-02-001-02, 2-03-001-01)		EMISSION FACTOR RATING
	Emission Factor (lb/hp-hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	Emission Factor (lb/hp-hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	
NO_x	0.011	1.63	0.031	4.41	D
CO	0.439	62.7	6.68 E-03	0.95	D
SO_x	5.91 E-04	0.084	2.05 E-03	0.29	D
PM-10[b]	7.21 E-04	0.10	2.20 E-03	0.31	D
CO_2[c]	1.08	154	1.15	164	B
Aldehydes	4.85 E-04	0.07	4.63 E-04	0.07	D
TOC					
Exhaust	0.015	2.10	2.47 E-03	0.35	D
Evaporative	6.61 E-04	0.09	0.00	0.00	E
Crankcase	4.85 E-03	0.69	4.41 E-05	0.01	E
Refueling	1.08 E-03	0.15	0.00	0.00	E

[a] References 2,5-6,9-14. When necessary, an average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr. To convert from lb/hp-hr to kg/kw-hr, multiply by 0.608. To convert from lb/MMBtu to ng/J, multiply by 430. SCC = Source Classification Code. TOC = total organic compounds.

[b] PM-10 = particulate matter less than or equal to 10 μm aerodynamic diameter. All particulate is assumed to be ≤ 1 μm in size.

[c] Assumes 99% conversion of carbon in fuel to CO_2 with 87 weight % carbon in diesel, 86 weight % carbon in gasoline, average BSFC of 7,000 Btu/hp-hr, diesel heating value of 19,300 Btu/lb, and gasoline heating value of 20,300 Btu/lb.

Table 3.3-2. SPECIATED ORGANIC COMPOUND EMISSION FACTORS FOR UNCONTROLLED DIESEL ENGINES[a]

EMISSION FACTOR RATING: E

Pollutant	Emission Factor (Fuel Input) (lb/MMBtu)
Benzene[b]	9.33 E-04
Toluene[b]	4.09 E-04
Xylenes[b]	2.85 E-04
Propylene[b]	2.58 E-03
1,3-Butadiene[b,c]	<3.91 E-05
Formaldehyde[b]	1.18 E-03
Acetaldehyde[b]	7.67 E-04
Acrolein[b]	<9.25 E-05
Polycyclic aromatic hydrocarbons (PAH)	
Naphthalene[b]	8.48 E-05
Acenaphthylene	<5.06 E-06
Acenaphthene	<1.42 E-06
Fluorene	2.92 E-05
Phenanthrene	2.94 E-05
Anthracene	1.87 E-06
Fluoranthene	7.61 E-06
Pyrene	4.78 E-06
Benzo(a)anthracene	1.68 E-06
Chrysene	3.53 E-07
Benzo(b)fluoranthene	<9.91 E-08
Benzo(k)fluoranthene	<1.55 E-07
Benzo(a)pyrene	<1.88 E-07
Indeno(1,2,3-cd)pyrene	<3.75 E-07
Dibenz(a,h)anthracene	<5.83 E-07
Benzo(g,h,l)perylene	<4.89 E-07
TOTAL PAH	1.68 E-04

[a] Based on the uncontrolled levels of 2 diesel engines from References 6-7. Source Classification Codes 2-02-001-02, 2-03-001-01. To convert from lb/MMBtu to ng/J, multiply by 430.
[b] Hazardous air pollutant listed in the *Clean Air Act*.
[c] Based on data from 1 engine.

Table 3.3-3. EFFECT OF VARIOUS EMISSION CONTROL TECHNOLOGIES ON DIESEL ENGINES[a]

Technology	Affected Parameter	
	Increase	Decrease
Fuel modifications		
Sulfur content increase	PM, wear	
Aromatic content increase	PM, NO_x	
Cetane number		PM, NO_x
10% and 90% boiling point		PM
Fuel additives		PM, NO_x
Water/Fuel emulsions		NO_x
Engine modifications		
Injection timing retard	PM, BSFC	NO_x, power
Fuel injection pressure	PM, NO_x	
Injection rate control		NO_x, PM
Rapid spill nozzles		PM
Electronic timing & metering		NO_x, PM
Injector nozzle geometry		PM
Combustion chamber modifications		NO_x, PM
Turbocharging	PM, power	NO_x
Charge cooling		NO_x
Exhaust gas recirculation	PM, power, wear	NO_x
Oil consumption control		PM, wear
Exhaust after-treatment		
Particulate traps		PM
Selective catalytic reduction		NO_x
Oxidation catalysts		TOC, CO, PM

[a] Reference 8. PM = particulate matter. BSFC = brake-specific fuel consumption.

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TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
CHAPTER 106	EXEMPTIONS FROM PERMITTING
SUBCHAPTER W	TURBINES AND ENGINES
RULE §106.511	**Portable and Emergency Engines and Turbines (Previously SE 5)**

Internal combustion engine and gas turbine driven compressors, electric generator sets, and water pumps, used only for portable, emergency, and/or standby services are exempt, provided that the maximum annual operating hours shall not exceed 10% of the normal annual operating schedule of the primary equipment; and all electric motors. For purposes of this section, "standby" means to be used as a "substitute for" and not "in addition to" other equipment.

Source Note: The provisions of this §106.511 adopted to be effective March 14, 1997, 22 TexReg 2439.

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BOILERS, HEATERS, AND OTHER COMBUSTION DEVICES

There are four boilers used for supplemental/backup steam capacity (comfort heat) at CSSA, located in Building 46, Building 201, and two in Building 89. The boilers in Buildings 46 and 201 are fired with diesel oil (#2) while the two in Building 89 are natural gas fired. Emissions were estimated based on Section 1.3 Fuel Oil Combustion or Section 1.4 Natural Gas Combustion, as appropriate, of EPA AP-42 based on a maximum of 720 annual operating hours. Pollutants emitted from these sources include NO_X, CO, SO_2, PM_{10}, and various VOCs.

These sources are exempt from permitting based on 30 TAC § 106.183 because they are rated at less than 40 million British thermal unit (Btu) per hour heat input. (Other requirements also exist; refer to the actual exemption citation provided for specifics.)

Standby Boiler

Heat Rating: 990.0 Mbtu/hr
Fuel Usage: 7.1 gph
Yearly Hours: 720 hr/yr

Pollutant	Emission Factor (1) ($lb/10^3$ gal)	Emission Rates (lb/hr)	Emission Rates (tons/yr)
NO_X	20	0.14	0.05
CO	5	0.04	0.01
SO_2 (2)	42.6	0.30	0.11
PM_{10}	3.3	0.02	0.01
TOC			
Methane	0.216	1.53E-03	5.51E-04
Non-Methane	0.34	2.41E-03	8.68E-04
Tank	EPA TANKS (3)	N/A	1.90E-04
TOTAL TOC		3.94E-03	1.61E-03

(1) Emission factors for combustion taken from AP-42 (9/98), Section 1.3 Fuel Oil Combustion.
(2) Assumes a sulfur content of 0.3%.
(3) Emissions from storage tanks are calculated via EPA TANKS v4.07.

Standby Boiler

Heat Rating: 1170.0 Mbtu/hr
Fuel Usage: 8.4 gph
Yearly Hours: 720 hr/yr

Pollutant	Emission Factor (1) ($lb/10^3$ gal)	Emission Rates (lb/hr)	Emission Rates (tons/yr)
NO_X	20	0.17	0.06
CO	5	0.04	0.01
SO_2 (2)	42.6	0.36	0.13
PM_{10}	3.3	0.03	0.01
TOC			
Methane	0.216	1.81E-03	6.52E-04
Non-Methane	0.34	2.86E-03	1.03E-03
Tank	EPA TANKS (3)	N/A	2.85E-04
TOTAL TOC		4.67E-03	1.97E-03

(1) Emission factors for combustion taken from AP-42 (9/98), Section 1.3 Fuel Oil Combustion.
(2) Assumes a sulfur content of 0.3%.
(3) Emissions from storage tanks are calculated via EPA TANKS v4.07.

Standby Boiler (Natural Gas Combustion)

Heat Rating: 4185.0 Mbtu/hr
Fuel Usage: 4024.0 ft^3/hr
Yearly Hours: 720 hr/yr

Pollutant	Emission Factor (1) ($lb/10^6$ ft^3)	Emission Rates (lb/hr)	Emission Rates (tons/yr)
NO_X	100	0.40	0.14
CO	84	0.34	0.12
SO_2 (2)	0.57	2.29E-03	8.24E-04
PM_{10}	7.6	0.03	0.01
VOC	5.5	2.21E-02	7.96E-03

(1) Emission factors for combustion taken from AP-42 (7/98), Section 1.4 Natural Gas Combustion.
(2) Assumes a sulfur content of 2000 grains per 10^6 ft^3.

Standby Boiler (Natural Gas Combustion)

Heat Rating: 4185.0 Mbtu/hr
Fuel Usage: 4024.0 ft^3/hr
Yearly Hours: 720 hr/yr

Pollutant	Emission Factor (1) ($lb/10^6$ ft^3)	Emission Rates (lb/hr)	Emission Rates (tons/yr)
NO_X	100	0.40	0.14
CO	84	0.34	0.12
SO_2 (2)	0.57	2.29E-03	8.24E-04
PM_{10}	7.6	0.03	0.01
VOC	5.5	2.21E-02	7.96E-03

(1) Emission factors for combustion taken from AP-42 (7/98), Section 1.4 Natural Gas Combustion.
(2) Assumes a sulfur content of 2000 grains per 10^6 ft^3.

1.3 Fuel Oil Combustion

1.3.1 General[1-3]

Two major categories of fuel oil are burned by combustion sources: distillate oils and residual oils. These oils are further distinguished by grade numbers, with Nos. 1 and 2 being distillate oils; Nos. 5 and 6 being residual oils; and No. 4 being either distillate oil or a mixture of distillate and residual oils. No. 6 fuel oil is sometimes referred to as Bunker C. Distillate oils are more volatile and less viscous than residual oils. They have negligible nitrogen and ash contents and usually contain less than 0.3 percent sulfur (by weight). Distillate oils are used mainly in domestic and small commercial applications, and include kerosene and diesel fuels. Being more viscous and less volatile than distillate oils, the heavier residual oils (Nos. 5 and 6) may need to be heated for ease of handling and to facilitate proper atomization. Because residual oils are produced from the residue remaining after the lighter fractions (gasoline, kerosene, and distillate oils) have been removed from the crude oil, they contain significant quantities of ash, nitrogen, and sulfur. Residual oils are used mainly in utility, industrial, and large commercial applications.

1.3.2 Firing Practices[4]

The major boiler configurations for fuel oil-fired combustors are watertube, firetube, cast iron, and tubeless design. Boilers are classified according to design and orientation of heat transfer surfaces, burner configuration, and size. These factors can all strongly influence emissions as well as the potential for controlling emissions.

Watertube boilers are used in a variety of applications ranging from supplying large amounts of process steam to providing space heat for industrial facilities. In a watertube boiler, combustion heat is transferred to water flowing through tubes which line the furnace walls and boiler passes. The tube surfaces in the furnace (which houses the burner flame) absorb heat primarily by radiation from the flames. The tube surfaces in the boiler passes (adjacent to the primary furnace) absorb heat primarily by convective heat transfer.

Firetube boilers are used primarily for heating systems, industrial process steam generators, and portable power boilers. In firetube boilers, the hot combustion gases flow through the tubes while the water being heated circulates outside of the tubes. At high pressures and when subjected to large variations in steam demand, firetube units are more susceptible to structural failure than watertube boilers. This is because the high-pressure steam in firetube units is contained by the boiler walls rather than by multiple small-diameter watertubes, which are inherently stronger. As a consequence, firetube boilers are typically small and are used primarily where boiler loads are relatively constant. Nearly all firetube boilers are sold as packaged units because of their relatively small size.

A cast iron boiler is one in which combustion gases rise through a vertical heat exchanger and out through an exhaust duct. Water in the heat exchanger tubes is heated as it moves upward through the tubes. Cast iron boilers produce low pressure steam or hot water, and generally burn oil or natural gas. They are used primarily in the residential and commercial sectors.

Another type of heat transfer configuration used on smaller boilers is the tubeless design. This design incorporates nested pressure vessels with water in between the shells. Combustion gases are fired into the inner pressure vessel and are then sometimes recirculated outside the second vessel.

1.3.3 Emissions[5]

Emissions from fuel oil combustion depend on the grade and composition of the fuel, the type and size of the boiler, the firing and loading practices used, and the level of equipment maintenance. Because the combustion characteristics of distillate and residual oils are different, their combustion can produce significantly different emissions. In general, the baseline emissions of criteria and noncriteria pollutants are those from uncontrolled combustion sources. Uncontrolled sources are those without add-on air pollution control (APC) equipment or other combustion modifications designed for emission control. Baseline emissions for sulfur dioxide (SO_2) and particulate matter (PM) can also be obtained from measurements taken upstream of APC equipment.

1.3.3.1 Particulate Matter Emissions[6-15] -

Particulate emissions may be categorized as either filterable or condensable. Filterable emissions are generally considered to be the particules that are trapped by the glass fiber filter in the front half of a Reference Method 5 or Method 17 sampling van. Vapors and particles less than 0.3 microns pass through the filter. Condensable particulate matter is material that is emitted in the vapor state which later condenses to form homogeneous and/or heterogeneous aerosol particles. The condensable particulate emitted from boilers fueled on coal or oil is primarily inorganic in nature.

Filterable particulate matter emissions depend predominantly on the grade of fuel fired. Combustion of lighter distillate oils results in significantly lower PM formation than does combustion of heavier residual oils. Among residual oils, firing of No. 4 or No. 5 oil usually produces less PM than does the firing of heavier No. 6 oil.

In general, filterable PM emissions depend on the completeness of combustion as well as on the oil ash content. The PM emitted by distillate oil-fired boilers primarily comprises carbonaceous particles resulting from incomplete combustion of oil and is not correlated to the ash or sulfur content of the oil. However, PM emissions from residual oil burning are related to the oil sulfur content. This is because low-sulfur No. 6 oil, either from naturally low-sulfur crude oil or desulfurized by one of several processes, exhibits substantially lower viscosity and reduced asphaltene, ash, and sulfur contents, which results in better atomization and more complete combustion.

Boiler load can also affect filterable particulate emissions in units firing No. 6 oil. At low load (50 percent of maximum rating) conditions, particulate emissions from utility boilers may be lowered by 30 to 40 percent and by as much as 60 percent from small industrial and commercial units. However, no significant particulate emission reductions have been noted at low loads from boilers firing any of the lighter grades. At very low load conditions (approximately 30 percent of maximum rating), proper combustion conditions may be difficult to maintain and particulate emissions may increase significantly.

1.3.3.2 Sulfur Oxides Emissions[1-2,6-9,16] -

Sulfur oxides (SO_x) emissions are generated during oil combustion from the oxidation of sulfur contained in the fuel. The emissions of SO_x from conventional combustion systems are predominantly in the form of SO_2. Uncontrolled SO_x emissions are almost entirely dependent on the sulfur content of the fuel and are not affected by boiler size, burner design, or grade of fuel being fired. On average, more than 95 percent of the fuel sulfur is converted to SO_2, about 1 to 5 percent is further oxidized to sulfur trioxide (SO_3), and 1 to 3 percent is emitted as sulfate particulate. SO_3 readily reacts with water vapor (both in the atmosphere and in flue gases) to form a sulfuric acid mist.

1.3.3.3 Nitrogen Oxides Emissions[1-2,6-10,15,17-27] -

Oxides of nitrogen (NO_x) formed in combustion processes are due either to thermal fixation of atmospheric nitrogen in the combustion air ("thermal NO_x"), or to the conversion of chemically bound nitrogen in the fuel ("fuel NO_x"). The term NO_x refers to the composite of nitric oxide (NO) and nitrogen dioxide (NO_2). Test data have shown that for most external fossil fuel combustion systems, over 95 percent of the emitted NO_x is in the form of nitric oxide (NO). Nitrous oxide (N_2O) is not included in NO_x but has recently received increased interest because of atmospheric effects.

Experimental measurements of thermal NO_x formation have shown that NO_x concentration is exponentially dependent on temperature, and proportional to N_2 concentration in the flame, the square root of O_2 concentration in the flame, and the residence time. Thus, the formation of thermal NO_x is affected by four factors: (1) peak temperature, (2) fuel nitrogen concentration, (3) oxygen concentration, and (4) time of exposure at peak temperature. The emission trends due to changes in these factors are generally consistent for all types of boilers: an increase in flame temperature, oxygen availability, and/or residence time at high temperatures leads to an increase in NO_x production.

Fuel nitrogen conversion is the more important NO_x-forming mechanism in residual oil boilers. It can account for 50 percent of the total NO_x emissions from residual oil firing. The percent conversion of fuel nitrogen to NO_x varies greatly, however; typically from 20 to 90 percent of nitrogen in oil is converted to NO_x. Except in certain large units having unusually high peak flame temperatures, or in units firing a low nitrogen content residual oil, fuel NO_x generally accounts for over 50 percent of the total NO_x generated. Thermal fixation, on the other hand, is the dominant NO_x-forming mechanism in units firing distillate oils, primarily because of the negligible nitrogen content in these lighter oils. Because distillate oil-fired boilers are usually smaller and have lower heat release rates, the quantity of thermal NO_x formed in them is less than that of larger units which typically burn residual oil.[28]

A number of variables influence how much NO_x is formed by these two mechanisms. One important variable is firing configuration. NO_x emissions from tangentially (corner) fired boilers are, on the average, less than those of horizontally opposed units. Also important are the firing practices employed during boiler operation. Low excess air (LEA) firing, flue gas recirculation (FGR), staged combustion (SC), reduced air preheat (RAP), low NO_x burners (LNBs), burning oil/water emulsions (OWE), or some combination thereof may result in NO_x reductions of 5 to 60 percent. Load reduction (LR) can likewise decrease NO_x production. Nitrogen oxide emissions may be reduced from 0.5 to 1 percent for each percentage reduction in load from full load operation. It should be noted that most of these variables, with the exception of excess air, only influence the NO_x emissions of large oil-fired boilers. Low excess air-firing is possible in many small boilers, but the resulting NO_x reductions are less significant.

1.3.3.4 Carbon Monoxide Emissions[29-32] -

The rate of carbon monoxide (CO) emissions from combustion sources depends on the oxidation efficiency of the fuel. By controlling the combustion process carefully, CO emissions can be minimized. Thus if a unit is operated improperly or not well maintained, the resulting concentrations of CO (as well as organic compounds) may increase by several orders of magnitude. Smaller boilers, heaters, and furnaces tend to emit more of these pollutants than larger combustors. This is because smaller units usually have a higher ratio of heat transfer surface area to flame volume than larger combustors have; this leads to reduced flame temperature and combustion intensity and, therefore, lower combustion efficiency.

The presence of CO in the exhaust gases of combustion systems results principally from incomplete fuel combustion. Several conditions can lead to incomplete combustion, including insufficient oxygen (O_2) availability; poor fuel/air mixing; cold-wall flame quenching; reduced combustion temperature; decreased combustion gas residence time; and load reduction (i. e., reduced combustion

intensity). Since various combustion modifications for NO_x reduction can produce one or more of the above conditions, the possibility of increased CO emissions is a concern for environmental, energy efficiency, and operational reasons.

1.3.3.5 Organic Compound Emissions[29-39] -

Small amounts of organic compounds are emitted from combustion. As with CO emissions, the rate at which organic compounds are emitted depends, to some extent, on the combustion efficiency of the boiler. Therefore, any combustion modification which reduces the combustion efficiency will most likely increase the concentrations of organic compounds in the flue gases.

Total organic compounds (TOCs) include VOCs, semi-volatile organic compounds, and condensable organic compounds. Emissions of VOCs are primarily characterized by the criteria pollutant class of unburned vapor phase hydrocarbons. Unburned hydrocarbon emissions can include essentially all vapor phase organic compounds emitted from a combustion source. These are primarily emissions of aliphatic, oxygenated, and low molecular weight aromatic compounds which exist in the vapor phase at flue gas temperatures. These emissions include all alkanes, alkenes, aldehydes, carboxylic acids, and substituted benzenes (e. g., benzene, toluene, xylene, and ethyl benzene).

The remaining organic emissions are composed largely of compounds emitted from combustion sources in a condensed phase. These compounds can almost exclusively be classed into a group known as polycyclic organic matter (POM), and a subset of compounds called polynuclear aromatic hydrocarbons (PAH or PNA). There are also PAH-nitrogen analogs. Information available in the literature on POM compounds generally pertains to these PAH groups.

Formaldehyde is formed and emitted during combustion of hydrocarbon-based fuels including coal and oil. Formaldehyde is present in the vapor phase of the flue gas. Formaldehyde is subject to oxidation and decomposition at the high temperatures encountered during combustion. Thus, larger units with efficient combustion (resulting from closely regulated air-fuel ratios, uniformly high combustion chamber temperatures, and relatively long gas retention times) have lower formaldehyde emission rates than do smaller, less efficient combustion units.

1.3.3.6 Trace Element Emissions[29-32,40-44] -

Trace elements are also emitted from the combustion of oil. For this update of AP-42, trace metals included in the list of 189 hazardous air pollutants under Title III of the 1990 Clean Air Act Amendments are considered. The quantity of trace elements entering the combustion device depends solely on the fuel composition. The quantity of trace metals emitted from the source depends on combustion temperature, fuel feed mechanism, and the composition of the fuel. The temperature determines the degree of volatilization of specific compounds contained in the fuel. The fuel feed mechanism affects the separation of emissions into bottom ash and fly ash. In general, the quantity of any given metal emitted depends on the physical and chemical properties of the element itself; concentration of the metal in the fuel; the combustion conditions; and the type of particulate control device used, and its collection efficiency as a function of particle size.

Some trace metals concentrate in certain waste particle streams from a combustor (bottom ash, collector ash, flue gas particulate), while others do not. Various classification schemes to describe this partitioning have been developed. The classification scheme used by Baig, et al.[44] is as follows:

- Class 1: Elements which are approximately equally distributed between fly ash and bottom ash, or show little or no small particle enrichment.

- Class 2: Elements which are enriched in fly ash relative to bottom ash, or show increasing enrichment with decreasing particle size.

- Class 3: Elements which are emitted in the gas phase.

By understanding trace metal partitioning and concentration in fine particulate, it is possible to postulate the effects of combustion controls on incremental trace metal emissions. For example, several NO_x controls for boilers reduce peak flame temperatures (e. g., SC, FGR, RAP, OWE, and LR). If combustion temperatures are reduced, fewer Class 2 metals will initially volatilize, and fewer will be available for subsequent condensation and enrichment on fine PM. Therefore, for combustors with particulate controls, lower volatile metal emissions should result due to improved particulate removal. Flue gas emissions of Class 1 metals (the non-segregating trace metals) should remain relatively unchanged.

Lower local O_2 concentrations is also expected to affect segregating metal emissions from boilers with particle controls. Lower O_2 availability decreases the possibility of volatile metal oxidation to less volatile oxides. Under these conditions, Class 2 metals should remain in the vapor phase as they enter the cooler sections of the boiler. More redistribution to small particles should occur and emissions should increase. Again, Class 1 metal emissions should remain unchanged.

1.3.3.7 Greenhouse Gases[45-50] -

Carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) emissions are all produced during fuel oil combustion. Nearly all of the fuel carbon (99 percent) in fuel oil is converted to CO_2 during the combustion process. This conversion is relatively independent of firing configuration. Although the formation of CO acts to reduce CO_2 emissions, the amount of CO produced is insignificant compared to the amount of CO_2 produced. The majority of the fuel carbon not converted to CO_2 is due to incomplete combustion in the fuel stream.

Formation of N_2O during the combustion process is governed by a complex series of reactions and its formation is dependent upon many factors. Formation of N_2O is minimized when combustion temperatures are kept high (above 1475°F) and excess air is kept to a minimum (less than 1 percent). Additional sampling and research is needed to fully characterize N_2O emissions and to understand the N_2O formation mechanism. Emissions can vary widely from unit to unit, or even from the same unit at different operating conditions. Average emission factors based on reported test data have been developed for conventional oil combustion systems.

Methane emissions vary with the type of fuel and firing configuration, but are highest during periods of incomplete combustion or low-temperature combustion, such as the start-up or shut-down cycle for oil-fired boilers. Typically, conditions that favor formation of N_2O also favor emissions of CH_4.

1.3.4 Controls

Control techniques for criteria pollutants from fuel oil combustion may be classified into three broad categories: fuel substitution/alteration, combustion modification, and postcombustion control. Emissions of noncriteria pollutants such as particulate phase metals have been controlled through the use of post combustion controls designed for criteria pollutants. Fuel substitution reduces SO_2 or NO_x and involves burning a fuel with a lower sulfur or nitrogen content, respectively. Particulate matter will generally be reduced when a lighter grade of fuel oil is burned.[6,8,11] Fuel alteration of heavy oils includes mixing water and heavy oil using emulsifying agents for better atomization and lower combustion temperatures. Under some conditions, emissions of NO_x, CO, and PM may be reduced significantly. Combustion modification includes any physical or operational change in the furnace or boiler and is applied

primarily for NO_x control purposes, although for small units, some reduction in PM emissions may be available through improved combustion practice. Postcombustion control is a device after the combustion of the fuel and is applied to control emissions of PM, SO_2, and NO_x.

1.3.4.1 Particulate Matter Controls[51] -

Control of PM emissions from residential and commercial units is accomplished by improving burner servicing and improving oil atomization and combustion aerodynamics. Optimization of combustion aerodynamics using a flame retention device, swirl, and/or recirculation is considered effective toward achieving the triple goals of low PM emissions, low NO_x emissions, and high thermal efficiency.

Large industrial and utility boilers are generally well-designed and well-maintained so that soot and condensable organic compound emissions are minimized. Particulate matter emissions are more a result of emitted fly ash with a carbon component in such units. Therefore, postcombustion controls (mechanical collectors, ESP, fabric filters, etc.) or fuel substitution/alteration may be used to reduce PM emissions from these sources.

Mechanical collectors, a prevalent type of control device, are primarily useful in controlling particulates generated during soot blowing, during upset conditions, or when a very dirty heavy oil is fired. For these situations, high-efficiency cyclonic collectors can achieve up to 85 percent control of particulate. Under normal firing conditions, or when a clean oil is combusted, cyclonic collectors are not nearly so effective because of the high percentage of small particles (less than 3 micrometers in diameter) emitted.

Electrostatic precipitators (ESPs) are commonly used in oil-fired power plants. Older precipitators, usually small, typically remove 40 to 60 percent of the emitted PM. Because of the low ash content of the oil, greater collection efficiency may not be required. Currently, new or rebuilt ESPs can achieve collection efficiencies of up to 90 percent.

In fabric filtration, a number of filtering elements (bags) along with a bag cleaning system are contained in a main shell structure incorporating dust hoppers. The particulate removal efficiency of the fabric filter system is dependent on a variety of particle and operational characteristics including particle size distribution, particle cohesion characteristics, and particle electrical resistivity. Operational parameters that affect collection efficiency include air-to-cloth ratio, operating pressure loss, cleaning sequence, interval between cleaning, and cleaning intensity. The structure of the fabric filter, filter composition, and bag properties also affect collection efficiency. Collection efficiencies of baghouses may be more than 99 percent.

Scrubbing systems have also been installed on oil-fired boilers to control both sulfur oxides and particulate. These systems can achieve SO_2 removal efficiencies of 90 to 95 percent and particulate control efficiencies of 50 to 60 percent.

Fuel alteration of heavy oil by mixing with water and an emulsifying agent has reduced PM emissions significantly in controlled tests.

1.3.4.2 SO_2 Controls[52-53] -

Commercialized postcombustion flue gas desulfurization (FGD) processes use an alkaline reagent to absorb SO_2 in the flue gas and produce a sodium or a calcium sulfate compound. These solid sulfate compounds are then removed in downstream equipment. Flue gas desulfurization technologies are categorized as wet, semi-dry, or dry depending on the state of the reagent as it leaves the absorber vessel. These processes are either regenerable (such that the reagent material can be treated and reused) or nonregenerable (in which case all waste streams are de-watered and discarded).

Wet regenerable FGD processes are attractive because they have the potential for better than 95 percent sulfur removal efficiency, have minimal waste water discharges, and produce a saleable sulfur product. Some of the current nonregenerable calcium-based processes can, however, produce a saleable gypsum product.

To date, wet systems are the most commonly applied. Wet systems generally use alkali slurries as the SO_x absorbent medium and can be designed to remove greater than 90 percent of the incoming SO_x. Lime/limestone scrubbers, sodium scrubbers, and dual alkali scrubbing are among the commercially proven wet FGD systems. Effectiveness of these devices depends not only on control device design but also on operating variables.

1.3.4.3 NO_x Controls[41,54-55] -

In boilers fired on crude oil or residual oil, the control of fuel NO_x is very important in achieving the desired degree of NO_x reduction since fuel NO_x typically accounts for 60 to 80 percent of the total NO_x formed. Fuel nitrogen conversion to NO_x is highly dependent on the fuel-to-air ratio in the combustion zone and, in contrast to thermal NO_x formation, is relatively insensitive to small changes in combustion zone temperature. In general, increased mixing of fuel and air increases nitrogen conversion which, in turn, increases fuel NO_x. Thus, to reduce fuel NO_x formation, the most common combustion modification technique is to suppress combustion air levels below the theoretical amount required for complete combustion. The lack of oxygen creates reducing conditions that, given sufficient time at high temperatures, cause volatile fuel nitrogen to convert to N_2 rather than NO.

Several techniques are used to reduce NO_x emissions from fuel oil combustion. Fuel substitution consists of burning lower nitrogen fuels. Fuel alteration includes burning emulsified heavy oil and water mixtures. In addition to these, the primary techniques can be classified into one of two fundamentally different methods — combustion controls and postcombustion controls. Combustion controls reduce NO_x by suppressing NO_x formation during the combustion process while postcombustion controls reduce NO_x emissions after their formation. Combustion controls are the most widely used method of controlling NO_x formation in all types of boilers and include low excess air, burners out of service, biased-burner firing, flue gas recirculation, overfire air, and low-NO_x burners. Postcombustion control methods include selective noncatalytic reduction (SNCR) and selective catalytic reduction (SCR). These controls can be used separately, or combined to achieve greater NO_x reduction.

Operating at low excess air involves reducing the amount of combustion air to the lowest possible level while maintaining efficient and environmentally compliant boiler operation. NO_x formation is inhibited because less oxygen is available in the combustion zone. Burners out of service involves withholding fuel flow to all or part of the top row of burners so that only air is allowed to pass through. This method simulates air staging, or overfire air conditions, and limits NO_x formation by lowering the oxygen level in the burner area. Biased-burner firing involves firing the lower rows of burners more fuel-rich than the upper row of burners. This method provides a form of air staging and limits NO_x formation by limiting the amount of oxygen in the firing zone. These methods may change the normal operation of the boiler and the effectiveness is boiler-specific. Implementation of these techniques may also reduce operational flexibility; however, they may reduce NO_x by 10 to 20 percent from uncontrolled levels.

Flue gas recirculation involves extracting a portion of the flue gas from the economizer section or air heater outlet and readmitting it to the furnace through the furnace hopper, the burner windbox, or both. This method reduces the concentration of oxygen in the combustion zone and may reduce NO_x by as much as 40 to 50 percent in some boilers.

Overfire air is a technique in which a percentage of the total combustion air is diverted from the burners and injected through ports above the top burner level. Overfire air limits NO_x by (1) suppressing thermal NO_x by partially delaying and extending the combustion process resulting in less intense combustion and cooler flame temperatures; (2) a reduced flame temperature that limits thermal NO_x formation, and/or (3) a reduced residence time at peak temperature which also limits thermal NO_x formation.

Low NO_x burners are applicable to tangential and wall-fired boilers of various sizes. They have been used as a retrofit NO_x control for existing boilers and can achieve approximately 35 to 55 percent reduction from uncontrolled levels. They are also used in new boilers to meet NSPS limits. Low NO_x burners can be combined with overfire air to achieve even greater NO_x reduction (40 to 60 percent reduction from uncontrolled levels).

SNCR is a postcombustion technique that involves injecting ammonia or urea into specific temperature zones in the upper furnace or convective pass. The ammonia or urea reacts with NO_x in the flue gas to produce nitrogen and water. The effectiveness of SNCR depends on the temperature where reagents are injected; mixing of the reagent in the flue gas; residence time of the reagent within the required temperature window; ratio of reagent to NO_x; and the sulfur content of the fuel that may create sulfur compound that deposit in downstream equipment. There is not as much commercial experience to base effectiveness on a wide range of boiler types; however, in limited applications, NO_x reductions of 25 to 40 percent have been achieved.

SCR is another postcombustion technique that involves injecting ammonia into the flue gas in the presence of a catalyst to reduce NO_x to nitrogen and water. The SCR reactor can be located at various positions in the process including before an air heater and particulate control device, or downstream of the air heater, particulate control device, and flue gas desulfurization systems. The performance of SCR is influenced by flue gas temperature, fuel sulfur content, ammonia to NO_x ratio, inlet NO_x concentration, space velocity, and catalyst condition. NO_x emission reductions of 75 to 85 percent have been achieved through the use of SCR on oil-fired boilers operating in the U.S.

Fuel alteration for NO_x reduction includes use of oil/water emulsion fuels. In controlled tests, a mixture of 9 percent water in No. 6 oil with a petroleum based emulsifying agent reduced NO_x emissions by 36 percent on a Btu basis or 41 percent on a volume basis, compared with the same fuel in unaltered form. The reduction appears to be due primarily to improved atomization with a corresponding reduction of excess combustion air, with lower flame temperature contributing slightly to the reduction.[84]

Tables 1.3-1 and 1.3-3 present emission factors for uncontrolled criteria pollutants from fuel oil combustion. Tables in this section present emission factors on a volume basis (lb/10^3gal). To convert to an energy basis (lb/MMBtu), divide by a heating value of 150 MMBtu/10^3gal for Nos. 4, 5, 6, and residual fuel oil, and 140 MMBtu/10^3gal for No. 2 and distillate fuel oil. Table 1.3-2 presents emission factors for condensible particulate matter. Tables 1.3-4, 1.3-5, 1.3-6, and 1.3-7 present cumulative size distribution data and size-specific emission factors for particulate emissions from uncontrolled and controlled fuel oil combustion. Figures 1.3-1, 1.3-2, 1.3-3, and 1.3-4 present size-specific emission factors for particulate emissions from uncontrolled and controlled fuel oil combustion. Emission factors for N_2O, POM, and formaldehyde are presented in Table 1.3-8. Emission factors for speciated organic compounds are presented in Table 1.3-9. Emission factors for trace elements in distillate oil are given in Table 1.3-10. Emission factors for trace metals residual oil are given in Table 1.3-11. Default emission factors for CO_2 are presented in Table 1.3-12. A summary of various SO_2 and NO_x controls for fuel-oil-fired boilers is presented in Table 1.3-13 and 1.3-14, respectively. Emission factors for CO, NO_x, and PM from burning No. 6 oil/water emulsion fuel are presented in Table 1.3-15.

1.3.5 Updates Since the Fifth Edition

The Fifth Edition was released in January 1995. Revisions to this section since that date are summarized below. For further detail, consult the memoranda describing each supplement or the background report for this section. These and other documents can be found on the EFIG home page (http://www.epa.gov/oar/oaqps/efig/).

Supplement A, February 1996

- The formulas presented in the footnotes for filterable PM were moved into the table.
- For SO_2 and SO_3 emission factors, text was added to the table footnotes to clarify that "S" is a weight percent and not a fraction. A similar clarification was made to the CO and NO_x footnotes. SCC A2104004/A2104011 was provided for residential furnaces.
- For industrial boilers firing No. 6 and No. 5 oil, the methane emission factor was changed from 1 to 1.0 to show two significant figures.
- For SO_2 and SO_3 factors, text was added to the table footnotes to clarify that "S" is a weight percent and not a fraction.
- The N_2O, POM, and formaldehyde factors were corrected.
- Table 1.3-10 was incorrectly labeled 1.1-10. This was corrected.

Supplement B, October 1996

- Text was added concerning firing practices.
- Factors for N_2O, POM, and formaldehyde were added.
- New data for filterable PM were used to create a new PM factor for residential oil-fired furnaces.
- Many new factors were added for toxic organics, toxic metals from distillate oil, and toxic metals from residual oil.
- A table was added for new CO_2 emission factors.

Supplement E, September 1998

- Table 1.3-1, the sub-heading for "Industrial Boilers" was added to the first column.
- Table 1.3-3, the emission factor for uncontrolled PM less than 0.625 micron was corrected to 1.7A, the emission factor for scrubber controlled PM less than 10 micron was corrected to 0.50A, and the relationships for each content in various fuel oils was corrected in footnote C.
- Table 1.3-4 and 1.3-6, the relationship for ash content in various fuel oils was corrected in the footnote C of each table.

- Table 1.3-9, the emission factors for trace metals in distillate oil were updated with newer data where available.
- 1.3-10, the title of the table was changed to clarify these factors apply to uncontrolled fuel oil boilers.
- Text and emission factors were added pertaining to No. 6 oil/water emulsion fuel.
- Table 1.3-1 was revised to include new NO_x emission factors.
- Emission factors for condensable particulate matter were added (Table 1.3-2).

Table 1.3-1. CRITERIA POLLUTANT EMISSION FACTORS FOR FUEL OIL COMBUSTION[a]

Firing Configuration (SCC)[a]	SO_2[b]		SO_3[c]		NO_x[d]		CO[e]		Filterable PM[f]	
	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING
Boilers > 100 Million Btu/hr										
No. 6 oil fired, normal firing (1-01-004-01), (1-02-004-01), (1-03-004-01)	157S	A	5.7S	C	47	A	5	A	9.19(S)+3.22	A
No. 6 oil fired, normal firing, low NO_x burner (1-01-004-01), (1-02-004-01)	157S	A	5.7S	C	40	B	5	A	9.19(S)+3.22	A
No. 6 oil fired, tangential firing, (1-01-004-04)	157S	A	5.7S	C	32	A	5	A	9.19(S)+3.22	A
No. 6 oil fired, tangential firing, low NO_x burner (1-01-004-04)	157S	A	5.7S	C	26	E	5	A	9.19(S)+3.22	A
No. 5 oil fired, normal firing (1-01-004-05), (1-02-004-04)	157S	A	5.7S	C	47	B	5	A	10	B
No. 5 oil fired, tangential firing (1-01-004-06)	157S	A	5.7S	C	32	B	5	A	10	B
No. 4 oil fired, normal firing (1-01-005-04), (1-02-005-04)	150S	A	5.7S	C	47	B	5	A	7	B
No. 4 oil fired, tangential firing (1-01-005-05)	150S	A	5.7S	C	32	B	5	A	7	B
No. 2 oil fired (1-01-005-01), (1-02-005-01), (1-03-005-01)	157S	A	5.7S	C	24	D	5	A	2	A
No.2 oil fired, LNB/FGR, (1-01-005-01), (1-02-005-01), (1-03-005-01)	157S	A	5.7S	A	10	D	5	A	2	A

Table 1.3-1. (cont.)

Firing Configuration (SCC)[a]	SO_2[b]		SO_3[c]		NO_x[d]		CO[e]		Filterable PM[f]	
	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING
Boilers < 100 Million Btu/hr										
No. 6 oil fired (1-02-004-02/03) (1-03-004-02/03)	157S	A	2S	A	55	A	5	A	10	B
No. 5 oil fired (1-03-004-04)	157S	A	2S	A	55	A	5	A	9.19(S)+3.22	A
No. 4 oil fired (1-03-005-04)	150S	A	2S	A	20	A	5	A	7	B
Distillate oil fired (1-02-005-02/03) (1-03-005-02/03)	142S	A	2S	A	20	A	5	A	2	A
Residential furnace (A2104004/A2104011)	142S	A	2S	A	18	A	5	A	0.4[g]	B

[a] To convert from $lb/10^3$ gal to $kg/10^3$ L, multiply by 0.120. SCC = Source Classification Code.

[b] References 1-2,6-9,14,56-60. S indicates that the weight % of sulfur in the oil should be multiplied by the value given. For example, if the fuel is 1% sulfur, then S = 1.

[c] References 1-2,6-8,16,57-60. S indicates that the weight % of sulfur in the oil should be multiplied by the value given. For example, if the fuel is 1% sulfur, then S = 1.

[d] References 6-7,15,19,22,56-62. Expressed as NO_2. Test results indicate that at least 95% by weight of NO_x is NO for all boiler types except residential furnaces, where about 75% is NO. For utility vertical fired boilers use 105 $lb/10^3$ gal at full load and normal (>15%) excess air. Nitrogen oxides emissions from residual oil combustion in industrial and commercial boilers are related to fuel nitrogen content, estimated by the following empirical relationship: lb $NO_2/10^3$ gal = 20.54 + 104.39(N), where N is the weight % of nitrogen in the oil. For example, if the fuel is 1% nitrogen, then N = 1.

[e] References 6-8,14,17-19,56-61. CO emissions may increase by factors of 10 to 100 if the unit is improperly operated or not well maintained.

[f] References 6-8,10,13-15,56-60,62-63. Filterable PM is that particulate collected on or prior to the filter of an EPA Method 5 (or equivalent) sampling train. Particulate emission factors for residual oil combustion are, on average, a function of fuel oil sulfur content where S is the weight % of sulfur in oil. For example, if fuel oil is 1% sulfur, then S = 1.

[g] Based on data from new burner designs. Pre-1970's burner designs may emit filterable PM as high as 3.0 $lb/10^3$ gal.

Table 1.3-2. CONDENSABLE PARTICULATE MATTER EMISSION FACTORS FOR OIL COMBUSTION[a]

Firing Configuration[b] (SCC)	Controls	CPM - TOT[c, d]		CPM - IOR[c, d]		CPM - ORG[c, d]	
		Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING
No. 2 oil fired (1-01-005-01, 1-02-005-01, 1-03-005-01)	All controls, or uncontrolled	1.3[d, e]	D	65% of CPM-TOT emission factor[c]	D	35% of CPM-TOT emission factor[c]	D
No. 6 oil fired (1-01-004-01/04, 1-02-004-01, 1-03-004-01)	All controls, or uncontrolled	1.5[f]	D	85% of CPM-TOT emission factor[d]	E	15% of CPM-TOT emission factor[d]	E

[a] All condensable PM is assumed to be less than 1.0 micron in diameter.
[b] No data are available for numbers 3, 4, and 5 oil. For number 3 oil, use the factors provided for number 2 oil. For numbers 4 and 5 oil, use the factors provided for number 6 oil.
[c] CPM-TOT = total condensable particulate matter.
CPM-IOR = inorganic condensable particulate matter.
CPM-ORG = organic condensable particulate matter.
[d] To convert to lb/MMBtu of No. 2 oil, divide by 140 MMBtu/10^3 gal. To convert to lb/MMBtu of No. 6 oil, divide by 150 MMBtu/10^3 gal.
[e] References: 76-78.
[f] References: 79-82.

Table 1.3-3. EMISSION FACTORS FOR TOTAL ORGANIC COMPOUNDS (TOC), METHANE, AND NONMETHANE TOC (NMTOC) FROM UNCONTROLLED FUEL OIL COMBUSTION[a]

EMISSION FACTOR RATING: A

Firing Configuration (SCC)	TOC[b] Emission Factor ($lb/10^3$ gal)	Methane[b] Emission Factor ($lb/10^3$ gal)	NMTOC[b] Emission Factor ($lb/10^3$ gal)
Utility boilers			
No. 6 oil fired, normal firing (1-01-004-01)	1.04	0.28	0.76
No. 6 oil fired, tangential firing (1-01-004-04)	1.04	0.28	0.76
No. 5 oil fired, normal firing (1-01-004-05)	1.04	0.28	0.76
No. 5 oil fired, tangential firing (1-01-004-06)	1.04	0.28	0.76
No. 4 oil fired, normal firing (1-01-005-04)	1.04	0.28	0.76
No. 4 oil fired, tangential firing (1-01-005-05)	1.04	0.28	0.76
Industrial boilers			
No. 6 oil fired (1-02-004-01/02/03)	1.28	1.00	0.28
No. 5 oil fired (1-02-004-04)	1.28	1.00	0.28
Distillate oil fired (1-02-005-01/02/03)	0.252	0.052	0.2
No. 4 oil fired (1-02-005-04)	0.252	0.052	0.2
Commercial/institutional/residential combustors			
No. 6 oil fired (1-03-004-01/02/03)	1.605	0.475	1.13
No. 5 oil fired (1-03-004-04)	1.605	0.475	1.13
Distillate oil fired (1-03-005-01/02/03)	0.556	0.216	0.34
No. 4 oil fired (1-03-005-04)	0.556	0.216	0.34
Residential furnace (A2104004/A2104011)	2.493	1.78	0.713

[a] To convert from $lb/10^3$ gal to $kg/10^3$ L, multiply by 0.12. SCC = Source Classification Code.

[b] References 29-32. Volatile organic compound emissions can increase by several orders of magnitude if the boiler is improperly operated or is not well maintained.

Table 1.3-4. CUMULATIVE PARTICLE SIZE DISTRIBUTION AND SIZE-SPECIFIC EMISSION FACTORS FOR UTILITY BOILERS FIRING RESIDUAL OIL[a]

Particle Size[b] (μm)	Cumulative Mass % ≤ Stated Size			Cumulative Emission Factor lb/10^3 gal)					
		Controlled		Uncontrolled[c]		ESP Controlled[d]		Scrubber Controlled[e]	
	Uncon-trolled	ESP	Scrubber	Emission Factor	EMISSION FACTOR RATING	Emission Factor	EMISSION FACTOR RATING	Emission Factor	EMISSION FACTOR RATING
15	80	75	100	6.7A	C	0.05A	E	0.50A	D
10	71	63	100	5.9A	C	0.042A	E	0.50A	D
6	58	52	100	4.8A	C	0.035A	E	0.50A	D
2.5	52	41	97	4.3A	C	0.028A	E	0.48A	D
1.25	43	31	91	3.6A	C	0.021A	E	0.46A	D
1.00	39	28	84	3.3A	C	0.018A	E	0.42A	D
0.625	20	20	64	1.7A	C	0.007A	E	0.32A	D
TOTAL	100	100	100	8.3A	C	0.067A	E	0.50A	D

[a] Reference 26. Source Classification Codes 1-01-004-01/04/05/06 and 1-01-005-04/05. To convert from lb/10 gal to kg/m^3, multiply by 0.120. ESP = electrostatic precipitator.

[b] Expressed as aerodynamic equivalent diameter.

[c] Particulate emission factors for residual oil combustion without emission controls are, on average, a function of fuel oil grade and sulfur content where S is the weight % of sulfur in the oil. For example, if the fuel is 1.00% sulfur, then S = 1.
No. 6 oil: A = 1.12(S) + 0.37
No. 5 oil: A = 1.2
No. 4 oil: A = 0.84

[d] Estimated control efficiency for ESP is 99.2%.

[e] Estimated control efficiency for scrubber is 94%

Table 1.3-5. CUMULATIVE PARTICLE SIZE DISTRIBUTION AND SIZE-SPECIFIC EMISSION FACTORS FOR INDUSTRIAL BOILERS FIRING RESIDUAL OIL[a]

Particle Size[b] (μm)	Cumulative Mass % ≤ Stated Size		Cumulative Emission Factof (lb/10^3 gal)			
			Uncontrolled		Multiple Cyclone Controlled[d]	
	Uncontrolled	Multiple Cyclone Controlled	Emission Factor	EMISSION FACTOR RATING	Emission Factor	EMISSION FACTOR RATING
15	91	100	7.59A	D	1.67A	E
10	86	95	7.17A	D	1.58A	E
6	77	72	6.42A	D	1.17A	E
2.5	56	22	4.67A	D	0.33A	E
1.25	39	21	3.25A	D	0.33A	E
1.00	36	21	3.00A	D	0.33A	E
0.625	30	—[e]	2.50A	D	—[e]	NA
TOTAL	100	100	8.34A	D	1.67A	E

[a] Reference 26. Source Classification Codes 1-02-004-01/02/03/04 and 1-02-005-04. To convert lb/10^3 gal to kg/10^3 L, multiply by 0.120. NA = not applicable.

[b] Expressed as aerodynamic equivalent diameter.

[c] Particulate emission factors for residual oil combustion without emission controls are, on average, a function of fuel oil grade and sulfur content where S is the weight % of sulfur in the oil. For example, if the fuel is 1.0% sulfur, then S = 1.
No. 6 oil: A = 1.12(S) + 0.37
No. 5 oil: A = 1.2
No. 4 oil: A = 0.84

[d] Estimated control efficiency for multiple cyclone is 80%.

[e] Insufficient data.

Table 1.3-6. CUMULATIVE PARTICLE SIZE DISTRIBUTION AND SIZE-SPECIFIC EMISSION FACTORS FOR UNCONTROLLED INDUSTRIAL BOILERS FIRING DISTILLATE OIL[a]

EMISSION FACTOR RATING: E

Particle Size[b] (μm)	Cumulative Mass % ≤ Stated Size	Cumulative Emission Factor ($lb/10^3$ gal)
15	68	1.33
10	50	1.00
6	30	0.58
2.5	12	0.25
1.25	9	0.17
1.00	8	0.17
0.625	2	0.04
TOTAL	100	2.00

[a] Reference 26. Source Classification Codes 1-02-005-01/02/03. To convert from $lb/10^3$ gal to $kg/10^3$ L, multiply by 0.12.
[b] Expressed as aerodynamic equivalent diameter.

Table 1.3-7. CUMULATIVE PARTICLE SIZE DISTRIBUTION AND SIZE-SPECIFIC EMISSION FACTORS UNCONTROLLED COMMERCIAL BOILERS BURNING RESIDUAL OR DISTILLATE OIL[a]

EMISSION FACTOR RATING: D

Particle Size[b] (μm)	Cumulative Mass % ≤ Stated Size		Cumulative Emission Factor[c] ($lb/10^3$ gal)	
	Residual Oil	Distillate Oil	Residual Oil	Distillate Oil
15	78	60	6.50A	1.17
10	62	55	5.17A	1.08
6	44	49	3.67A	1.00
2.5	23	42	1.92A	0.83
1.25	16	38	1.33A	0.75
1.00	14	37	1.17A	0.75
0.625	13	35	1.08A	0.67
TOTAL	100	100	8.34A	2.00

[a] Reference 26. Source Classification Codes: 1-03-004-01/02/03/04 and 1-03-005-01/02/03/04. To convert from $lb/10^3$ gal to $kg/10^3$ L, multiply by 0.12.
[b] Expressed as aerodynamic equivalent diameter.
[c] Particulate emission factors for residual oil combustion without emission controls are, on average, a function of fuel oil grade and sulfur content where S is the weight % of sulfur in the fuel. For example, if the fuel is 1.0% sulfur, then S = 1.
No. 6 oil: $A = 1.12(S) + 0.37$
No. 5 oil: $A = 1.2$
No. 4 oil: $A = 0.84$
No. 2 oil: $A = 0.24$

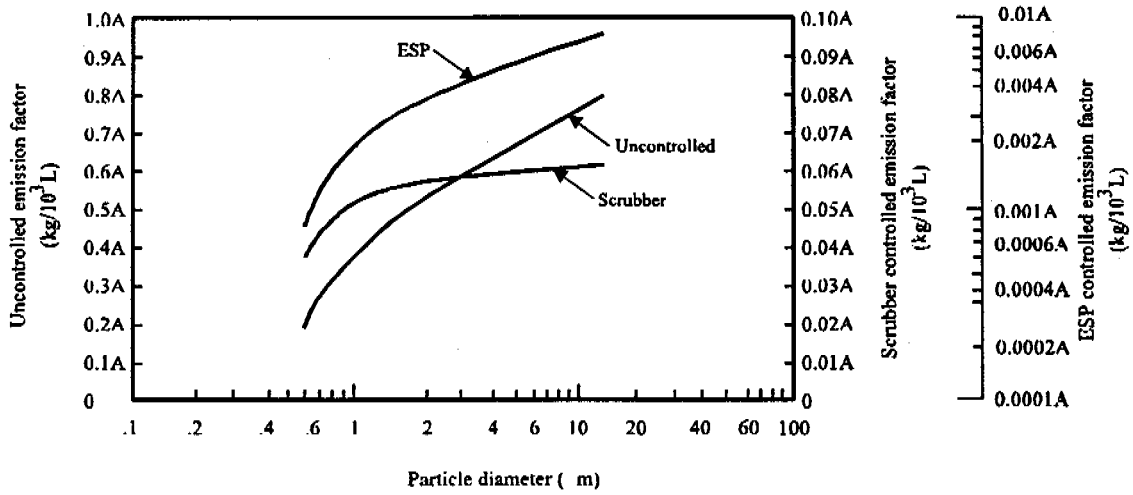

Figure 1.3-1. Cumulative size-specific emission factors for utility boilers firing residual oil.

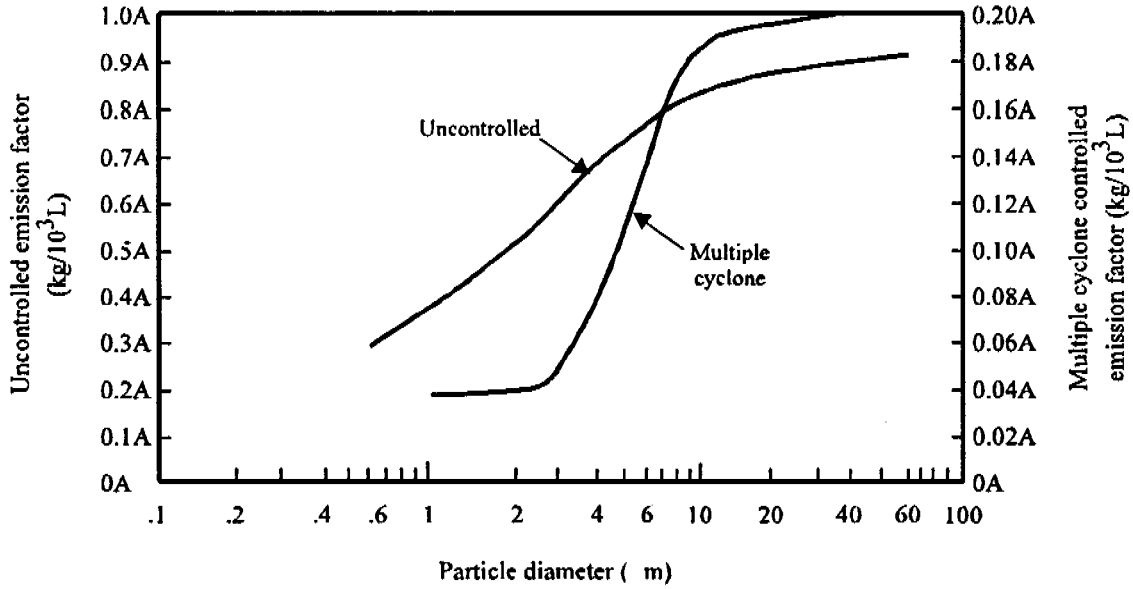

Figure 1.3-2. Cumulative size-specific emission factors for industrial boilers firing residual oil.

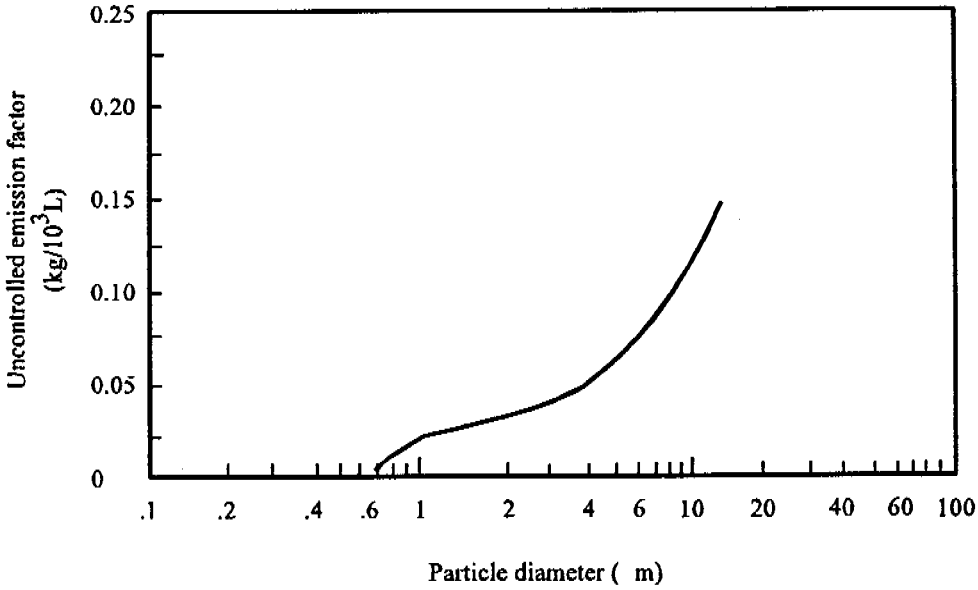

Figure 1.3-3. Cumulative size-specific emission factors for uncontrolled industrial boilers firing distillate oil.

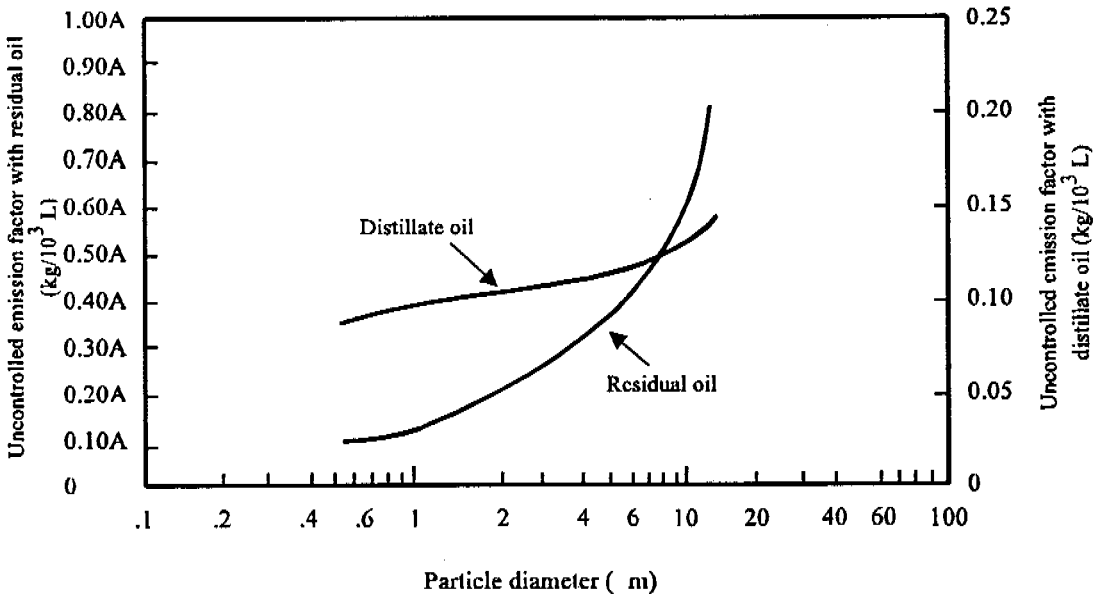

Figure 1.3-4. Cumulative size-specific emission factors for uncontrolled commercial boilers burning residual and distillate oil.

Table 1.3-8. EMISSION FACTORS FOR NITROUS OXIDE (N_2O), POLYCYCLIC ORGANIC MATTER (POM), AND FORMALDEHYDE (HCOH) FROM FUEL OIL COMBUSTION[a]

EMISSION FACTOR RATING: E

Firing Configuration (SCC)	Emission Factor (lb/10^3 gal)		
	N_2O[b]	POM[c]	HCOH[c]
Utility/industrial/commercial boilers			
No. 6 oil fired (1-01-004-01, 1-02-004-01, 1-03-004-01)	0.11	0.0011 - 0.0013[d]	0.024 - 0.061
Distillate oil fired (1-01-005-01, 1-02-005-01, 1-03-005-01)	0.11	0.0033[e]	0.035 - 0.061
Residential furnaces (A2104004/A2104011)	0.05	ND	ND

[a] To convert from lb/10^3 gal to kg/10^3 L, multiply by 0.12. SCC = Source Classification Code. ND = no data.
[b] References 45-46. EMISSION FACTOR RATING = B.
[c] References 29-32.
[d] Particulate and gaseous POM.
[e] Particulate POM only.

Table 1.3-9. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM FUEL OIL COMBUSTION[a]

Organic Compound	Average Emission Factor[b] ($lb/10^3$ Gal)	EMISSION FACTOR RATING
Benzene	2.14E-04	C
Ethylbenzene	6.36E-05[c]	E
Formaldehyde[d]	3.30E-02	C
Naphthalene	1.13E-03	C
1,1,1-Trichloroethane	2.36E-04[c]	E
Toluene	6.20E-03	D
o-Xylene	1.09E-04[c]	E
Acenaphthene	2.11E-05	C
Acenaphthylene	2.53E-07	D
Anthracene	1.22E-06	C
Benz(a)anthracene	4.01E-06	C
Benzo(b,k)fluoranthene	1.48E-06	C
Benzo(g,h,i)perylene	2.26E-06	C
Chrysene	2.38E-06	C
Dibenzo(a,h) anthracene	1.67E-06	D
Fluoranthene	4.84E-06	C
Fluorene	4.47E-06	C
Indo(1,2,3-cd)pyrene	2.14E-06	C
Phenanthrene	1.05E-05	C
Pyrene	4.25E-06	C
OCDD	3.10E-09[c]	E

[a] Data are for residual oil fired boilers, Source Classification Codes (SCCs) 1-01-004-01/04.
[b] References 64-72. To convert from $lb/10^3$ gal to $kg/10^3$ L, multiply by 0.12.
[c] Based on data from one source test (Reference 67).
[d] The formaldehyde number presented here is based only on data from utilities using No. 6 oil. The number presented in Table 1.3-7 is based on utility, commercial, and industrial boilers.

Table 1.3-10. EMISSION FACTORS FOR TRACE ELEMENTS FROM DISTILLATE FUEL OIL COMBUSTION SOURCES[a]

EMISSION FACTOR RATING: E

Firing Configuration (SCC)	Emission Factor ($lb/10^{12}$ Btu)										
	As	Be	Cd	Cr	Cu	Pb	Hg	Mn	Ni	Se	Zn
Distillate oil fired (1-01-005-01, 1-02-005-01, 1-03-005-01)	4	3	3	3	6	9	3	6	3	15	4

[a] Data are for distillate oil fired boilers, SCC codes 1-01-005-01, 1-02-005-01, and 1-03-005-01. References 29-32, 40-44 and 83. To convert from $lb/10^{12}$ Btu to pg/J, multiply by 0.43.

Table 1.3-11. EMISSION FACTORS FOR METALS FROM UNCONTROLLED NO. 6 FUEL OIL COMBUSTION[a]

Metal	Average Emission Factor[b, d] ($lb/10^3$ Gal)	EMISSION FACTOR RATING
Antimony	5.25E-03[c]	E
Arsenic	1.32E-03	C
Barium	2.57E-03	D
Beryllium	2.78E-05	C
Cadmium	3.98E-04	C
Chloride	3.47E-01	D
Chromium	8.45E-04	C
Chromium VI	2.48E-04	C
Cobalt	6.02E-03	D
Copper	1.76E-03	C
Fluoride	3.73E-02	D
Lead	1.51E-03	C
Manganese	3.00E-03	C
Mercury	1.13E-04	C
Molybdenum	7.87E-04	D
Nickel	8.45E-02	C
Phosphorous	9.46E-03	D
Selenium	6.83E-04	C
Vanadium	3.18E-02	D
Zinc	2.91E-02	D

[a] Data are for residual oil fired boilers, Source Classification Codes (SCCs) 1-01-004-01/04.

[b] References 64-72. 18 of 19 sources were uncontrolled and 1 source was controlled with low efficiency ESP. To convert from $lb/10^3$ gal to $kg/10^3$ L, multiply by 0.12.

[c] References 29-32,40-44.

[d] For oil/water mixture, reduce factors in proportion to water content of the fuel (due to dilution). To adjust the listed values for water content, multiply the listed value by 1-decimal fraction of water (ex: For fuel with 9 percent water by volume, multiply by 1-0.9=.91).

Table 1.3-12. DEFAULT CO_2 EMISSION FACTORS FOR LIQUID FUELS[a]

EMISSION FACTOR RATING: B

Fuel Type	%C[b]	Density[c] (lb/gal)	Emission Factor (lb/10^3 gal)
No. 1 (kerosene)	86.25	6.88	21,500
No. 2	87.25	7.05	22,300
Low Sulfur No. 6	87.26	7.88	25,000
High Sulfur No. 6	85.14	7.88	24,400

[a] Based on 99% conversion of fuel carbon content to CO_2. To convert from lb/gal to gram/cm^3, multiply by 0.12. To convert from lb/10^3 gal to kg/m^3, multiply by 0.12.

[b] Based on an average of fuel carbon contents given in references 73-74.

[c] References 73, 75.

Table 1.3-13. POSTCOMBUSTION SO_2 CONTROLS FOR FUEL OIL COMBUSTION SOURCES

Control Technology	Process	Typical Control Efficiencies	Remarks
Wet scrubber	Lime/limestone	80-95+%	Applicable to high-sulfur fuels, Wet sludge product
	Sodium carbonate	80-98%	5-430 MMBtu/hr typical application range, High reagent costs
	Magnesium oxide/hydroxide	80-95+%	Can be regenerated
	Dual alkali	90-96%	Uses lime to regenerate sodium-based scrubbing liquor
Spray drying	Calcium hydroxide slurry, vaporizes in spray vessel	70-90%	Applicable to low-and medium-sulfur fuels, Produces dry product
Furnace injection	Dry calcium carbonate/hydrate injection in upper furnace cavity	25-50%	Commercialized in Europe, Several U.S. demonstration projects underway
Duct injection	Dry sorbent injection into duct, sometimes combined with water spray	25-50+%	Several R&D and demonstration projects underway, Not yet Commercially available in the U.S.

Table 1.3-14. NO_x CONTROL OPTIONS FOR OIL-FIRED BOILERS[a]

Control Technique	Description Of Technique	NO_x Reduction Potential (%)		Range Of Application	Commercial Availability/ R&D Status	Comments
		Residual Oil	Distillate Oil			
Low Excess Air (LEA)	Reduction of combustion air	0 to 28	0 to 24	Generally excess O_2 can be reduced to 2.5% representing a 3% drop from baseline	Available for boilers with sufficient operational flexibility.	Added benefits included increase in boiler efficiency. Limited by increase in CO, HC, and smoke emissions.
Staged Combustion (SC)	Fuel-rich firing burners with secondary combustion air ports	20 to 50	17 to 44	70-90% burner stoichiometries can be used with proper installation of secondary air ports	Technique is applicable on packaged and field-erected units. However, not commercially available for all design types.	Best implemented on new units. Retrofit is probably not feasible for most units, especially packaged ones.
Burners Out of Service (BOOS)	One or more burners on air only. Remainder of burners firing fuel-rich	10 to 30	ND	Most effective on boilers with 4 or more burners in a square pattern.	Available.	Requires careful selection of BOOS pattern and control of air flow. May result in boiler de-rating unless fuel delivery system is modified.
Flue Gas Recirculation (FGR)	Recirculation of portion of flue gas to burners	15 to 30	58 to 73	Up to 25-30% of flue gas recycled. Can be implemented on most design types.	Available. Best suited for new units.	Requires extensive modifications to the burner and windbox. Possible flame instability at high FGR rates.
Flue Gas Recirculation Plus Staged Combustion	Combined techniques of FGR and staged combustion	25 to 53	73 to 77	Maximum FGR rates set at 25% for distillate oil and 20% for residual oil.	Available for boilers with sufficient operational flexibility.	May not be feasible on all existing boiler types. Best implemented on new units.

Table 1.3-14 (cont.).

Control Technique	Description Of Technique	NO_x Reduction Potential (%)		Range Of Application	Commercial Availability/ R&D Status	Comments
		Residual Oil	Distillate Oil			
Load Reduction (LR)	Reduction of air and fuel flow to all burners in service	33% decrease to 25% increase in No_x	31% decrease to 17% increase in NO_x	Applicable to all boiler types and sizes. Load can be reduced to 25% of maximum.	Available in retrofit applications.	Technique not effective when it necessitates an increase in excess O_2 levels. LR possibly implemented in new designs as reduced combustion intensity (i. e., enlarged furnace plan area).
Low NO_x Burners (LNB)	New burner designs with controlled air/fuel mixing and increased heat dissipation	20 to 50	20 to 50	New burners described generally applicable to all boilers.	Commercially available.	Specific emissions data from industrial boilers equipped with LNB are lacking.
Reduced Air Preheat (RAP)	Bypass of combustion air preheater	5 to 16	ND	Combustion air temperature can be reduced to ambient conditions.	Available.	Application of this technique on new boilers requires installation of alternate heat recovery system (e. g., an economizer).
Selective Noncatalytic Reduction (SNCR)	Injection of NH_3 or urea as a reducing agent in the flue gas	40 to 70	40 to 70	Applicable for large packaged and field-erected watertube boilers. May not be feasible for fire-tube boilers.	Commercially offered but not widely demonstrated on large boilers.	Elaborate reagent injection, monitoring, and control system required. Possible load restrictions on boilers and air preheater fouling when burning high sulfur oil. Must have sufficient residence time at correct temperature.
Conventional Selective Catalytic Reduction (SCR)	Injections of NH_3 in the presence of a catalyst (usually upstream of air heater).	Up to 90% (estimated)	Up to 90% (estimated)	Typically large boiler designs	Commercially offered but not widely demonstrated.	Applicable to most boiler designs as a retrofit technology or for new boilers.

Table 1.3-14 (cont.).

Control Technique	Description Of Technique	NO_x Reduction Potential (%)		Range Of Application	Commercial Availability/ R&D Status	Comments
		Residual Oil	Distillate Oil			
Air Heater (SCR)	Catalyst-coated baskets in the air heater.	40-65 (estimated)	40-65 (estimated)	Boilers with rotating-basket air heaters	Available but not widely demonstrated	Design must address pressure drop and maintain heat transfer.
Duct SCR	A smaller version of conventional SCR is placed in existing ductwork	30 (estimated)	30 (estimated)	Typically large boiler designs	Available but not widely demonstrated.	Location of SCR in duct is temperature dependent.
Activated Carbon SCR	Activated carbon catalyst, installed downstream of air heater.	ND	ND	Typically large boiler designs	Available but not widely demonstrated.	High pressure drop.
Oil/Water Emulsified Fuel[a,b]	Oil/water fuel with emulsifying agent	41	ND	Firetube boilers	Available but not widely demonstrated	Thermal efficiency reduced due to water content

[a] ND = no data.

[b] Test conducted by EPA using commercially premixed fuel and water (9 percent water) containing a petroleum based emulsifying agent. Test boiler was a 2400 lb/hr, 15 psig Scotch Marine firetube type, fired at 2×10^6 Btu/hr.

Table 1.3-15. EMISSION FACTORS FOR NO. 6 OIL/WATER EMULSION IN INDUSTRIAL/COMMERCIAL/INSTITUTIONAL BOILERS[a]

Pollutant	Emission Factor ($lb/10^3$ gal)	Factor Rating	Comments
CO	1.90	C	33% Reduction from plain oil
NO_x	38.0	C	41% Reduction
PM	14.9	C	45% Reduction

[a] Test conducted by EPA using commercially premixed fuel and water (9 percent water) containing a petroleum based emulsifying agent. Test boiler was a 2400 lb/hr, 15 psig Scotch Marine firetube type, fired at 2×10^6 Btu/hr.

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Errata to section 1.3, Fuel Oil Combustion, 9/98 version.

1. In table 1.3-1, for boilers > 100 million BTU/hr, the SO2 emission factor for fired and for no. 2 oil fired with LNB/FGR, is 142S, not 157S.

2. Also in table 1.3-1, for boilers < 100 million BTU/hr, the filterable PM emiss no. 6 oil fired is 9.19(S)+3.22, not 10. The factor for no. 5 oil fired is 10, n These two factors were reversed.

1.4 Natural Gas Combustion

1.4.1 General[1-2]

Natural gas is one of the major combustion fuels used throughout the country. It is mainly used to generate industrial and utility electric power, produce industrial process steam and heat, and heat residential and commercial space. Natural gas consists of a high percentage of methane (generally above 85 percent) and varying amounts of ethane, propane, butane, and inerts (typically nitrogen, carbon dioxide, and helium). The average gross heating value of natural gas is approximately 1,020 British thermal units per standard cubic foot (Btu/scf), usually varying from 950 to 1,050 Btu/scf.

1.4.2 Firing Practices[3-5]

There are three major types of boilers used for natural gas combustion in commercial, industrial, and utility applications: watertube, firetube, and cast iron. Watertube boilers are designed to pass water through the inside of heat transfer tubes while the outside of the tubes is heated by direct contact with the hot combustion gases and through radiant heat transfer. The watertube design is the most common in utility and large industrial boilers. Watertube boilers are used for a variety of applications, ranging from providing large amounts of process steam, to providing hot water or steam for space heating, to generating high-temperature, high-pressure steam for producing electricity. Furthermore, watertube boilers can be distinguished either as field erected units or packaged units.

Field erected boilers are boilers that are constructed on site and comprise the larger sized watertube boilers. Generally, boilers with heat input levels greater than 100 MMBtu/hr, are field erected. Field erected units usually have multiple burners and, given the customized nature of their construction, also have greater operational flexibility and NO_x control options. Field erected units can also be further categorized as wall-fired or tangential-fired. Wall-fired units are characterized by multiple individual burners located on a single wall or on opposing walls of the furnace while tangential units have several rows of air and fuel nozzles located in each of the four corners of the boiler.

Package units are constructed off-site and shipped to the location where they are needed. While the heat input levels of packaged units may range up to 250 MMBtu/hr, the physical size of these units are constrained by shipping considerations and generally have heat input levels less than 100 MMBtu/hr. Packaged units are always wall-fired units with one or more individual burners. Given the size limitations imposed on packaged boilers, they have limited operational flexibility and cannot feasibly incorporate some NO_x control options.

Firetube boilers are designed such that the hot combustion gases flow through tubes, which heat the water circulating outside of the tubes. These boilers are used primarily for space heating systems, industrial process steam, and portable power boilers. Firetube boilers are almost exclusively packaged units. The two major types of firetube units are Scotch Marine boilers and the older firebox boilers. In cast iron boilers, as in firetube boilers, the hot gases are contained inside the tubes and the water being heated circulates outside the tubes. However, the units are constructed of cast iron rather than steel. Virtually all cast iron boilers are constructed as package boilers. These boilers are used to produce either low-pressure steam or hot water, and are most commonly used in small commercial applications.

Natural gas is also combusted in residential boilers and furnaces. Residential boilers and furnaces generally resemble firetube boilers with flue gas traveling through several channels or tubes with water or air circulated outside the channels or tubes.

1.4.3 Emissions[3-4]

The emissions from natural gas-fired boilers and furnaces include nitrogen oxides (NO_x), carbon monoxide (CO), and carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), volatile organic compounds (VOCs), trace amounts of sulfur dioxide (SO_2), and particulate matter (PM).

Nitrogen Oxides -

Nitrogen oxides formation occurs by three fundamentally different mechanisms. The principal mechanism of NO_x formation in natural gas combustion is thermal NO_x. The thermal NO_x mechanism occurs through the thermal dissociation and subsequent reaction of nitrogen (N_2) and oxygen (O_2) molecules in the combustion air. Most NO_x formed through the thermal NO_x mechanism occurs in the high temperature flame zone near the burners. The formation of thermal NO_x is affected by three furnace-zone factors: (1) oxygen concentration, (2) peak temperature, and (3) time of exposure at peak temperature. As these three factors increase, NO_x emission levels increase. The emission trends due to changes in these factors are fairly consistent for all types of natural gas-fired boilers and furnaces. Emission levels vary considerably with the type and size of combustor and with operating conditions (e.g., combustion air temperature, volumetric heat release rate, load, and excess oxygen level).

The second mechanism of NO_x formation, called prompt NO_x, occurs through early reactions of nitrogen molecules in the combustion air and hydrocarbon radicals from the fuel. Prompt NO_x reactions occur within the flame and are usually negligible when compared to the amount of NO_x formed through the thermal NO_x mechanism. However, prompt NO_x levels may become significant with ultra-low-NO_x burners.

The third mechanism of NO_x formation, called fuel NO_x, stems from the evolution and reaction of fuel-bound nitrogen compounds with oxygen. Due to the characteristically low fuel nitrogen content of natural gas, NO_x formation through the fuel NO_x mechanism is insignificant.

Carbon Monoxide -

The rate of CO emissions from boilers depends on the efficiency of natural gas combustion. Improperly tuned boilers and boilers operating at off-design levels decrease combustion efficiency resulting in increased CO emissions. In some cases, the addition of NO_x control systems such as low NO_x burners and flue gas recirculation (FGR) may also reduce combustion efficiency, resulting in higher CO emissions relative to uncontrolled boilers.

Volatile Organic Compounds -

The rate of VOC emissions from boilers and furnaces also depends on combustion efficiency. VOC emissions are minimized by combustion practices that promote high combustion temperatures, long residence times at those temperatures, and turbulent mixing of fuel and combustion air. Trace amounts of VOC species in the natural gas fuel (e.g., formaldehyde and benzene) may also contribute to VOC emissions if they are not completely combusted in the boiler.

Sulfur Oxides -

Emissions of SO_2 from natural gas-fired boilers are low because pipeline quality natural gas typically has sulfur levels of 2,000 grains per million cubic feet. However, sulfur-containing odorants are added to natural gas for detecting leaks, leading to small amounts of SO_2 emissions. Boilers combusting unprocessed natural gas may have higher SO_2 emissions due to higher levels of sulfur in the natural gas. For these units, a sulfur mass balance should be used to determine SO_2 emissions.

Particulate Matter -

Because natural gas is a gaseous fuel, filterable PM emissions are typically low. Particulate matter from natural gas combustion has been estimated to be less than 1 micrometer in size and has filterable and condensable fractions. Particulate matter in natural gas combustion are usually larger molecular weight hydrocarbons that are not fully combusted. Increased PM emissions may result from poor air/fuel mixing or maintenance problems.

Greenhouse Gases -[6-9]

CO_2, CH_4, and N_2O emissions are all produced during natural gas combustion. In properly tuned boilers, nearly all of the fuel carbon (99.9 percent) in natural gas is converted to CO_2 during the combustion process. This conversion is relatively independent of boiler or combustor type. Fuel carbon not converted to CO_2 results in CH_4, CO, and/or VOC emissions and is due to incomplete combustion. Even in boilers operating with poor combustion efficiency, the amount of CH_4, CO, and VOC produced is insignificant compared to CO_2 levels.

Formation of N_2O during the combustion process is affected by two furnace-zone factors. N_2O emissions are minimized when combustion temperatures are kept high (above 1475°F) and excess oxygen is kept to a minimum (less than 1 percent).

Methane emissions are highest during low-temperature combustion or incomplete combustion, such as the start-up or shut-down cycle for boilers. Typically, conditions that favor formation of N_2O also favor emissions of methane.

1.4.4 Controls[4,10]

NO_x Controls -

Currently, the two most prevalent combustion control techniques used to reduce NO_x emissions from natural gas-fired boilers are flue gas recirculation (FGR) and low NO_x burners. In an FGR system, a portion of the flue gas is recycled from the stack to the burner windbox. Upon entering the windbox, the recirculated gas is mixed with combustion air prior to being fed to the burner. The recycled flue gas consists of combustion products which act as inerts during combustion of the fuel/air mixture. The FGR system reduces NO_x emissions by two mechanisms. Primarily, the recirculated gas acts as a dilutent to reduce combustion temperatures, thus suppressing the thermal NO_x mechanism. To a lesser extent, FGR also reduces NO_x formation by lowering the oxygen concentration in the primary flame zone. The amount of recirculated flue gas is a key operating parameter influencing NO_x emission rates for these systems. An FGR system is normally used in combination with specially designed low NO_x burners capable of sustaining a stable flame with the increased inert gas flow resulting from the use of FGR. When low NO_x burners and FGR are used in combination, these techniques are capable of reducing NO_x emissions by 60 to 90 percent.

Low NO_x burners reduce NO_x by accomplishing the combustion process in stages. Staging partially delays the combustion process, resulting in a cooler flame which suppresses thermal NO_x formation. The two most common types of low NO_x burners being applied to natural gas-fired boilers are staged air burners and staged fuel burners. NO_x emission reductions of 40 to 85 percent (relative to uncontrolled emission levels) have been observed with low NO_x burners.

Other combustion control techniques used to reduce NO_x emissions include staged combustion and gas reburning. In staged combustion (e.g., burners-out-of-service and overfire air), the degree of staging is a key operating parameter influencing NO_x emission rates. Gas reburning is similar to the use of overfire

in the use of combustion staging. However, gas reburning injects additional amounts of natural gas in the upper furnace, just before the overfire air ports, to provide increased reduction of NO_x to NO_2.

Two postcombustion technologies that may be applied to natural gas-fired boilers to reduce NO_x emissions are selective noncatalytic reduction (SNCR) and selective catalytic reduction (SCR). The SNCR system injects ammonia (NH_3) or urea into combustion flue gases (in a specific temperature zone) to reduce NO_x emission. The Alternative Control Techniques (ACT) document for NO_x emissions from utility boilers, maximum SNCR performance was estimated to range from 25 to 40 percent for natural gas-fired boilers.[12] Performance data available from several natural gas fired utility boilers with SNCR show a 24 percent reduction in NO_x for applications on wall-fired boilers and a 13 percent reduction in NO_x for applications on tangential-fired boilers.[11] In many situations, a boiler may have an SNCR system installed to trim NO_x emissions to meet permitted levels. In these cases, the SNCR system may not be operated to achieve maximum NO_x reduction. The SCR system involves injecting NH_3 into the flue gas in the presence of a catalyst to reduce NO_x emissions. No data were available on SCR performance on natural gas fired boilers at the time of this publication. However, the ACT Document for utility boilers estimates NO_x reduction efficiencies for SCR control ranging from 80 to 90 percent.[12]

Emission factors for natural gas combustion in boilers and furnaces are presented in Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4.[11] Tables in this section present emission factors on a volume basis (lb/10^6 scf). To convert to an energy basis (lb/MMBtu), divide by a heating value of 1,020 MMBtu/10^6 scf. For the purposes of developing emission factors, natural gas combustors have been organized into three general categories: large wall-fired boilers with greater than 100 MMBtu/hr of heat input, boilers and residential furnaces with less than 100 MMBtu/hr of heat input, and tangential-fired boilers. Boilers within these categories share the same general design and operating characteristics and hence have similar emission characteristics when combusting natural gas.

Emission factors are rated from A to E to provide the user with an indication of how "good" the factor is, with "A" being excellent and "E" being poor. The criteria that are used to determine a rating for an emission factor can be found in the Emission Factor Documentation for AP-42 Section 1.4 and in the introduction to the AP-42 document.

1.4.5 Updates Since the Fifth Edition

The Fifth Edition was released in January 1995. Revisions to this section are summarized below. For further detail, consult the Emission Factor Documentation for this section. These and other documents can be found on the Emission Factor and Inventory Group (EFIG) home page (http://www.epa.gov/ttn/chief).

Supplement D, March 1998

- Text was revised concerning Firing Practices, Emissions, and Controls.
- All emission factors were updated based on 482 data points taken from 151 source tests. Many new emission factors have been added for speciated organic compounds, including hazardous air pollutants.

July 1998 - minor changes

- Footnote D was added to table 1.4-3 to explain why the sum of individual HAP may exceed VOC or TOC, the web address was updated, and the references were reordered.

Table 1.4-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO_x) AND CARBON MONOXIDE (CO) FROM NATURAL GAS COMBUSTION[a]

Combustor Type (MMBtu/hr Heat Input) [SCC]	NO_x[b]		CO	
	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
Large Wall-Fired Boilers (>100) [1-01-006-01, 1-02-006-01, 1-03-006-01]				
Uncontrolled (Pre-NSPS)[c]	280	A	84	B
Uncontrolled (Post-NSPS)[c]	190	A	84	B
Controlled - Low NO_x burners	140	A	84	B
Controlled - Flue gas recirculation	100	D	84	B
Small Boilers (<100) [1-01-006-02, 1-02-006-02, 1-03-006-02, 1-03-006-03]				
Uncontrolled	100	B	84	B
Controlled - Low NO_x burners	50	D	84	B
Controlled - Low NO_x burners/Flue gas recirculation	32	C	84	B
Tangential-Fired Boilers (All Sizes) [1-01-006-04]				
Uncontrolled	170	A	24	C
Controlled - Flue gas recirculation	76	D	98	D
Residential Furnaces (<0.3) [No SCC]				
Uncontrolled	94	B	40	B

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. To convert from $lb/10^6$ scf to $kg/10^6 m^3$, multiply by 16. Emission factors are based on an average natural gas higher heating value of 1,020 Btu/scf. To convert from $lb/10^6$ scf to lb/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. SCC = Source Classification Code. ND = no data. NA = not applicable.

[b] Expressed as NO_2. For large and small wall fired boilers with SNCR control, apply a 24 percent reduction to the appropriate NO_x emission factor. For tangential-fired boilers with SNCR control, apply a 13 percent reduction to the appropriate NO_x emission factor.

[c] NSPS=New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction modification, or reconstruction after June 19, 1984.

TABLE 1.4-2. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM NATURAL GAS COMBUSTION[a]

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
CO_2[b]	120,000	A
Lead	0.0005	D
N_2O (Uncontrolled)	2.2	E
N_2O (Controlled-low-NO_X burner)	0.64	E
PM (Total)[c]	7.6	D
PM (Condensable)[c]	5.7	D
PM (Filterable)[c]	1.9	B
SO_2[d]	0.6	A
TOC	11	B
Methane	2.3	B
VOC	5.5	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $lb/10^6$ scf to 1b/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. TOC = Total Organic Compounds. VOC = Volatile Organic Compounds.

[b] Based on approximately 100% conversion of fuel carbon to CO_2. $CO_2[lb/10^6 scf] = (3.67)(CON)(C)(D)$, where CON = fractional conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.76), and D = density of fuel, 4.2×10^4 $lb/10^6$ scf.

[c] All PM (total, condensible, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM_{10}, $PM_{2.5}$ or PM_1 emissions. Total PM is the sum of the filterable PM and condensible PM. Condensible PM is the particulate matter collected using EPA Method 202 (or equivalent). Filterable PM is the particulate matter collected on, or prior to, the filter of an EPA Method 5 (or equivalent) sampling train.

[d] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content is natural gas of 2,000 grains/10^6 scf. The SO_2 emission factor in this table can be converted to other natural gas sulfur contents by multiplying the SO_2 emission factor by the ratio of the site-specific sulfur content (grains/10^6 scf) to 2,000 grains/10^6 scf.

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION[a]

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
91-57-6	2-Methylnaphthalene[b, c]	2.4E-05	D
56-49-5	3-Methylchloranthrene[b, c]	<1.8E-06	E
	7,12-Dimethylbenz(a)anthracene[b,c]	<1.6E-05	E
83-32-9	Acenaphthene[b,c]	<1.8E-06	E
203-96-8	Acenaphthylene[b,c]	<1.8E-06	E
120-12-7	Anthracene[b,c]	<2.4E-06	E
56-55-3	Benz(a)anthracene[b,c]	<1.8E-06	E
71-43-2	Benzene[b]	2.1E-03	B
50-32-8	Benzo(a)pyrene[b,c]	<1.2E-06	E
205-99-2	Benzo(b)fluoranthene[b,c]	<1.8E-06	E
191-24-2	Benzo(g,h,i)perylene[b,c]	<1.2E-06	E
205-82-3	Benzo(k)fluoranthene[b,c]	<1.8E-06	E
106-97-8	Butane	2.1E+00	E
218-01-9	Chrysene[b,c]	<1.8E-06	E
53-70-3	Dibenzo(a,h)anthracene[b,c]	<1.2E-06	E
25321-22-6	Dichlorobenzene[b]	1.2E-03	E
74-84-0	Ethane	3.1E+00	E
206-44-0	Fluoranthene[b,c]	3.0E-06	E
86-73-7	Fluorene[b,c]	2.8E-06	E
50-00-0	Formaldehyde[b]	7.5E-02	B
110-54-3	Hexane[b]	1.8E+00	E
193-39-5	Indeno(1,2,3-cd)pyrene[b,c]	<1.8E-06	E
91-20-3	Naphthalene[b]	6.1E-04	E
109-66-0	Pentane	2.6E+00	E
85-01-8	Phenanathrene[b,c]	1.7E-05	D

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION (Continued)

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
74-98-6	Propane	1.6E+00	E
129-00-0	Pyrene[b, c]	5.0E-06	E
108-88-3	Toluene[b]	3.4E-03	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $lb/10^6$ scf to lb/MMBtu, divide by 1,020. Emission Factors preceeded with a less-than symbol are based on method detection limits.

[b] Hazardous Air Pollutant (HAP) as defined by Section 112(b) of the Clean Air Act.

[c] HAP because it is Polycyclic Organic Matter (POM). POM is a HAP as defined by Section 112(b) of the Clean Air Act.

[d] The sum of individual organic compounds may exceed the VOC and TOC emission factors due to differences in test methods and the availability of test data for each pollutant.

TABLE 1.4-4. EMISSION FACTORS FOR METALS FROM NATURAL GAS COMBUSTION[a]

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
7440-38-2	Arsenic[b]	2.0E-04	E
7440-39-3	Barium	4.4E-03	D
7440-41-7	Beryllium[b]	<1.2E-05	E
7440-43-9	Cadmium[b]	1.1E-03	D
7440-47-3	Chromium[b]	1.4E-03	D
7440-48-4	Cobalt[b]	8.4E-05	D
7440-50-8	Copper	8.5E-04	C
7439-96-5	Manganese[b]	3.8E-04	D
7439-97-6	Mercury[b]	2.6E-04	D
7439-98-7	Molybdenum	1.1E-03	D
7440-02-0	Nickel[b]	2.1E-03	C
7782-49-2	Selenium[b]	<2.4E-05	E
7440-62-2	Vanadium	2.3E-03	D
7440-66-6	Zinc	2.9E-02	E

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. Emission factors preceeded by a less-than symbol are based on method detection limits. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $lb/10^6$ scf to lb/MMBtu, divide by 1,020.

[b] Hazardous Air Pollutant as defined by Section 112(b) of the Clean Air Act.

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AP-42 Section 1.4: Natural Gas Combustion Data Files

The data that supports the emission factors are presented in summary in the background report and are reported more completely in an electronic database. The database is in Microsoft Access 97®. The file is located on the CHIEF web site at http://www.epa.gov/ttn/chief/ap42c1.html.

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TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
CHAPTER 106	EXEMPTIONS FROM PERMITTING
SUBCHAPTER G	COMBUSTION
RULE §106.183	**Boilers, Heaters, and Other Combustion Devices (Previously SE 7)**

Boilers, heaters, drying or curing ovens, furnaces, or other combustion units, but not including stationary internal combustion engines or turbines are exempt, provided that the following conditions are met.

(1) The only emissions shall be products of combustion of the fuel.

(2) The maximum heat input shall be 40 million British thermal unit (Btu) per hour with the fuel being:

(A) sweet natural gas;

(B) liquid petroleum gas;

(C) fuel gas containing no more than 0.1 grain of total sulfur compounds, calculated as sulfur, per dry standard cubic foot; or

(D) combinations of the fuels in subparagraphs (A)-(C) of this paragraph.

(3) Distillate fuel oil shall be fired as a backup fuel only. Firing shall be limited to 720 hours per year. The fuel oil shall contain less than 0.3% sulfur by weight and shall not be blended with waste oils or solvents.

(4) All gas fired heaters and boilers with a heat input greater than ten million Btu per hour (higher heating value) shall be designed such that the emissions of nitrogen oxides shall not exceed 0.1 pounds per million Btu heat input.

(5) Records of hours of fuel oil firing and fuel oil purchases shall be maintained on-site on a two-year rolling retention period and made available upon request to the commission or any local air pollution control agency having jurisdiction.

Source Note: The provisions of this §106.183 adopted to be effective June 18, 1997, 22 TexReg 5668.

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STORAGE TANK AND CHANGE OF SERVICE

CSSA uses a 10,000-gallon horizontal fixed roof tank for storage and dispensing of vehicle gasoline. In addition, six smaller tanks are associated with the storage of diesel fuel for standby boilers and generators (Building 1, Building 201, Building 36, Building 46, Building 99, and radio tower.) Emissions of VOCs from these tanks were estimated using v4.07 of the EPA TANKS computer program. TANKS is a Windows-based computer software program that estimates VOC and HAP emissions from fixed- and floating-roof storage tanks. TANKS is based on the emission estimation procedures from Chapter 7 of EPA's AP-42.

While total VOC losses from diesel tanks were very small (less than 2 pounds per year) due to its low volatility, the VOC losses from the refueling tank were estimated at about 1 ton per year.

These sources are exempt from permitting based on 30 TAC § 106.478 because the maximum vapor pressures of the stored materials are less than 11 psia. The exemption does not need to be registered with the TNRCC since the capacity of each tank is less than 25,000 gallons. (Other requirements also exist; refer to the actual exemption citation provided for specifics.)

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Bldg 1
City:	Boerne
State:	Texas
Company:	Camp Stanley Storage Activity
Type of Tank:	Horizontal Tank
Description:	Diesel storage tank (1000 gal) associated with standby generator at Building 1.

Tank Dimensions

Shell Length (ft):	12.00
Diameter (ft):	4.00
Volume (gallons):	1,000.00
Turnovers:	2.60
Net Throughput (gal/yr):	2,600.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: San Antonio, Texas (Avg Atmospheric Pressure = 14.33 psia)

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	70.73	64.95	76.52	68.64	0.0092	0.0076	0.0110	130.0000			188.00	Option 5: A=12.101, B=6907
1,2,4-Trimethylbenzene						0.0311	0.0249	0.0386	120.1900	0.0100	0.0490	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5614	1.3375	1.8154	78.1100	0.0000	0.0020	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1562	0.1287	0.1887	106.1700	0.0001	0.0032	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5128	2.1731	2.8949	86.1700	0.0000	0.0004	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Toluene						0.4574	0.3844	0.5417	92.1300	0.0003	0.0231	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0078	0.0071	0.0075	134.5415	0.9866	0.8626	169.60	
Xylene (-m)						0.1306	0.1073	0.1580	106.1700	0.0029	0.0597	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.07	0.29	0.36
Hexane (-n)	0.00	0.00	0.00
Benzene	0.00	0.00	0.00
Toluene	0.00	0.01	0.01
Ethylbenzene	0.00	0.00	0.00
Xylene (-m)	0.00	0.02	0.02
1,2,4-Trimethylbenzene	0.00	0.01	0.02
Unidentified Components	0.06	0.25	0.31

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Bldg 201
City:	Boerne
State:	Texas
Company:	Camp Stanley Storage Activity
Type of Tank:	Horizontal Tank
Description:	Diesel storage tank (2000 gal) associated with standby generator at Building 201.

Tank Dimensions

Shell Length (ft):	12.00
Diameter (ft):	5.00
Volume (gallons):	2,000.00
Turnovers:	2.00
Net Throughput (gal/yr):	4,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: San Antonio, Texas (Avg Atmospheric Pressure = 14.33 psia)

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	70.73	64.95	76.52	68.64	0.0092	0.0076	0.0110	130.0000			188.00	Option 5: A=12.101, B=8907
1,2,4-Trimethylbenzene						0.0311	0.0249	0.0386	120.1900	0.0100	0.0490	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5614	1.3375	1.8154	78.1100	0.0000	0.0020	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1562	0.1287	0.1887	106.1700	0.0001	0.0032	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5128	2.1731	2.8949	86.1700	0.0000	0.0004	86.17	Option 2: A=6.878, B=1171.17, C=224.41
Toluene						0.4574	0.3844	0.5417	92.1300	0.0003	0.0231	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0078	0.0071	0.0075	134.5415	0.9866	0.8626	189.60	
Xylene (-m)						0.1306	0.1073	0.1580	106.1700	0.0029	0.0597	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.11	0.45	0.57
Hexane (-n)	0.00	0.00	0.00
Benzene	0.00	0.00	0.00
Toluene	0.00	0.01	0.01
Ethylbenzene	0.00	0.00	0.00
Xylene (-m)	0.01	0.03	0.03
1,2,4-Trimethylbenzene	0.01	0.02	0.03
Unidentified Components	0.10	0.39	0.49

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Bldg 36
City:	Boerne
State:	Texas
Company:	Camp Stanley Storage Activity
Type of Tank:	Horizontal Tank
Description:	Day tank for standby diesel generator.

Tank Dimensions

Shell Length (ft):	10.00
Diameter (ft):	3.00
Volume (gallons):	75.00
Turnovers:	3.00
Net Throughput (gal/yr):	225.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: San Antonio, Texas (Avg Atmospheric Pressure = 14.33 psia)

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	70.73	64.95	76.52	68.64	0.0092	0.0076	0.0110	130.0000			188.00	Option 5: A=12.101, B=8907
1,2,4-Trimethylbenzene						0.0311	0.0249	0.0386	120.1900	0.0100	0.0490	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5814	1.3375	1.8154	78.1100	0.0000	0.0020	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1562	0.1287	0.1887	106.1700	0.0001	0.0032	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5128	2.1731	2.8949	86.1700	0.0000	0.0004	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Toluene						0.4574	0.3844	0.5417	92.1300	0.0003	0.0231	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0078	0.0071	0.0075	134.5415	0.9866	0.8626	189.60	
Xylene (-m)						0.1306	0.1073	0.1580	106.1700	0.0029	0.0597	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.01	0.14	0.14
Hexane (-n)	0.00	0.00	0.00
Benzene	0.00	0.00	0.00
Toluene	0.00	0.00	0.00
Ethylbenzene	0.00	0.00	0.00
Xylene (-m)	0.00	0.01	0.01
1,2,4-Trimethylbenzene	0.00	0.01	0.01
Unidentified Components	0.01	0.12	0.12

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Bldg 46
City:	Boerne
State:	Texas
Company:	Camp Stanley Storage Activity
Type of Tank:	Horizontal Tank
Description:	Diesel storage tank (1000 gal) associated with standby boiler at Building 46.

Tank Dimensions

Shell Length (ft):	12.00
Diameter (ft):	4.00
Volume (gallons):	1,000.00
Turnovers:	3.00
Net Throughput (gal/yr):	3,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: San Antonio, Texas (Avg Atmospheric Pressure = 14.33 psia)

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	70.73	64.95	76.52	68.64	0.0092	0.0076	0.0110	130.0000			188.00	Option 5: A=12.101, B=8907
1,2,4-Trimethylbenzene						0.0311	0.0249	0.0386	120.1900	0.0100	0.0490	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5614	1.3375	1.8154	78.1100	0.0000	0.0020	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1562	0.1287	0.1887	106.1700	0.0001	0.0032	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5128	2.1731	2.8949	86.1700	0.0000	0.0004	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Toluene						0.4574	0.3844	0.5417	92.1300	0.0003	0.0231	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0078	0.0071	0.0075	134.5415	0.9866	0.8626	189.60	
Xylene (-m)						0.1306	0.1073	0.1580	106.1700	0.0029	0.0597	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.09	0.29	0.38
Hexane (-n)	0.00	0.00	0.00
Benzene	0.00	0.00	0.00
Toluene	0.00	0.01	0.01
Ethylbenzene	0.00	0.00	0.00
Xylene (-m)	0.01	0.02	0.02
1,2,4-Trimethylbenzene	0.00	0.01	0.02
Unidentified Components	0.07	0.25	0.32

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Bldg 99
City:	Boerne
State:	Texas
Company:	Camp Stanley Storage Activity
Type of Tank:	Horizontal Tank
Description:	Diesel storage tank (500 gal) associated with standby generator at Building 99.

Tank Dimensions

Shell Length (ft):	6.00
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	3.00
Net Throughput (gal/yr):	1,500.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: San Antonio, Texas (Avg Atmospheric Pressure = 14.33 psia)

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	70.73	64.95	76.52	68.64	0.0092	0.0076	0.0110	130.0000			188.00	Option 5: A=12.101, B=8907
1,2,4-Trimethylbenzene						0.0311	0.0249	0.0386	120.1900	0.0100	0.0490	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5614	1.3375	1.8154	78.1100	0.0000	0.0020	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1562	0.1287	0.1887	106.1700	0.0001	0.0032	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5128	2.1731	2.8949	86.1700	0.0000	0.0004	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Toluene						0.4574	0.3844	0.5417	92.1300	0.0003	0.0231	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0078	0.0071	0.0075	134.5415	0.9866	0.8626	189.80	
Xylene (-m)						0.1306	0.1073	0.1580	106.1700	0.0029	0.0597	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.04	0.15	0.19
Hexane (-n)	0.00	0.00	0.00
Benzene	0.00	0.00	0.00
Toluene	0.00	0.00	0.00
Ethylbenzene	0.00	0.00	0.00
Xylene (-m)	0.00	0.01	0.01
1,2,4-Trimethylbenzene	0.00	0.01	0.01
Unidentified Components	0.04	0.13	0.16

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Radio Tower
City:	Boerne
State:	Texas
Company:	Camp Stanley Storage Activity
Type of Tank:	Horizontal Tank
Description:	Day tank for standby diesel generator.

Tank Dimensions

Shell Length (ft):	5.00
Diameter (ft):	3.00
Volume (gallons):	10.00
Turnovers:	3.00
Net Throughput (gal/yr):	30.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: San Antonio, Texas (Avg Atmospheric Pressure = 14.33 psia)

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	70.73	64.95	76.52	68.64	0.0092	0.0076	0.0110	130.0000			188.00	Option 5: A=12.101, B=8907
1,2,4-Trimethylbenzene						0.0311	0.0249	0.0386	120.1900	0.0100	0.0490	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5614	1.3375	1.8154	78.1100	0.0000	0.0020	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1562	0.1287	0.1887	106.1700	0.0001	0.0032	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5128	2.1731	2.8949	86.1700	0.0000	0.0004	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Toluene						0.4574	0.3844	0.5417	92.1300	0.0003	0.0231	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0078	0.0071	0.0075	134.5415	0.9866	0.8626	189.60	
Xylene (-m)						0.1306	0.1073	0.1580	106.1700	0.0029	0.0597	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.00	0.07	0.07
Hexane (-n)	0.00	0.00	0.00
Benzene	0.00	0.00	0.00
Toluene	0.00	0.00	0.00
Ethylbenzene	0.00	0.00	0.00
Xylene (-m)	0.00	0.00	0.00
1,2,4-Trimethylbenzene	0.00	0.00	0.00
Unidentified Components	0.00	0.06	0.06

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Vehicle Refueling
City:	Boerne
State:	Texas
Company:	Camp Stanley Storage Activity
Type of Tank:	Horizontal Tank
Description:	Gasoline storage tank for motor vehicles located near Building 5.

Tank Dimensions

Shell Length (ft):	27.00
Diameter (ft):	8.00
Volume (gallons):	10,000.00
Turnovers:	2.50
Net Throughput (gal/yr):	25,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: San Antonio, Texas (Avg Atmospheric Pressure = 14.33 psia)

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 10)	All	70.73	64.95	76.52	68.64	6.3591	5.7027	7.0743	66.0000			92.00	Option 4: RVP=10, ASTM Slope=3
1,2,4-Trimethylbenzene						0.0311	0.0249	0.0386	120.1900	0.0250	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5614	1.3375	1.8154	78.1100	0.0180	0.0062	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.6088	1.3830	1.8641	84.1600	0.0024	0.0008	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1562	0.1287	0.1887	106.1700	0.0140	0.0005	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5128	2.1731	2.8949	86.1700	0.0100	0.0055	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isooctane						0.8326	0.6948	0.9953	114.2200	0.0400	0.0073	114.22	Option 1: VP70 = .812 VP80 = 1.093
Isopropyl benzene						0.0756	0.0614	0.0926	120.2000	0.0050	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Toluene						0.4574	0.3844	0.5417	92.1300	0.0700	0.0070	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						8.1099	8.0746	8.0793	65.4234	0.7456	0.9704	89.36	
Xylene (-m)						0.1306	0.1073	0.1580	106.1700	0.0700	0.0020	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 10)	249.82	2,063.65	2,313.47
Hexane (-n)	1.38	11.37	12.74
Xylene (-m)	0.50	4.13	4.63
Isopropyl benzene	0.02	0.17	0.19
1,2,4-Trimethylbenzene	0.04	0.35	0.39
Cyclohexane	0.21	1.75	1.96
Unidentified Components	242.43	2,002.63	2,245.06
Benzene	1.54	12.71	14.25
Isooctane	1.82	15.07	16.89
Toluene	1.75	14.48	16.24
Ethylbenzene	0.12	0.99	1.11

TANKS 4.0
Emissions Report - Summary Format
Total Emissions Summaries - All Tanks in Report

Annual Emissions Report

Tank Identification				Losses (lbs)
Bldg 1	Camp Stanley Storage Activity	Horizontal Tank	Boerne, Texas	0.36
Bldg 201	Camp Stanley Storage Activity	Horizontal Tank	Boerne, Texas	0.57
Bldg 36	Camp Stanley Storage Activity	Horizontal Tank	Boerne, Texas	0.14
Bldg 46	Camp Stanley Storage Activity	Horizontal Tank	Boerne, Texas	0.38
Bldg 99	Camp Stanley Storage Activity	Horizontal Tank	Boerne, Texas	0.19
Radio Tower	Camp Stanley Storage Activity	Horizontal Tank	Boerne, Texas	0.07
Vehicle Refueling	Camp Stanley Storage Activity	Horizontal Tank	Boerne, Texas	2,313.47
Total Emissions for all Tanks:				2,315.18

EPA United States Environmental Protection Agency

Office of Air Quality Planning & Standards OAQPS

TTNWeb technology transfer network

CHIEF Clearinghouse for Inventories and Emissions Factors

TANKS 4.07 for Windows®

Updated March 27, 2000

System Requirements
How to Get *TANKS*
Who to call for more information
TANKSVersion 4.0 FAQ

What Is *TANKS*?

TANKS is a Windows-based computer software program that estimates volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions from fixed- and floating-roof storage tanks. *TANKS* is based on the emission estimation procedures from Chapter 7 of EPA's *Compilation Of Air Pollutant Emission Factors* (AP-42). The user's manual, available in Adobe Acrobat format and WordPerfect, explains the many features and options of *TANKS*. The program includes on-line help for every screen.

Audience

TANKS is designed for use by local, state, and federal agencies, environmental consultants, and others who need to calculate air pollutant emissions from organic liquid storage tanks.

Program Capabilities

TANKS uses chemical, meteorological, roof fitting, and rim seal data to generate emissions estimates for several types of storage tanks,including:

- vertical and horizontal fixed roof tanks
- internal and external floating roof tanks
- domed external floating roof tanks
- underground tanks

To use the program, one enters specific information about storage tank construction and the stored liquid. The program produces a report estimating VOC emissions. A batch mode of operation is available to generate a single report for multiple tanks.

The *TANKS* program employs a chemical database of over 100 organic liquids, and a meteorological database of over 240 cities in the United States. The program allows the addition of more chemicals and cities, if desired. *TANKS* is capable of calculating individual component emissions from known mixtures and estimating emissions from crude oils and selected refined petroleum products using liquid concentration HAP profiles supplied with the program.

System Requirements

TANKS 4.07 will run under Windows 95, 98, or Windows NT. The program requires 8 MB of random access memory (RAM). The installed program requires 15 MB of available hard disk space. *TANKS* is designed for operation from a PC's hard drive. Many users are able to share tank databases via LAN connections to increase the utility of the program. Installations requiring TANK program files to be resident on a LAN are not advisable and are beyond our support capabilities.

How To Get A Copy Of *TANKS*

Version 4.07 of the *TANKS* software is available here! If you have problems or questions about the files below, please contact *Info CHIEF* at (919) 541-1000.

The program installation file is a self extracting executable file which can be easily downloaded to your hard drive and installed by following the installation instructions (install.txt). A smaller "zipped" file (tank407exe.zip) is available for previous users of TANKS 4.0. It is only the TANKS program file and does not include the databases and report components.

YEAR 2000 COMPLIANCE: During the development of *TANKS 4.X,* care was taken to ensure that the program would be fully Y2K compliant.

You are advised to bookmark this web site and check it from time to time for information about updates to the TANKS program. Alternatively, you can subscribe to the CHIEF Listserver and receive information about TANKS updates via email. If you would like to be a member of the listserv, send email to listserver@unixmail.rtpnc.epa.gov, with this single line as the body of the message:

subscribe CHIEF *your-name-here*

6/2/00 - The Emission Factor and Inventory Group is currently testing the installation and operation of TANKS 4.X on PC's running Microsoft® Office 2000. System conflicts have been reported to the Info CHIEF Help Desk on some desktops. More information will be posted after further investigation of the problem. In the meantime, if you are running MS Office 2000, be aware that you may experience problems with your PC's normal operation after installing TANKS 4.0X.

Description	Files	Upload Date	Size
Installation instructions - PLEASE READ.		4-2000	3 KB
TANKS Release Notes 3/27/2000- PLEASE READ.		3-27-2000	17 KB
Changes from version 3.1		4-5-2000	14 KB
TANKS 4.07 Installation File - 32 bit. For Windows 95, Windows 98 and Windows NT.		3-27-2000	13.9 MB
TANKS 4.07 Executable - 32 bit Update file. For previous users of TANKS 4.0 only.		3-27-2000	13.5 MB
User's Manual for TANKS 4.X (Adobe Acrobat® format)		12-2-99	646 KB
User's Manual for TANKS 4.X ("zipped" WordPerfect® format)		12-2-99	294 KB
VBRUN60.exe - Please read the "TANKS Release Notes"		8-19-99	1.03 KB

The information below pertains to earlier versions of *TANKS*

The U.S. EPA recommends the use of the version of *TANKS* version 4.X or 3.1 for the estimation of emissions from storage tanks. Earlier versions previously available on this Web site have been removed to avoid confusion. TANKS 3.1 will continue to be posted on CHIEF until TANKS users have fully transitioned to the latest version of TANKS 4.0.

Description	Files	Upload Date	Size
Installation instructions - PLEASE READ.		5-98	4 KB
TANKS 3.1 Program w/ WordPerfect User's Guide. (April 28, 1998 version)		6-11-98	1.4 MB
Notice for TANKS 3.1 Program.		6-11-98	16 KB
User's Manual for TANKS 3.1 (Adobe Acrobat® format)		11-97	401 KB

For current activities of the Emission Factorand Inventory Group, subscribe to the CHIEF Listserver.

You can also contact the Info CHIEF help desk,
info.chief@epamail.epa.gov.

Phone: (919) 541-1000, **Fax:** (919) 541-5680

Mailing Address:
Info CHIEF
Emission Factor And Inventory Group (MD-14)
Office of Air Quality Planning and Standards

U. S. Environmental Protection Agency
Research Triangle Park, NC 27711

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TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
CHAPTER 106	EXEMPTIONS FROM PERMITTING
SUBCHAPTER U	TANKS, STORAGE, AND LOADING
RULE §106.478	**Storage Tank and Change of Service (Previously SE 86)**

Any fixed or floating roof storage tank, or change of service in any tank, used to store chemicals or mixtures of chemicals shown in Table 478 in paragraph (8) of this section is exempt, provided that all of the following conditions of this section are met:

(1) The tank shall be located at least 500 feet away from any recreational area or residence or other structure not occupied or used solely by the owner of the facility or the owner of the property upon which the facility is located.

(2) The true vapor pressure of the compound to be stored shall be less than 11.0 psia at the maximum storage temperature.

(3) For those compounds that have a true vapor pressure greater than 0.5 psia and less than 11.0 psia at the maximum storage temperature, any storage vessel larger than 40,000 gallons capacity shall be equipped with an internal floating cover or equivalent control.

(A) An open top tank containing an external floating roof using double seal technology shall be an approved control alternative equivalent to an internal floating cover tank, provided the primary seal consists of either a mechanical shoe seal or a liquid-mounted seal. Double seals having a vapor-mounted primary seal are an approved alternative for existing open top floating roof tanks undergoing a change of service.

(B) The floating cover or floating roof design shall incorporate sufficient flotation to conform to the requirements of American Petroleum Institute Code 650, Appendix C or an equivalent degree of flotation.

(4) Compounds with a true vapor pressure of 0.5 psia or less at the maximum storage temperature may be stored in a fixed roof or cone roof tank which includes a submerged fill pipe or utilizes bottom loading.

(5) For fixed or cone roof tanks having no internal floating cover, all uninsulated tank exterior surfaces exposed to the sun shall be painted chalk white except where a dark color is necessary to help the tank absorb or retain heat in order to maintain the material in the tank in a liquid state.

(6) Emissions shall be calculated by methods specified in Section 4.3 of the current edition of the United States Environmental Protection Agency Publication AP-42. This document may be obtained from the Superintendent of Documents, Washington D.C. 20402. It is Stock Number 0550000251-7, Volume I.

(7) Before construction begins, storage tanks of 25,000 gallons or greater capacity and located in a designated nonattainment area for ozone shall be registered with the commission's Office of Air Quality in Austin using Form PI-7. The registration shall include a list of all tanks, calculated emissions for each carbon compound in tons per year for each tank, and a Table 7 of Form PI-2 for each different tank design.

(8) Mixtures of the chemicals listed in Table 478 which contain more than a total of 1.0% by volume of all other chemicals not listed in Table 478 are not covered by this section.

Attached Graphic

Source Note: The provisions of this §106.478 adopted to be effective March 14, 1997, 22 TexReg 2439.

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DIPPING TANKS AND CONTAINERS

One dipping tank containing light oil is used at CSSA. Since no standardized method exists for estimating emissions of this type, a technique taken from the "Handbook of Chemical Hazard Analysis Procedures" was used. This technique estimates losses of VOCs through the surface of a pooled liquid using an empirical formula based on material volatility to calculate evaporation flux. This method would be very conservative (i.e. tend to over estimate emissions) but since the resultant value is so low, its accuracy is not imperative.

These sources are exempt from permitting based on 30 TAC § 106.432 for coating of objects with oils.

Light Oil Tank

The estimation technique for evaporative emissions from an unagitated tank is taken from "Handbook of Chemical Hazard Analysis Procedures," Appendix B.8 Emission Rates from Liquid Pools.

Equation B.16

$$E_v = 4.66E\text{-}06 * U_w^{0.75} * T_F * (P_s * M_W) / P_{sh}$$

where:

E_v = Evaporation flux, lb/min/ft^2
U_w = Wind speed, mph
P_s = Vapor pressure of chemical, mm Hg
P_{sh} = Vapor pressure of hydrazine, mm Hg
M_W = Molecular weight of chemical
T_F = Spill temperature correction factor

The spill temperature correction factor is defined as follows:

$T_F = 1$ for $Tp < 0$ C
$T_F = 1 + 4.3E\text{-}03 * Tp^2$ for $Tp > 0$ C
where Tp is the pool temperature in degrees C.

For T = 25 C,
$T_F = 1 + 4.3E\text{-}03 * 25^2$
$T_F =$ 3.6875

The vapor pressure of hydrazine is given by the following equation:

$\ln(P) = 65.3319 - (7245.2 / T) - 8.22 \ln(T) + 6.1557E\text{-}03 * T$
where T is in Kelvin and P is in atmospheres.

For T = 25 C (298 K),
$\ln(P) = 65.3319 - (7245.2 / 298) - 8.22 \ln(298) + 6.1557E\text{-}03 * 298$
$\ln(P) =$ -3.976561537
P = 0.01875 atmospheres
= 14.24999985 mm Hg

For Light Oil Tank assume:

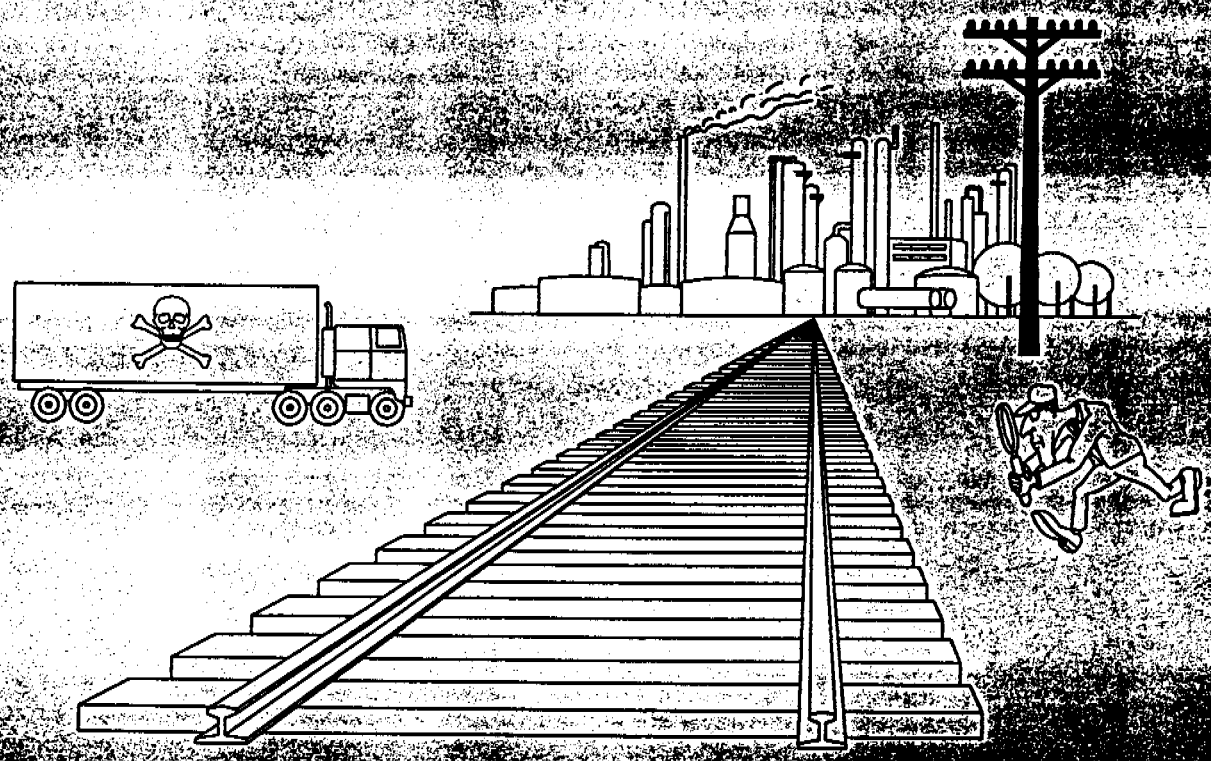
U_w = 1 mph
P_s = 0.01 mm Hg
M_W = 100

E_v = 1.20588E-06 lb/min/ft^2

$E_r = E_v * 15\ ft^2 * 60\ min/hr * 2080\ hr/yr / 2000\ lb/ton$ = 0.0011 tons/yr

ARCHIE

HANDBOOK OF CHEMICAL HAZARD ANALYSIS PROCEDURES



FEDERAL EMERGENCY MANAGEMENT AGENCY

U.S. DEPARTMENT OF TRANSPORTATION

U.S. ENVIRONMENTAL PROTECTION AGENCY

m = Total liquid mass spilled, lbs

A = Pool area, ft^2

Computation of pool areas for boiling liquids is accomplished via use of the boiling rate models described in section B.8 to determine the vaporization flux and the same pool spreading model described in section B.10. In this latter case, the vaporization flux is substituted for the burning velocity of the liquid in appropriate units.

B.8 Emission Rates From Liquid Pools

Pools of evaporating liquids are modeled with one of two methods, depending upon the volatility, normal boiling point, and storage temperature of the liquid and their relationship to the ambient temperature. [11,14,31].

If a discharged liquid is near ambient temperature, a simplified model developed by the U. S. Air Force Engineering and Services Laboratory [32] is used to predict the evaporation rate. This model was correlated to a complex numerical model [31], also developed by the Air Force and validated with experimental data [11]. It requires far less user input, yet yields reasonably accurate answers. The model applies to spills that can vary up and down in temperature as the liquid pool heats and cools, and is limited in emission rate by how fast mass can transfer into the air from the pool surface. It is also reasonably accurate for pools being heated moderately by the sun, but does not fully account for the decreases in evaporation rates that boiling or very volatile liquids may experience as a result of cooling by evaporation. However, the error applies only to one specialized category of spills, and normally results in a conservative answer. Inaccuracies resulting from heating of a relatively low volatility substance spilled onto a hot surface or warmed by the sun over time are counterbalanced by recommendations

made to users of **ARCHIE** in Chapter 12 with respect to specification of ambient and liquid storage temperatures.

The equation used to calculate the evaporation flux of volatile liquid is:

$$E_v = 4.66 \times 10^{-6} U_w^{0.75} T_F \frac{P_s M_w}{P_{sh}} \tag{B.16}$$

where

E_v = Evaporation flux, $lbs/min/ft^2$

U_w = Wind speed, mph

P_s = Vapor pressure of chemical, $mm\ Hg$

P_{sh} = Vapor pressure of hydrazine, $mm\ Hg$

M_w = Molecular weight of chemical

T_F = Spill temperature correction factor

The spill temperature correction factor is defined as follows:

$$T_F = 1 \quad T_p < 0\ C \tag{B.17}$$

$$T_F = 1 + 4.3 \times 10^{-3} T_p^2 \quad T_p > 0\ C \tag{B.18}$$

where T_p is the pool temperature in degrees C. The vapor pressure of hydrazine is given by the following equation:

$$\ln(P) = 65.3319 - \frac{7245.2}{T} - 8.22 \ln(T) + 6.1557 \times 10^{-3}\ T \tag{B.19}$$

where T is in kelvins and P is an atmospheres. Note that the total vaporization rate of the pool is obtained by multiplying the evaporation flux by the pool area. The duration of vapor emission is obtained by dividing the total mass of discharged liquid by the total vaporization rate. Equation B.18 is used by **ARCHIE** for all non-boiling liquids and for those liquids which boil at pool temperatures in excess of zero degrees Celcius.

The vaporization rate of cold boiling liquids, including most liquefied gases, is normally driven by the rate of heat transferred from the ground by conduction. Accurate computation of vaporization rates by so-called *ground conduction models* requires knowledge of several ground surface properties as well as the physio-chemical properties of the spilled material. Further complicating the proper use of such models is the fact that rates will vary with time as the surface beneath the pool is cooled. Notwithstanding the above, several existing models without excessive data demands were tested for inclusion in ARCHIE , including a novel approach based on observations of the relationship between the boiling and burning rates of liquids which provided the best overall results.

An understanding of the logic applied during development of the latter approach requires knowledge of the following observations:

1. Larger differences in temperature between the ground and the boiling point of the discharged liquid lead to higher vaporization rates in general.
2. The depletion rate of a boiling pool at low temperatures can approach but not exceed the expected rate of depletion if the pool is burning.
3. Burning rates of most common flammable liquids vary within a relatively narrow range regardless of the boiling point of the liquid.
4. The burning rate of a liquid is a function of its boiling point, molecular weight, and density.

Based on the above findings, a simplified method was developed by correlating burning velocities estimated by the equation presented in section B.10 with experimentally derived boiling rates for a variety of hazardous materials, these including butane, sulfur dioxide, propane, methane, and oxygen.

The resulting correlation was:

$$F = 0.5322 - 0.001035T_b \quad \text{(B.20)}$$

$$E_v = Fy\rho \quad \text{(B.21)}$$

where,

E_v = Vaporization flux, $kg/m^2/s$

T_b = Boiling point, F

ρ = Liquid density, kg/m^3

y = Burning velocity, m/s

This approach provides answers of reasonable accuracy within the correct order of magnitude. It is slated for further refinement in a future varsion of **ARCHIE** .

B.9 Vapor Dispersion Model

The size of a dispersion hazard zone depends upon the quantity of the material released, its effective density, volatilization, prevailing atmospheric conditions, source elevation, and the user specified toxicity limit.

The toxicity limit must be selected by the user carefully to reflect both the impact of interest (fatality, serious injury, injury, etc.) and the scenario release conditions (especially duration of release or pool evaporation). Chapter 6 of the guide discusses this topic in detail.

The model in **ARCHIE** is used to determine the downwind distances where the concentrations are at or above a user specified toxic limiting concentration. Among the models required for hazard assessments, vapor dispersion

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CHAPTER 106	EXEMPTIONS FROM PERMITTING
SUBCHAPTER S	SURFACE COATING
RULE §106.432	**Dipping Tanks and Containers (Previously SE 50)**

Containers, reservoirs, or tanks used exclusively for dipping operations for coating objects with oils, waxes, or greases where no organic solvents, diluents, or thinners are used; or dipping operations for applying coatings of natural or synthetic resins which contain no organic solvents are exempt.

Source Note: The provisions of this §106.432 adopted to be effective March 14, 1997, 22 TexReg 2439.

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AQUEOUS SOLUTIONS FOR ELECTROLYTIC AND ELECTROLESS PROCESSES

The gun bluing shop is exempt from permitting based on 30 TAC § 106.375 because the solution used is an aqueous media with no VOC emissions. Emissions are estimated to be negligible and have not been quantified.

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SUBCHAPTER P	PLANT OPERATIONS
RULE §106.375	**Aqueous Solutions for Electrolytic and Electroless Processes (Previously SE 41)**

Equipment using aqueous solutions is exempt, providing the conditions of this section are met.

(1) This section authorizes the following operations:

(A) anodizing, chromate conversion coating processes, electroplating, electrodeposition, electroless plating, electrolytic polishing, and electrolytic stripping, as follows.

(i) For plating onto or stripping from any basis substrate, only brass, bronze, cadmium, copper, iron, lead, nickel, tin, zinc, and precious metals may be used.

(ii) Chromic acid shall not be used in any step of a process which involves electrical current, air agitation, or any other factor which causes the chromic acid to bubble or mist.

(B) cleaning, electroless stripping, etching, or other surface preparation and finishing, not including chemical milling or electrolytic metal recovery and reclaiming systems.

(2) Operating conditions.

(A) Hydrochloric acid tank operating conditions shall not exceed:

(i) a temperature of 100 degrees Fahrenheit and a hydrochloric acid concentration of 19.0% by solution weight; or

(ii) a partial pressure of 0.5 millimeters of mercury.

(B) Hydrochloric acid in any state, and any aqueous solution which bubbles or mists due to electrical current, air agitation, or any other factor shall be used in an enclosed building. If the doors and windows of the building are open for any reason other than temporarily for access, emissions shall either be:

(i) captured and exhausted using forced air through a stack with an unobstructed minimum vertical discharge of four feet above the peak of the roofline; or

(ii) controlled with a fume suppressant.

(3) If a facility cannot comply with the hydrochloric acid temperature and concentration limits in paragraph (2)(A)(i) of this section, then to demonstrate compliance with paragraph (2)(A)(ii) of this

section, the maximum hydrochloric acid temperature and concentration for each tank shall be recorded daily. At least once per month, the recorded data shall be converted to partial pressure. All data shall be maintained for the most recent 24-month period.

Source Note: The provisions of this §106.375 adopted to be effective August 4, 1998, 23 TexReg 7830.

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WATER AND WASTEWATER TREATMENT

The water treatment system at CSSA is exempt from permitting based on 30 TAC § 106.532 because the facility does not employ VOC stripping and only normal water treatment techniques are used. Emissions are estimated to be negligible and have not been quantified.

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CHAPTER 106	EXEMPTIONS FROM PERMITTING
SUBCHAPTER X	WASTE PROCESSES AND REMEDIATION
RULE §106.532	**Water and Wastewater Treatment (Previously SE 61)**

Water and wastewater treatment units are exempt, provided the following conditions of this section are met.

(1) The facility performs only the following functions:

(A) disinfection;

(B) softening;

(C) filtration;

(D) flocculation;

(E) stabilization;

(F) taste and odor control;

(G) clarification;

(H) carbonation;

(I) sedimentation;

(J) neutralization;

(K) chlorine removal;

(L) activated sludge treatment, anaerobic treatment, and associated control of gases from these treatments;

(M) aerobic oxidation/biodegration using oxygen or peroxide in the absence of nitrogen or other gas that would cause stripping of volatile organic compounds (VOC) from the water;

(N) stripping VOC, ammonia, or other air contaminants from the water with air or other gas, provided the stripped gases are controlled with an abatement system that meets the requirements of §106.533(5) of this title (relating to Water and Soil Remediation (Previously SE 68(e)). For ammonia or hydrogen chloride (HCl) or other acid gas emissions, abatement may include a water or caustic scrubbing system as a means of complying with this section. Final emissions of HCl resulting from

combustion of chlorine or chlorine-containing compounds shall not exceed 0.1 pounds per hour;

(O) liquid phase separation of VOC and water in which:

(i) the sum of the partial pressures of all species of VOC in any sample is less than 1.5 psia; or

(ii) the separator is enclosed and emissions are vented through an emission abatement system meeting the requirements specified previously for stripped VOC and ammonia.

(2) Chlorine or sulfur dioxide (SO[sub]2[/sub]) shall be used only in containers approved by the United States Department of Transportation and emissions of chlorine or SO[sub]2[/sub] from treatment of water or decontamination of equipment at any water treatment plant shall not exceed ten tons per year.

(3) The following shall not be exempted by this section:

(A) gas stripping or aeration facilities where VOC or other air contaminants are stripped from water directly to the atmosphere;

(B) disposal facilities using land surface treatment;

(C) surface facilities associated with injection wells;

(D) cooling towers in which VOC or other air contaminants may be stripped to the atmosphere.

Source Note: The provisions of this §106.532 adopted to be effective March 14, 1997, 22 TexReg 2439.

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DRY ABRASIVE CLEANING

CSSA uses several steel/bead abrasive cleaners. These cleaners keep the blast material totally enclosed with an integral vacuum system and as such are exempt from permitting based on 30 TAC § 106.452. Emissions are estimated to be negligible and have not been quantified.

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SUBCHAPTER T	SURFACE PREPARATION
RULE §106.452	**Dry Abrasive Cleaning (Previously SE 102)**

Any abrasive cleaning operation that will satisfy paragraphs (1) or (2) of this section is exempt:

(1) enclosed abrasive cleaning:

(A) the particulate matter emissions are evacuated through a fabric filter with a maximum filtering velocity of 4.0 feet per minute (ft/min) with mechanical cleaning or 7.0 ft/min with air cleaning; and

(B) there are no visible fugitive emissions from the facility;

(2) outside blast cleaning:

(A) abrasive usage rate shall not exceed 150 tons per year, 15 tons per month, and one ton per day; and

(B) the blast cleaning is performed at least 500 feet from any recreational area or residence or other structure not occupied or used solely by the owner of the facility or the owner of the property upon which the facility is located; and

(C) records shall be maintained of operating hours and abrasive material usage; and

(D) before construction begins, the facility is registered with the commission's Office of Air Quality in Austin using Form PI-7; and

(E) before construction of the facility begins, written site approval shall be received from the executive director.

Source Note: The provisions of this §106.452 adopted to be effective March 14, 1997, 22 TexReg 2439.

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GRANDFATHERED FACILITY

The gun room located in Building 90 is a grandfathered source based on its construction date of 1962. Records are maintained summarizing the rounds fired, and these records show that usage is essentially constant or decreasing slightly over time (i.e., grandfathered rates are not being exceeded). Emissions estimation for this source is very difficult because no emission factors exist for this type of source and a material balance is not practicable. However, based on various data sources a very conservative (on the high side) estimate is based on 11 tons per year of sand lost. Assuming 98% control, which is typical for cyclone type controls, gives an estimated air emissions of 0.22 tons per year.

SECTION 4
CONCLUSIONS AND RECOMMENDATIONS

Based on emissions estimation and speciation of VOC components provided in this analysis, Title V applicability is not currently triggered at CSSA. However, changes over time could cause this to change. It is imperative to keep appropriate records to continuously demonstrate that current sources are operated in accordance with its specific authorization be it permit, exemption or grandfathered status.

If any changes occur to a permitted source, then that permit may need to be altered or amended. Changes to an exempted source could render that source non-exempt, and a permit application would need to be filed with the TNRCC. Any of these types of changes would change the potential to emit and possibly trigger Title V requirements.

However, based on current levels of emissions it is unlikely that any pollutant would exceed the trigger level, with the exception of VOC. Since a specific HAP has a trigger level of only 10 tons per year, these levels must be closely monitored. Currently, the paint booths and B-3 soil vapor extraction system have the greatest possibility of exceeding this level should changes occur in the future.

APPENDIX A
TNRCC GUIDANCE DOCUMENT FOR POTENTIAL TO EMIT

Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

Date: December 30, 1998

From: Karen N.T. Olson, P.E., Director, Operating Permits Division

Subject: Disclaimer for Distribution of the Draft Potential to Emit Guidance Document

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The staff of the Texas Natural Resource Conservation Commission (TNRCC) Operating Permits Division (OPD) has developed forms and guidance documents to be used in the implementation and administration of the Federal Operating Permit Program required by Title V of the Federal Clean Air Act Amendments.

Attached is a copy of the final draft document for the definition of **Potential to Emit**. The guidance document reflects the current position of the TNRCC on issues relating to the potential to emit.

This guidance document will be final after review by the Public Information and Publications Division and assignment of a publication number. This document may also be updated as new developments occur and may be subject to change. The most recent version of this and all OPD guidance documents will be available on the Internet site at http://www.tnrcc.state.tx.us/air/opd/.

If you have any questions related to this document, please direct them to the following TNRCC OPD staff members: Ms. Nancy Gardiner (512) 239-1313 and Mr. Steve Hagle (512) 239-1295.

Attachment

POTENTIAL TO EMIT

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
TITLE 30 TEXAS ADMINISTRATIVE CODE CHAPTER 122
GUIDANCE DOCUMENT

DECEMBER 1998

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APPENDIX F TNRCC Response to the EPA May 16, 1995 Memo F-1

OVERVIEW

All major sources in Texas will be required to apply for a federal operating permit (FOP) as specified in Texas Natural Resource Conservation Commission (TNRCC) Title 30 Texas Administrative Code Chapter 122 (30 TAC Chapter 122). The objective of this document is to provide guidance to individuals from several companys on the definition of potential to emit (PTE) for purposes of determining applicability for the FOP Program. Furthermore, the document clarifies the primary intent of 30 TAC § 122.122 (Potential to Emit), which is to provide a mechanism for sources at a site, without any other federally enforceable limitations, to limit their PTE such that the site is determined not to be a major source and, therefore, not subject to the FOP Program in Texas.

This guidance is based on the U.S. Environmental Protection Agency (EPA) policies and practices regarding major source new source review (NSR) determinations, the TNRCC's interpretation of the EPA's policy on major source NSR determinations, and the definitions contained in 30 TAC Chapter 122.

I. INTRODUCTION

Regarding general applicability, 30 TAC § 122.120 requires the owner or operator of a **site** to submit an application to the TNRCC for an FOP if the site is a **major source**. As such, the criteria for determining FOP applicability requires an understanding of the terms "site" and "major source" as they are defined in 30 TAC Chapter 122.

A site is defined in 30 TAC § 122.10 as the total of all **stationary sources** located on one or more contiguous or adjacent properties, which are under common control of the same person (or persons under common control). More detailed guidance on the definition of a site is provided in a separate TNRCC guidance document entitled "Definition of a Site."

Title 30 TAC § 122.10 defines a major source as any site which emits or has the **potential to emit:** 10 tpy or more of any single hazardous air pollutant (HAP) or 25 tpy of total combined HAPs, 100 tpy of any air pollutant, or at levels equal to or greater than major thresholds under Part D of Title I (Nonattainment). A list of major source thresholds is shown in Table I-1. The key to determining a site's major source status is calculating its "potential to emit." The PTE of the stationary sources at a site must be calculated and summed to determine if the site is a major source. **NOTE:** The EPA may, by rule, require that some minor sources of HAP emissions comply with maximum achievable control technology (MACT) standards and may also require these or other minor sources to obtain an FOP. For example, minor sources which meet the other applicability criteria of Title 40 Code of Federal Regulations Part 63 (40 CFR Part 63), Subparts M, N, and others apply to minor, as well as, major sources of HAP emissions. Also, some municipal solid waste landfills and solid waste incineration units which may be minor sources are currently required to obtain FOPs.

The TNRCC 30 TAC Chapter 122 definition of potential to emit is the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design or configuration. The definition further states that any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restriction on hours of operation or on the type of material combusted, stored, or processed shall be treated as a part of its design <u>if</u> the limitation is **enforceable by the EPA**[1] (e.g., preconstruction authorization or regulatory requirement).

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[1] The requirement that the PTE must be <u>federally</u> enforceable by the EPA is currently under review by the EPA as a result of recent litigation. In <u>National Mining Association v. EPA</u>, *USEPA, 59 F.3d 1351 (D.C. Circuit July 21, 1995)*, the court remanded the FCAA § 112 General Provisions regulation to EPA for further proceedings. In addition, in <u>Chemical Manufacturers Association v. EPA</u>, No. 89-1514 (D.C. Cir. Sept. 14, 1995), the court remanded the PTE definition in the Prevention of Significant Deterioration (PSD) and NSR regulations and vacated the federal enforceability requirement of the PTE definition in the PSD and NSR regulations. The EPA plans rulemaking in the near future to address this issue and its effect on FCAA § 112, Title V, PSD, and NSR regulations. The term "enforceable" as it is used throughout the remainder of this guidance should be read to mean effectively enforceable by the EPA. See Section V.D. for more discussion on federal enforceability.

Table I-1.
Major Source Thresholds for 30 TAC Chapter 122 Applicability

Area Classification	Major Source Threshold Levels								
	NO_x tpy	CO tpy	SO_2 tpy	PM_{10} tpy	TSP tpy	VOC tpy	Pb tpy	All HAPs tpy	Any Single HAP tpy
Unclassified or Attainment	100	100	100	100	100	100	100	25	10
Marginal or Moderate Ozone Nonattainment[1]	100	100	100	100	100	100	100	25	10
Serious Ozone Nonattainment[2]	50[4]	100	100	100	100	50	100	25	10
Severe Ozone Nonattainment[3]	25	100	100	100	100	25	100	25	10

[1] This includes Hardin, Jefferson, and Orange Counties
[2] This includes El Paso, Collin, Dallas, Denton, and Tarrant Counties
[3] This includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties
[4] The El Paso, Collin, Dallas, Denton, and Tarrant Counties currently have a waiver for NO_x controls under FCAA § 182(f). This means that the major source definition for NO_x for these counties is 100 tpy. See Section V.B. for a discussion of the waiver and possible future changes for Collin, Dallas, Denton, and Tarrant Counties.

The definition of PTE in 30 TAC § 122.10 allows a certified registration of emissions to be considered a part of the **facility's** design if the registration is enforceable. In addition, 30 TAC § 122.10 allows a source's configuration to be considered in determining PTE. The TNRCC will make case-by-case determinations as to how a specific source-type may be limited by operational design or configuration. Section V.G contains guidance concerning inherent limitations on PTE for certain specific source categories.

The certified registration of emissions, provided for in 30 TAC § 122.122, allows sources (without any other available mechanism to limit emissions) a means to limit their site's PTE below all major source thresholds, thereby not requiring the source to obtain an FOP. In addition, 30 TAC § 122.122 may also be used to limit emissions so that the entire site is not subject to 40 CFR Part 63 (maximum achievable control technology [MACT] standards) even if the site is still subject to the FOP Program because of criteria pollutants (non-HAP) emissions. In this case, any limit established through a certified registration of emissions must be codified in the site's subsequent FOP.

However, 30 TAC § 122.122 cannot be used to limit individual **emission units** solely to avoid an applicable requirement such as a MACT standard where other units at the site are still subject to other MACT standards. It should be noted that a site could limit individual emission units to avoid MACT requirements within an issued FOP. Traditional NSR methods such as permit alterations and Form PI-8 can still be used to limit emissions from individual units to avoid MACT requirements.

What makes the limit enforceable?

Prior to 30 TAC Chapter 122 and pursuant to the federal definition, enforceable limitations could only be implemented through NSR preconstruction authorizations (permits, standard permits, exemptions, and registration of emissions provided for under 30 TAC Chapters 106 and 116), other TNRCC regulations, site-specific state implementation plan (SIP) revisions, TNRCC Agreed Orders (AO), and other TNRCC orders. However, the submittal of 30 TAC § 122.122 for incorporation into the Texas SIP provides a new mechanism for stationary sources without any other enforceable emission rates (grandfather sources and possibly others) to limit their PTE through a certified registration. Section V.D contains more detailed information on the latest guidance on federal enforceability.

Please note that PTE is a theoretical calculation used to determine applicability of the FOP Program. A site is not authorized to emit any air pollutant without first satisfying applicable NSR preconstruction requirements pursuant to 30 TAC Chapter 116.

Note: The full definitions of the bolded terms used in this guidance document can be found in Section VI.

II. DETERMINING A SITE'S POTENTIAL TO EMIT

To determine if a site is a major source and, therefore, required to obtain an FOP, the site's total potential emissions considering enforceable emission limitations must first be calculated and compared to the major source thresholds defined in 30 TAC § 122.10. As summarized in Figure II-1 and described in detail in Table II-1, a site's PTE is the sum of the PTE of each emission unit (as defined in 30 TAC Chapter 122) at the site. As noted in Table II-1, the PTE of each emission unit at a site is dependent on whether the unit operates as an NSR permitted, exempted, or grandfather facility.

Fugitive emissions should be included as specified in the definition of a major source in 30 TAC § 122.10. The definition of a major source requires inclusion of fugitive emissions of any HAPs listed in FCAA § 112(b) when determining whether a site emits more than 10 tpy of any single HAP or 25 tpy of any combination of HAPs. However, fugitive emissions of other regulated air pollutants are only included if the source belongs to one of the 27 specific source categories referenced in the definition of major source. See Section VI for a complete definition of major source.

With respect to grandfather facilities, please note that a grandfather facility may not operate at its PTE (if above its grandfather rate) if doing so triggers a modification without first satisfying applicable NSR preconstruction requirements pursuant to 30 TAC Chapter 116. Please contact the NSR Permits Division for guidance to determine whether any proposed change at a grandfather facility is a modification.

In the absence of enforceable rates established in an NSR permit, the applicant should calculate potential emissions based on the methods prescribed by the NSR Permits Division in their Technical Calculation Guidance Documents that are available. See Appendix E for a complete list of available guidance documents. In addition, Section IV has a more detailed discussion and examples of PTE emission calculations.

Figure II-1. Potential to Emit Determination Process

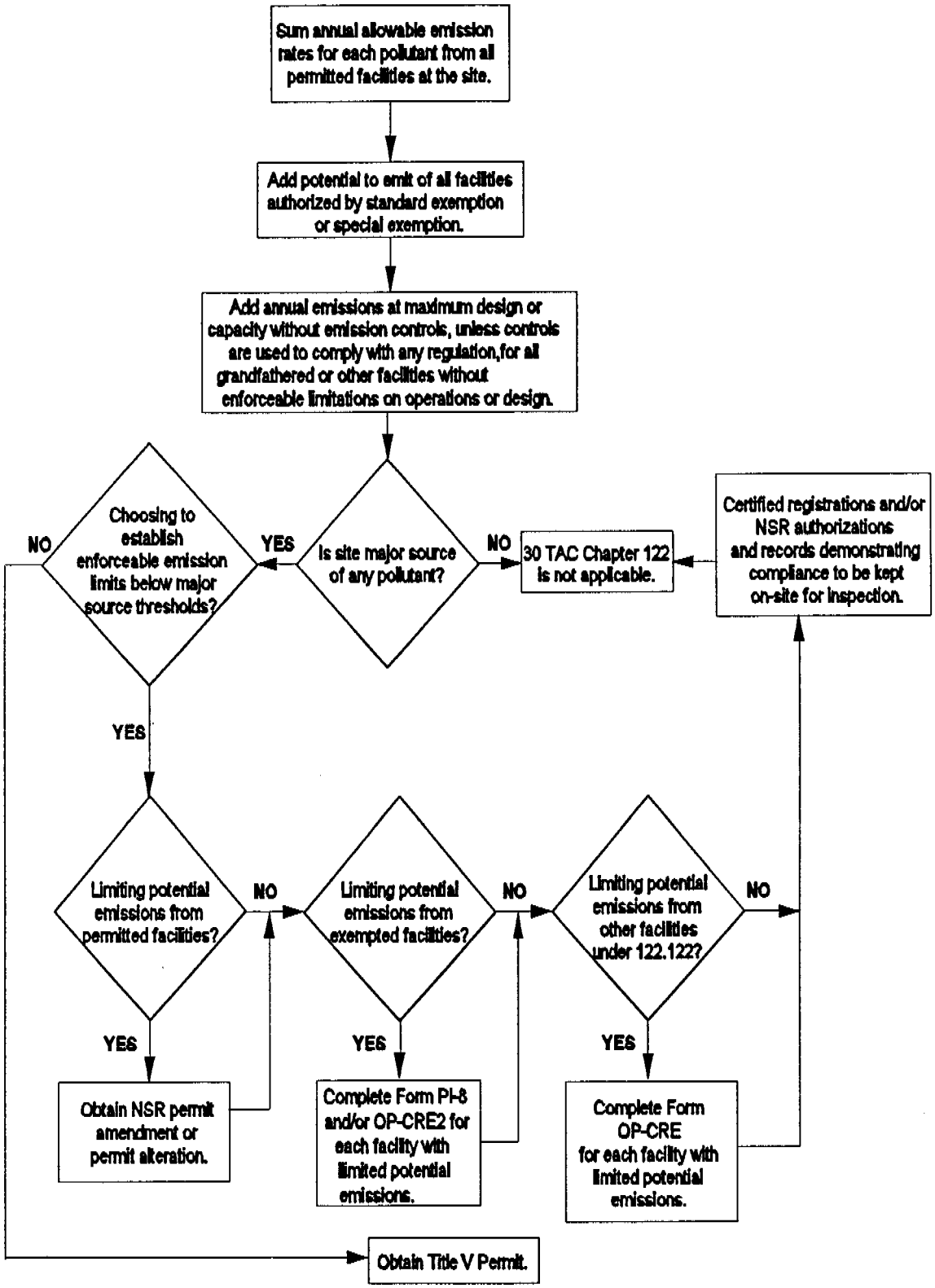


Table II-1.
Determination of Site's Potential to Emit

NSR Authorization Type	Potential To Emit Determination Basis
NSR Permit	Permitted Annual Allowable Emission Rates
NSR Exemption from Permitting	Sum of the following: 1. For each facility that has completed a Form PI-8 certification, the annual emission rates specified in the Form PI-8; 2. For each facility that has <u>not</u> completed a Form PI-8 certification, the lesser of: a. The annual emission rate resulting from the maximum physical and operational design or configuration of the facility. Control equipment that is used to meet the conditions of an exemption from permitting is considered part of the design or configuration; b. A specific limitation within the exemption (e.g., Exemption 106.262; 5 tpy per exemption claim) for the version of the standard exemption list in effect at the time of construction; c. The 250[1] tpy of nitrogen oxides (NO_x) and carbon monoxide (CO) and 25 tpy of any other pollutant for <u>each</u> exempted facility for a site that has gone through public notice at least once; and [2] d. 250[1] tpy of NO_x and CO and 25 tpy of any other pollutant for <u>all</u> existing exempted facilities at the site for a site that has never gone through public notice.
Grandfathered (Possibly Others)	The annual emission rate resulting from the maximum physical and operational design or configuration without consideration for any air pollution control equipment, unless the control equipment is required by regulation (e.g., 30 TAC § 115.112 and 30 TAC § 117.205[d]).

[1] These emission limits may change to 100 tpy of NO_x and CO, 10 tpy of a single HAP or 25 tpy of any combination of HAPs as defined in FCAA § 112(b) and 25 tpy of any other pollutant as a result of rulemaking currently in progress.

[2] In order to avoid prevention of significant deterioration (PSD) or nonattainment permitting, new major sources or major modifications may be required to have their potential emissions less than the 250/25 tpy limit specified in 30 TAC § 106.4.

After summing a site's potential emissions, if the potential emissions equal or exceed the appropriate major source threshold for any individual air pollutant, the site must apply for an FOP or seek additional enforceable emission limitations to restrict the site's emissions below these levels. The mechanisms to establish additional enforceable emission limitations are discussed in detail in Section III of this document.

If the site's total potential emissions are less than the major source thresholds for each individual air pollutant, an FOP application is not required. For a site that is a minor source (without establishing any enforceable emission limitations), there are no specific requirements for demonstrating compliance, such as monitoring and recordkeeping. However, it is the owner or operator's responsibility to ensure that appropriate documentation be maintained to demonstrate the site's minor status in the event of an inspection.

III. ESTABLISHING ADDITIONAL ENFORCEABLE LIMITS

III.A. Mechanisms to Establish Additional Enforceable Limits

Once a site has been determined to have potential emissions that exceed the major source thresholds for any pollutant specified in Table I-1, the site must apply for an FOP or seek additional enforceable emission limitations to restrict the site's emissions below these levels. If a site elects to establish reduced enforceable emission rates so that an FOP is not required, there are several available mechanisms depending on how the emission units are currently authorized under NSR. These mechanisms include the following:

Emission Unit Status	Mechanisms
Permit	Permit Alteration or Amendment Standard Permit
Exemption from Permitting	Certification of Enforceable Emission Limits (Form PI-8), and/or Registration of Emissions for Referenced Preconstruction Authorizations (Form OP-CRE2)
Other (Grandfathered, Possibly Others)	Registration of Emissions (Form OP-CRE1)

III.A.1. NSR Permitted Emission Units

As shown in the table above, NSR permitted emission units may revise enforceable limitations in their existing permit to reduce artificially high potential emissions or to account for additional control equipment installed to reduce the potential emissions for sources covered by the permit. In most cases, this may be accomplished using the simplified permit alteration process specified in 30 TAC § 116.116(c) or possibly a standard permit specified in 30 TAC Chapter 116, Subchapter F.

III.A.2. NSR Exemptions from Permitting

Facilities authorized under one or more exemptions from permitting may establish enforceable emission limitations below major source threshold using the NSR Permits Division's existing Form PI-8 (see Appendix B) and/or the Form OP-CRE2 (Registration of Emissions for Referenced Preconstruction Authorizations) (see Appendix D for form and instructions). The following paragraphs describe when each form should be used.

Use of Form PI-8:

An owner or operator of a facility authorized under exemption may use Form PI-8 to establish reduced enforceable emission rates in the following situations:

- The site has facilities operating under exemption registered with one or more PI-8 forms;
- The site has facilities operating under exemption(s) not requiring Form PI-7 registration; or
- The site has facilities operating under exemption(s) requiring Form PI-7 registration.

Basically, Form PI-8 is used as a certification for exemptions whereby the emission rates represented in the form become enforceable and can be relied upon in determining major source status. In the event that the site is operating under exemptions registered using several PI-7s, Form OP-CRE2 (as described below) can be used to reference the existing PI-7 registrations rather than completing new Form PI-8s.

Please note that the owner or operator using a Form PI-8 must follow the requirements specified in 30 TAC § 106.6. This includes documentation of the basis of emission estimates and a written statement by the registrant that the emission rates reflect the reasonably anticipated maximums for the facility. The Form PI-8 must be kept on site or at a designated location and is not required to be submitted to the TNRCC. Furthermore, it is imperative that Form PI-8 together with any associated controls, be in place by the date an FOP application would be due if the site were major.

Use of Form OP-CRE2:

Form OP-CRE2 should be used to establish reduced enforceable emission rates for a site that is authorized by existing Form PI-7 registrations. As described in the instructions in Appendix D, the main purpose of Form OP-CRE2 is to provide sources with existing PI-7s, a streamlined mechanism to limit emissions below major source thresholds *without having to prepare new Form PI-8s*. The previously completed Form PI-7s (which include specific emission rate limits) become enforceable after being referenced in the Form OP-CRE2 and certified by the Responsible Official, Duly Authorized Representative, Designated Representative, or Alternate Designated Representative.

In the event that the owner or operator of a site seeking to use a Form OP-CRE2 is authorized under a combination of NSR authorizations (i.e., exemptions and permits), Form OP-CRE2 must also reference all exemptions certified under Form PI-8, as well as, previously issued NSR permits. This is required because the owner or operator must demonstrate that all facilities at the site, when combined, do not trigger FOP Program permitting requirements.

If the site has grandfathered facilities or facilities authorized without any other mechanism to limit emissions (for example: facilities for which the owner or operator received a letter stating that no permit was required), a Form OP-CRE1 must also be completed for those facilities. If any of these facilites meet a current exemption, the owner or operator may instead choose to claim the exemption and use a Form PI-8 to limit the PTE.

Currently, the Form PI-8 and some of the older NSR permits do not explicitly require detailed documentation necessary to demonstrate ongoing compliance. As such, the Form OP-CRE2 does not specifically require the owner or operator to maintain records demonstrating that the site is not subject to the FOP Program. However, it is the owner or operator's responsibility to ensure that appropriate documentation be maintained to demonstrate the site's minor status in the event of an inspection.

The Form OP-CRE2 must be kept on site or at a designated location and is <u>not required</u> to be submitted to the TNRCC. Just as with Form PI-8, it is imperative that Form OP-CRE2, together with any associated controls, be in place by the date an FOP application would be due if the site were major.

III.A.3. Other (Grandfather, Possibly Others)

Sources without any other enforceable emission limits (grandfather sources and possibly others) may limit their potential emissions by means of a certified registration of emissions using the Form OP-CRE1 (see Appendix C for form and instructions). Although this is a new mechanism to establish enforceable limitations under 30 TAC Chapter 122, the Form OP-CRE1 is similar to the Form PI-8 used for exempted facilities.

If emission controls are added to a grandfathered unit to reduce the site's PTE or the source elects to take operational restrictions (i.e., reduced hours of operation or reduced production, etc.), the Form OP-CRE1 should be used to register the associated reduced emission rate. However, in cases where the control device is a facility as defined in the Texas Clean Air Act (TCAA) (e.g., flare or incinerator) or when the facility undergoes a modification; a permit, standard permit, or exemption must be obtained pursuant to 30 TAC Chapter 116 or 106.

It is important to note that a grandfathered facility may not set a limit in the Form OP-CRE1 up to its PTE (if above its grandfathered rate) if doing so triggers a modification without first satisfying applicable NSR preconstruction requirements pursuant to 30 TAC Chapter 106 or 116. Please contact the NSR Permits Division for guidance to determine whether any proposed change at a grandfather facility is a modification.

Figures III-1(a) and (b) provide examples to illustrate how to limit the potential emissions for a grandfathered unit. In Figure III-1(a), the PTE and grandfathered rate (as determined by the NSR Permits Division) are greater than the major source threshold. In order to demonstrate nonapplicability, the site would establish a limit less than the grandfather rate in Form OP-CRE1, such that the site's PTE is less than any major source threshold. If the owner or operator decides to operate at the grandfathered rate, then they must apply for an FOP.

In Figure III-1(b), the grandfathered rate is shown as less than 80 tpy. For purposes of this example, assume that the company cannot operate above their grandfathered rate without making a modification as defined in 30 TAC § 116.10. Therefore, the enforceable emission limit in the Form OP-CRE1 would have to be less than or equal to the grandfathered rate as determined by the NSR Permits Division.

Finally, please note that 30 TAC § 122.122 does not require owners or operators to submit a Form OP-CRE1 to the TNRCC. However, all certified registrations (Forms PI-8, OP-CRE1, and OP-CRE2) and NSR permits must be kept on site or at an accessible designated location and be made available for inspection during regular business hours upon request by the EPA, the TNRCC, or any other air pollution control agency having jurisdiction. In addition, all records demonstrating ongoing compliance with the represented emission limits must also be kept on site or at an accessible designated location and made available for inspection during regular business hours.

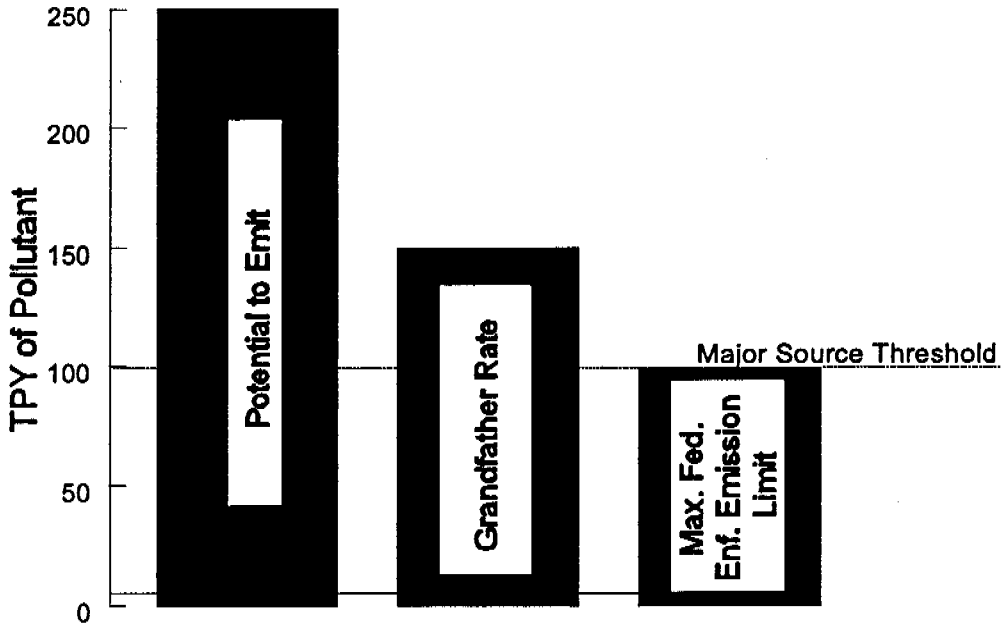
III.B. Dates Required to Establish Enforceable Limits

All sites that are proposing to establish enforceable emission limits less than major source thresholds must do so by the date that an FOP application would be due if the site was major.

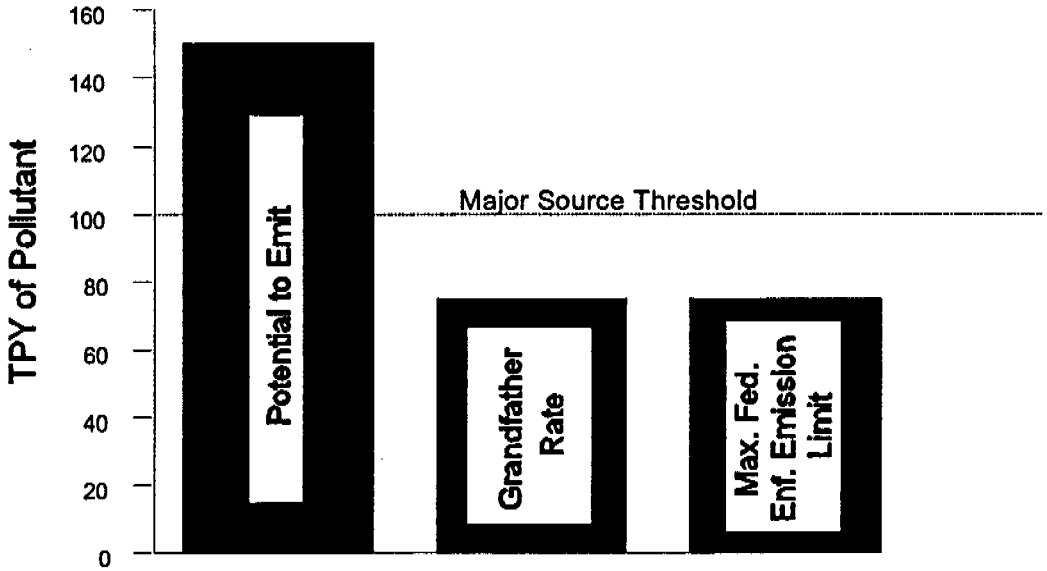
All existing sites subject to the FOP Program should have submitted a full or abbreviated permit application on or before February 1, 1998, as specified in 30 TAC Chapter 122 .

The owner or operator of sites that have established enforceable emissions rates below all major source thresholds and later become subject to the FOP Program as a result of an action by the Executive Director or the EPA after the effective date of either the interim or full program, shall submit permit applications no later than 12 months after the action that subjects the site to the FOP Program. New sites or sites that become subject to the FOP Program, as a result of a change at the site, must submit an abbreviated application prior to operating the new emission units or the change. Applicants may have an application or permit voided for a site upon establishing enforceable emission limits below all major source thresholds.

Figure III-1. Example of Limiting a Grandfathered Unit's Potential to Emit



(a)



(b)

III.C. Documentation and Recordkeeping

As required in 30 TAC § 122.122, if the company uses the Form OP-CRE1 to limit potential emissions such that the site is not subject to the FOP Program, the company must demonstrate that the emissions are less than major thresholds on an ongoing basis. Therefore, it is critical that enforceable documentation of the emission rates and/or operating parameters be maintained at the site or an accessible designated location for inspection by the EPA, the TNRCC, or any other air pollution control agency having jurisdiction for at least five years. This documentation may include, but is not limited to, production rate or throughput, hours of operation, type or amount of material combusted, stored, or processed, and other appropriate operating parameters temperature, pressure, flow rate, etc., as necessary to demonstrate that the source is in compliance with the emission limitations represented in the Form OP-CRE1 registration.

Although Forms PI-8 and OP-CRE2 do not specifically require the owner or operator to maintain records demonstrating that the site is not subject to 30 TAC Chapter 122, it is the owner or operator's responsibility to ensure that appropriate documentation be maintained to demonstrate the site's minor status in the event of an inspection. Therefore, sites utilizing these mechanisms to avoid 30 TAC Chapter 122 applicability may consider maintaining records similar to those required for Form OP-CRE1 on site or at an accessible designated location for inspection by the EPA, the TNRCC, or any other air pollution control agency having jurisdiction.

IV. DETERMINING POTENTIAL TO EMIT

IV.A. Calculating Potential to Emit

There are several divisions and sections within the TNRCC Office of Air Quality that review emissions calculations submitted by industry. These include the NSR Permits Division and Industrial Emissions Assessment Section. The NSR Permits Division uses methods to calculate potential emissions to establish enforceable operational limits for sources in permits. The Industrial Emissions Assessment Section requires facilities to calculate actual emissions, as accurately as possible, for use in emission control strategies and regulation development. The Industrial Emissions Assessment Section also bases emission fees on measured actual emissions, calculated actual emissions, and/or allowable permitted emissions.

Since 30 TAC Chapter 122 applicability is based on PTE, and a key element of PTE is enforceability, all emission calculation methods used to determine PTE must consider enforceability. Currently, the NSR Permits Division establishes enforceable limitations through various permit and exemption authorizations. Since the determination of PTE relies on existing enforceable NSR authorizations, it follows that companies calculating the PTE for 30 TAC Chapter 122 purposes should only use the most recent emission calculation methods approved by the NSR Permits Division.

Although the TNRCC can establish PTE limitations through the FOP, these limitations must be consistent with the method used by the NSR Permits Division when establishing the PTE for PSD, nonattainment review, or state permitting purposes. As a result, the NSR Permits Division and OPD

must use identical methods to calculate the PTE, especially since OPD is relying on NSR preconstruction authorizations for many of the mechanisms to establish PTE limitations.

Currently, the NSR Permits Division has technical guidance available that discusses the calculation methods for PTE for various processes and types of facilities. A comprehensive list of these technical guidance documents is presented in Appendix E. Copies of these guidance documents can be obtained from the NSR Permits Division. Additionally, these guidance documents are also available through the TNRCC World Wide Web Site at http://www.tnrcc.state.tx.us/air/nsr_permits/nsrhome.htm.

IV.B. Examples for Calculating Potential to Emit

Example 1

A wafer board mill is comprised of one preprocessing area, one shipping area, and two production lines. Each production line is comprised of one rotary dryer, one resin applicator, and one press. The preprocessing and shipping areas, one entire production line, and the resin applicator and press from the second production line have preconstruction authorization in an NSR permit. The remaining rotary dryer is grandfathered.

In the permit, the preprocessing and shipping areas have annual allowable emission rates based on 100 million square feet ($MMft^2$) of wafer board on 5/8 inch basis. The permitted production line has annual allowable emissions based on 50 $MMft^2$ of wafer board. The permitted resin applicator and press from the second production line have annual allowable emission rates based on 50 $MMft^2$ of wafer board for the second production line.

The grandfathered rotary dryer has a maximum operational design capacity that would produce 90 $MMft^2$ of wafer board. The grandfather rate of the dryer (as determined by the NSR Permits Division) is 70 $MMft^2$ of wafer board. In the event the dryer produces more dry wood than the presses can process, dried wood can be stored in bins or on open floor space adjacent to the presses.

What production rate is the PTE for the site based on?

For all the permitted equipment, the PTE is based on the site production rate of 100 $MMft^2$ of wafer board or production line rate of 50 $MMft^2$ of wafer board, since the annual allowable emission rates are based on that production rate. For the grandfather dryer, its potential emissions would be based on its design capacity since its production can bypass the presses even though the dryer and presses are in series. Although its PTE for 30 TAC Chapter 122 purposes would be based on 90 $MMft^2$, the dryer could not operate above 70 $MMft^2$ without triggering a modification that would require NSR preconstruction authorization.

Example 2

A natural gas processing station receives gas from a natural gas field which is located several miles from the station. The function of the processing station is to remove impurities (e.g., hydrogen sulfide, carbon dioxide, water) from the natural gas and then increase the gas pressure for transport by pipeline for sale. The station consists of one gas sweetening unit, one dehydration unit, and a three-stage gas compressor unit. All units are physically connected together in series with no means of bypass with the exception of a tie-in to an emergency flare. The compressor unit is comprised of three compressors arranged in series, each driven by a reciprocating internal combustion engine. All the units at the site are grandfathered units and are not subject to emission limits or control requirements in any TNRCC regulations nor has the site been issued any TNRCC AO or been used in a site-specific SIP revision.

Two of the compressors have a design capacity of 1,200 million dry standard cubic feet per year (MMdscf/yr), with the third having a design capacity of 1,100 MMdscf/yr. Company records show that the maximum production rate of the natural gas field, when it was first utilized, was 880 MMdscf/yr of natural gas. Currently, the production rate has declined to 600 MMdscf/yr of natural gas.

What production rate is the PTE for the site based on?

Since all the units are grandfathered units, the maximum capacity based on the physical and operational design or configuration must be used in calculating the potential emissions because grandfathered rates are not enforceable. Considering the configuration of the site, with all units connected in series, it is not possible for all pieces of equipment to operate simultaneously at their rated capacity. As a result of the equipment configuration, the maximum capacity of all units would be the capacity of the unit with the lowest maximum capacity. For this example, this would be 1,100 MMdscf/yr of natural gas for the third compressor. The other compressors at the site can never achieve their individual capacities of 1,200 MMdscf/yr as long as they are connected to the third compressor.

IV.C. Limiting Potential to Emit

Example 1

A site is located in a moderate ozone nonattainment area (See Table I-1 for a list of counties and major source thresholds) and consists of three emission units. One unit has been authorized by an NSR permit and another by an exemption certified using a Form PI-8. The third emission unit is grandfathered. The PTE for TNRCC 30 TAC Chapter 122 applicability of each emission unit and the entire site is shown in Table IV-1. It is clear that the site is a major source of NO_x and CO (this is assuming that the volatile organic compounds [VOCs] emission rate contains less than 25 tpy of all HAPs and 10 tpy of any single HAP). As shown in Table IV-1, the PTE of the grandfather unit

is 100 tpy of NO_x and CO; and 50 tpy of VOC. The grandfathered rate above which the company would have to modify its unit and obtain NSR preconstruction authorization is 40 tpy of NO_x, CO, and VOC. Thus, the maximum allowed annual emission rates for the site are less than any major source threshold.

Table IV-1.

Example of Potential to Emit for 30 TAC Chapter 122 Applicability and Enforceable Emission Limits

Example 1

Unit Type	Potential To Emit For 30 TAC Chapter 122 Applicability			Maximum Allowed Annual Emission Rate			Enforceable Maximum Emission Limit		
	NO_x tpy	CO tpy	VOC* tpy	NO_x tpy	CO tpy	VOC* tpy	NO_x tpy	CO tpy	VOC* tpy
Permitted	25	25	10	25	25	10	25	25	10
Exempted	25	25	10	25	25	10	25	25	10
Grandfathered	100	100	50	40	40	40	40	40	40
Site Total	150	150	70	90	90	60	90	90	60

*Assume that VOC emission rate contain less than 25 tpy of all HAPs and 10 tpy of any single HAP.

How can the owner or operator of the site limit the site's potential emissions below all major source thresholds?

Since the grandfathered unit cannot emit up to its potential or beyond its grandfather rate without triggering a modification, the owner or operator must establish an enforceable emission rate that is less than or equal to the grandfather rate in order to demonstrate that the site is not subject to 30 TAC Chapter 122 . The owner or operator would document emission rates which are less than major source thresholds by completing the Form OP-CRE1. Documentation that demonstrates compliance with the emission rates contained in the Form OP-CRE1; and the Form OP-CRE1 itself must be kept on site or at an accessible designated location and be made available upon inspection by the TNRCC, the EPA, or local agency with jurisdiction for at least five years.

Note that the VOC emission rate need not be listed on the Form OP-CRE1 because the potential emission rate of VOC was less than the major source threshold. It is the owner or operator's discretion to establish enforceable emission limits for any pollutant not triggering major source thresholds.

In addition, it is <u>not</u> necessary to complete Form OP-CRE2 to reference the NSR permitted facility and exempted facility in this situation. This is because the exemption at the site was authorized using Form PI-8 (rather than Form PI-7) which is considered enforceable. If the exemption at the site was authorized using Form PI-7, the company would have to either complete a Form OP-CRE2 to reference the Form PI-7 registration and the NSR permit at the site or complete a Form PI-8 to make the rates in the exemption enforceable.

Example 2

A site is located in a moderate ozone nonattainment area (See Table I-1 for a list of counties and major source thresholds) and comprised of three emission units. One unit has been authorized by an NSR permit and another by exemption registered using Form PI-7. The third emission unit is grandfathered. The PTE for TNRCC 30 TAC Chapter 122 applicability of each emission unit and the entire site is shown in Table IV-2. The site is a major source of NO_x, CO, and VOC (this is assuming that the VOC emission rate contains less than 25 tpy of all HAPs and 10 tpy of any single HAP). In this case, the maximum authorized annual emission rate of each unit is by itself above a major source threshold.

How can the owner or operator of the site limit the site's potential emissions below all major source thresholds?

The owner or operator would obtain an NSR permit alteration or amendment for the permitted unit such that the enforceable maximum VOC emission limit for the site is less than 100 tpy. In addition, a Form PI-8 would be completed to establish an enforceable maximum emission limit for the exempted unit such that the CO annual emission rate for the site is less than 100 tpy. The Form PI-8 was required because the original Form PI-7 included a maximum allowable CO rate of 100 tpy.

Just as with Example 1, it is <u>not</u> necessary to complete a Form OP-CRE2 to reference the NSR permitted facility and exempted facility.

The owner or operator would also establish enforceable emission rates of NO_x, CO, and VOC for the grandfathered unit by completing a Form OP-CRE1. As a reminder, the owner or operator would not establish enforceable emission limitations above the unit's grandfather rate if that higher limit would require a modification. Documentation that demonstrates compliance with the emission rates contained in Form OP-CRE1 must be kept on site or at an accessible designated location and be made available upon inspection by the TNRCC, the EPA, or local agency with jurisdiction for at least five years.

Table IV-2.

Example of Potential to Emit for 30 TAC Chapter 122 Applicability and Enforceable Emission Limits

Example 2

Unit Type	Potential To Emit For 30 TAC Chapter 122 Applicability			Maximum Allowed Annual Emission Rate			Enforceable Maximum Emission Limit		
	NO_x tpy	CO tpy	VOC* tpy	NO_x tpy	CO tpy	VOC* tpy	NO_x tpy	CO tpy	VOC* tpy
Permitted	25	25	100	25	25	100	25	25	49
Exempted	25	100	10	25	100	10	25	54	10
Grandfathered	150	25	50	120	20	40	49	20	40
Site Total	200	150	160	170	145	150	99	99	99

*Assume that VOC emission rate contains less than 25 tpy of all HAPs and 10 tpy of any single HAP.

V. RELATED ISSUES

V.A. Limiting Potential to Emit for Sources Subject to MACT Standards

The preceding sections discussed the interpretation and implementation of 30 TAC § 122.122 (through Form OP-CRE1) to limit a site's PTE below major source thresholds, such that the requirement to obtain an FOP does not apply. However, there may be circumstances when an applicant wants to limit the PTE of an emission unit without any other enforceable emission limitation (i.e., grandfathered sources and possibly others) for purposes of determining applicability with an "applicable requirement" such as a MACT standard. In such situations, it should be noted that 30 TAC § 122.122 cannot be used to limit individual emission units solely to avoid an applicable requirement such as MACT standard when remaining units at the site are subject to other MACT standards. However, a site could limit individual emission units to avoid MACT requirements within an issued FOP. The site can also use NSR methods such as permit alterations and Form PI-8 to limit the PTE of individual emission units to avoid MACT requirements.

Form OP-CRE1 may, however, be used to limit emissions such that the entire site is not subject to a MACT standard even if the site is still subject to the FOP Program because of criteria pollutant (non-HAP) emissions. In this case, any limit established through the Form OP-CRE1 must be codified in the site's subsequent FOP (or in the application for a general operating permit).

V.B. NO_x Exemption Pursuant to FCAA § 182(f)

The FCAA § 182(f) requires measures to reduce emissions of NO_x in ozone nonattainment areas except where the EPA has determined that net air quality benefits are greater in the absence of NO_x reductions. Approval of an exemption under FCAA § 182(f) waives the federal requirements for NO_x reasonably available control technology, nonattainment NSR, vehicle conformity, maintenance, and inspections for the period of the exemption. The TNRCC, with the approval of the EPA, currently has two ozone nonattainment areas where this exemption from NO_x controls is in effect - the Dallas/Fort Worth (DFW) and El Paso ozone nonattainment areas. This means that the major source definition for NO_x emissions in these two areas remains at 100 tpy rather than the 50 tpy normally associated with serious ozone nonattainment areas.

Recent TNRCC modeling indicates that NO_x controls may be needed for the DFW area to attain the ozone standard. When rulemaking to implement NO_x reductions for the DFW area is complete, it is expected that the EPA will rescind the FCAA § 182(f) exemption for the DFW area. At the time when the EPA rescinds the exemption, the major source definition for NO_x will become 50 tpy. Existing sites which are not major for any other pollutant, but which emit between 50 and 100 tpy of NO_x will then have 12 months after the EPA takes action to rescind the exemption to submit an FOP application.

V.C. Rulemaking Under FCAA § 302(j) - Inclusion of Fugitive Emissions

In the supplemental 40 CFR Part 70 Proposal (60 FR 45530), the EPA proposed to revise 40 CFR § 70.2, Paragraph (2)(xxvii) of the definition of major source, to require that fugitive

emissions be included for source categories subject to standards promulgated under FCAA § 111 or § 112 for which the EPA has made an affirmative determination under FCAA § 302(j). Although the EPA has yet to finalize the revisions to 40 CFR Part 70, 30 TAC Chapter 122 has been revised by the TNRCC to require that, for purposes of determining if a site is major, fugitive emissions must be counted for any source category regulated under FCAA § 111 or § 112 for which the EPA has made an affirmative determination under FCAA § 302(j). This requirement can be found in 30 TAC § 122.10(8)(C)(xxvii). The source categories regulated under FCAA § 111 for which fugitves currently must be counted are: 40 CFR Part 60, Subparts D, Da, E-J, K, Ka, L-N, O-Z, AA, BB-DD, GG, HH, KK, MM, NN, and PP. The source categories regulated under FCAA § 112 for which fugitives currently must be counted are: 40 CFR Part 61, Subparts C - F and M. It is important to note that a particular source does not have to be subject to the particular subpart in order to be required to count fugitve emissions for purposes of determining if a site is major. For example, a source may have been built prior to the applicability date of a particular 40 CFR Part 60 subpart. Fugitive emissions from the source must still be included in determining the PTE if the source belongs to the source category regulated by the subpart.

V. D. Federal Enforceability

A "major" source is defined for purposes of FCAA § 112, 30 TAC Chapter 122, and the Title I NSR programs as one that either "emits or has the potential to emit" above a specified amount. The EPA regulations provide that "controls" (i.e., both pollution control equipment and operational restrictions) that limit a source's maximum capacity to emit a pollutant may be considered in determining its PTE. Historically, large numbers of new or modified sources that otherwise would be subject to NSR permitting requirements have limited their PTE in order to obtain "synthetic minor" status and, thereby, avoid major source requirements. With the advent of OPPs under the FOP Program and the MACT program under FCAA § 112, many sources that otherwise would be subject to these new requirements under the FCAA Amendments are obtaining PTE limits to avoid applicability. For each of these programs, the EPA regulations have historically required that PTE limits be "federally enforceable" in order to be considered in determining the PTE.

The EPA, in 40 CFR § 52.21(b)(17), defines federally enforceable as, "all limitations and conditions which are enforceable by the administrator, including those requirements developed pursuant to 40 CFR Parts 60 and 61, requirements within any applicable SIP, any permit requirements established pursuant to 40 CFR § 52.21 or under regulations approved pursuant to 40 CFR Part 51, Subpart I, including operating permits issued under an EPA-approved program that is incorporated into the SIP and expressly requires adherence to any permit issued under such program."

These federal enforceability requirements were the subject of two recent decisions of the D.C. Circuit Court of Appeals. The first decision, National Mining Association v. EPA, 59 F.3d 1351 (D.C. Cir. July 21, 1995), dealt with the PTE definition under the HAP programs promulgated pursuant to FCAA § 112. In this decision, the court implicitly accepted EPA's argument that only "effective" state-issued controls should be cognizable in limiting the PTE. In addition, the court did not question the validity of current federally enforceable mechanisms in limiting the PTE. However, the court found that the EPA had not adequately explained why only federally enforceable measures should be considered in assessing the effectiveness of state-issued controls. Accordingly, the court

remanded the FCAA § 112 General Provisions regulation to the EPA for further proceedings. Thus, the EPA must either provide a better explanation as to why federal enforceability promotes the effectiveness of state controls or remove the exclusive federal enforceability requirement. The court did not vacate the FCAA § 112 regulations, and they remain in effect pending completion of the EPA rulemaking proceedings in response to the court's remand.

The second decision, Chemical Manufacturers Assn. v. EPA, No. 89-1514 (D.C. Cir. Sept. 15, 1995), dealt with the PTE definition in the PSD and NSR programs. Specifically, this case challenged the June 1989 rulemaking in which the EPA reaffirmed the requirement for federal enforceability of PTE limits taken to avoid major source permitting requirements in these programs. In a briefly worded judgment, the court, in light of National Mining, remanded the PSD and NSR regulations to the EPA. In addition, in contrast to its disposition of the FCAA § 112 regulations in National Mining, the court in Chemical Manufacturers vacated the federal enforceability requirement of the PTE definitions in the PSD and NSR regulations.

Subsequent to these court rulings the EPA has issued two memos, "Release of Interim Policy on Federal Enforceability of Limitations on Potential to Emit" from Mr. John Seitz, dated January 22, 1996 and "Effective Limits on Potential to Emit: Issues and Options" from Mr. Steven Herman and Ms. Mary Nichols, dated January 31, 1996. These guidance memos clarify the impacts of the two court decisions and may be accessed on the Internet at http://www.epa.gov/ttn. These documents may also be obtained from the EPA Technology Transfer Network Bulletin Board System by calling (919) 541-5742 from a computer equipped with a modem.

At the present time, the issue of federal enforceability and what the EPA considers to be an "effective" limit on a site's PTE is still unresolved. The EPA staff has indicated that further guidance and possibly rulemaking on this topic will be developed. The OPD considers the mechanisms identified in 30 TAC § 122.122 and discussed in this guidance document to be "effectively enforceable" and thus enforceable for purposes of limiting the PTE. The OPD staff will evaluate future guidance and/or rulemaking by the EPA and propose changes to the current PTE limiting mechanisms, if necessary.

V. E. Shutdowns

If an applicant claims that an emission unit or process is no longer in operation and it is not included in the site's PTE, this shutdown must be enforceable. The EPA considers equipment to be *permanently* shut down if the equipment is out of service for two years or more, if emission units are removed from the site's emissions inventory, or if the emissions reductions resulting from the shutdown are relied on in issuing an NSR permit. Shutdowns in which the owner or operator has deposited the emission reductions into the emission banking system pursuant to 30 TAC § 101.29 are also enforceable. Temporary shutdowns would be situations that do not fall into the permanent shutdown category.

For a site with shutdown equipment which is still in place and capable of operating and the site is not subject to the FOP Program, the shutdown must be enforceable though representation in a Form PI-8, Form OP-CRE1, Form OP-CRE2, or NSR permit. For those sites required to get an FOP, the shutdown should be included in the permit.

V.F. The EPA Guidance Documents

The following table provides a list of all the guidance documents recently issued by the EPA regarding the PTE. It should be noted that EPA's documents are strictly guidance and are subject to review and comment by the TNRCC. The TNRCC staff will review future EPA guidance documents and issue a formal response or interpretation as necessary. See Section V.G. for the OPD staff's guidance on inherent limitations restricting the PTE.

Date	EPA Guidance Document
01/31/96	"Effective" Limits on Potential to Emit: Issues and Options
01/22/96	Release of Interim Policy on Federal Enforceability of Limitations on Potential to Emit
11/14/95	Calculating Potential to Emit and Other Guidance for Grain Handling Facilities
09/06/96	Calculating Potential to Emit for Emergency Generators
05/16/95	Potential to Emit for MACT Standards - Guidance on Timing Issues
01/25/95	Options for Limiting the Potential to Emit (PTE) of a Stationary Source Under Section 112 and Title V of the Clean Air Act (Act)
04/14/98	Potential to Emit (PTE) Guidance for Specific Source Categories

Copies of the above guidance documents can be obtained by downloading them from the EPA's website at *http://www.epa.gov/ttn/oarpg*. The TTN BBS can also be accessed by dialing (919) 541-5742 on a computer equipped with a modem.

V.G. Guidance on Inherent Limitations Restricting the Potential to Emit

Pursuant to an initiative established in a memorandum on January 25, 1995, the EPA is in the process of providing guidance on specific source types they believe have inherent physical limitations and operational design features which restrict potential emissions. The EPA believes that for such facilities, if their physical limitations or design features are not taken into account, the potential emissions could be overestimated and the source could be subject to the FOP Program. Although owners or operators could accept enforceable limitations, the EPA believes this administrative requirement to be unnecessary and burdensome. The EPA has issued such guidance for grain handling facilities (November 14, 1995) and emergency generators (September 6, 1995). In an April 14, 1998 document entitled "Potential to Emit (PTE) Guidance for Specific Source Categories," the EPA also issued guidance for gasoline service stations; gasoline bulk plants; boilers with a capacity

of 100 MMBtu/hr or less and burning natural gas and/or oil; cotton gins; coating sources; printing, publishing, and packaging operations; degreasers using volatile organic solvents; and hot mix asphalt plants.

The TNRCC supports many of the EPA concepts to minimize unnecessary administrative burdens for these types of sources and may issue additional technical guidance on similar specific source types. One such source type for which TNRCC has issued PTE guidance is the inherent limitation of the operational design or configuration of certain oil and gas operations. This guidance document may be found on the TNRCC website at *http://www.tnrcc.state.tx.us/air/opd/formswp.htm#gd.*

A site whose operations are constrained by an inherent limitation which restricts emissions below a major source threshold does not need any additional documentation if they are following the procedures outlined in a guidance document provided by the EPA or the TNRCC. However, these sources may choose to also document their emissions limitations through one of the mechanisms identified in 30 TAC § 122.122.

The owner or operator of any site not covered by an EPA or TNRCC guidance document who chooses not to limit emissions through a means identified in 30 TAC § 122.122, but claims their operations are constrained by an inherent limitation which restricts their emissions below the major source threshold must first schedule a pre-meeting with the OPD staff to discuss their specific inherent limitation. A pre-meeting is necessary to ensure that the TNRCC fully understands the reasons why the site is constrained below their physical or operational design. A pre-meeting may also be required if specified in a TNRCC guidance document.

V.H. Upset, Maintenance, Start-up and Shutdown Emissions

Upset, maintenance, start-up and shutdown emissions are exempt from compliance with air emissions limitations established in permits, rules, and orders of the commission, or as authorized by Texas Clean Air Act, § 382.0518(g) if the owner or operator complies with the conditions of 30 TAC § 101.11. In addition, the NSR Permits Division does not include upset, maintenance, start-up and shutdown emissions when determining applicability to federal programs such as nonattainment or PSD, nor do they typically include these emissions in NSR permits. For these reasons, upset, maintenance, start-up and shutdown emissions should not be included in the PTE calculations when determining 30 TAC Chapter 122 applicability, unless such emissions are specifically contained in an NSR, nonattainment, or PSD air permit, or are required by rule or regulation. An example of a rule that potentially regulates maintenance emissions is contained in 40 CFR § 60.292(e), Subpart CC (Standards of Performance for Glass Manufacturing Plants). This regulation contains emission limitations for routine maintenance of add-on control devices for glass manufacturing plants in certain circumstances. As an opposite example, the upset emissions from an emergency flare, which is used only during upset conditions, would not need to be included in a site's PTE calculation, unless such emissions were specifically contained in permitted emissions or were required to be calculated by rule or regulation. Emissions normally included in a permit, such as emissions associated with a pilot or any continuous process vent, would need to be included in the PTE calculation.

VI. DEFINITIONS

Emission unit - The smallest discrete or identifiable structure, device, item, equipment, or enclosure that constitutes or contains a point of origin of air pollutants.

(A) A point of origin of fugitive emissions from individual pieces of equipment, e.g., valves, flanges, pumps, and compressors, shall not be considered an individual emission unit. The fugitive emissions shall be collectively considered as an emission unit based on their relationship to the associated process.
(B) The term may also be used in this chapter to refer to a group of similar emission units.
(C) This term is not meant to alter or affect the definition of the term "unit" for purposes of the Acid Rain Program. *(TNRCC 30 TAC § 122.10)*

Facility - A discrete or identifiable structure, device, item, equipment, or enclosure that constitutes or contains a stationary source, including appurtenances other than emission control equipment. A mine, quarry, well test, or road is not considered to be a facility. *(TCAA § 382.003[6])*

Federally enforceable - See Section V.D.

Major source

(A) For pollutants other than radionuclides, any site which emits or has the PTE, in the aggregate the following quantities:
  (i) 10 tpy or more of any single HAP listed under FCAA § 112(b);
  (ii) 25 tpy or more of any combination of HAPs listed under FCAA § 112(b); or
  (iii) any quantity less than those identified in Clause (i) or (ii) of this subparagraph established by the EPA through rulemaking.
(B) For radionuclides regulated under FCAA § 112, the term "major source" shall have the meaning specified by the EPA by rule.
(C) Any site which directly emits or has the PTE, 100 tpy or more of any air pollutant. The fugitive emissions of a stationary source shall not be considered in determining whether it is a major source, unless the stationary source belongs to one of the following categories of stationary sources:
  (i) coal cleaning plants (with thermal dryers);
  (ii) kraft pulp mills;
  (iii) portland cement plants;
  (iv) primary zinc smelters;
  (v) iron and steel mills;
  (vi) primary aluminum ore reduction plants;
  (vii) primary copper smelters;
  (viii) municipal incinerators capable of charging more than 250 tons of refuse per day;
  (ix) hydrofluoric, sulfuric, or nitric acid plants;
  (x) petroleum refineries;
  (xi) lime plants;
  (xii) phosphate rock processing plants;

(xiii) coke oven batteries;
(xiv) sulfur recovery plants;
(xv) carbon black plants (furnace process);
(xvi) primary lead smelters;
(xvii) fuel conversion plant;
(xviii) sintering plants;
(xix) secondary metal production plants;
(xx) chemical process plants;
(xxi) fossil-fuel boilers (or combination thereof) totaling more than 250 MMBtu/hr heat input;
(xxii) petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels;
(xxiii) taconite ore processing plants;
(xiv) glass fiber processing plants;
(xxv) charcoal production plants;
(xxvi) fossil fuel-fired steam electric plants of more than 250 MMBtu/hr heat input; or
(xxvii) any stationary source category regulated under the FCAA § 111 or § 112 for which the EPA has made an affirmative determination under FCAA § 302(j) (relating to Definitions).

(D) Any site, except those exempted under FCAA § 182(f) (relating to NO_x Requirements), which, in whole or in part, is a major source under FCAA, Title I, Part D (relating to Plan Requirements for Nonattainment Areas), including the following:
(i) any site with the PTE 100 tpy or more of VOC or NO_x in any ozone nonattainment area classified as "marginal or moderate";
(ii) any site with the PTE 50 tpy or more of VOC or NO_x in any ozone nonattainment area classified as "serious";
(iii) any site with the PTE 25 tpy or more of VOC or NO_x in any ozone nonattainment area classified as "severe";
(iv) any site with the PTE 10 tpy or more of VOC or NO_x in any ozone nonattainment area classified as "extreme";
(v) any site with the PTE 100 tpy or more of CO in any CO nonattainment area classified as "moderate";
(vi) any site with the PTE 50 tpy or more of CO in any CO nonattainment area classified as "serious";
(vii) any site with the PTE 100 tpy or more of inhalable particulate matter (PM_{10}) in any PM_{10} nonattainment are classified as "moderate";
(viii) any site with the PTE 70 tpy or more of PM_{10} in any PM_{10} nonattainment are classified as "serious"; and
(ix) any site with the PTE 100 tpy or more of lead in any lead nonattainment area.

(E) The fugitive emissons of a stationary source shall not be considered in determining whether it is a major source under Subparagraph (D) of this paragraph, unless the stationary source belongs to one of the categories of stationary sources listed in Subparagraph (C) of this paragraph.

(F) Any temporary source which is located at a site for less than six months shall not affect the determination of major for other stationary sources at a site under this chapter or require a revision to the existing permit at the site.

(G) Emissions from any oil or gas exploration or production well (with its associated equipment) and emissions from any pipeline compressor or pump station shall not be aggregated with emissions from other similar units, whether or not the units are in a contiguous area or under common control, to determine whether the units or stations are major sources under Subparagraph (A) of this paragraph. *(TNRCC 30 TAC § 122.10)*

Potential to emit - The maximum capacity of a stationary source to emit any air pollutant under its physical and operational design or configuration. Any certified registration or preconstruction authorization restricting emissions or any physical or operational limitation on the capacity of a stationary source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation is enforceable by the EPA. This term does not alter or affect the use of this term for any other purposes under the FCAA, or the term "capacity factor" as used in acid rain provisions of the FCAA or the acid rain rules. *(TNRCC 30 TAC § 122.10)*

Site - The total of all stationary sources located on one or more contiguous or adjacent properties, which are under common control of the same person (or persons under common control). If a research and development operation does not produce products for commercial sale, it shall be treated as a separate site from any manufacturing facility with which it is collocated. A site may contain multiple relevant emission units and grandfathered emission units. *(TNRCC 30 TAC § 122.10)*

Source - means a point of origin of air contaminants, whether privately or publicly owned or operated. *(TCAA § 382.003[12])*

Stationary source - Any building, structure, facility, or installation that emits or may emit any air pollutant. *(TNRCC 30 TAC § 122.10)*

APPENDIX A

Form PI-7

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

REGISTRATION FORM FOR EXEMPTIONS
FORM PI-7

Please mail to: TNRCC, Office of Air Quality, New Source Review Permits Division (MC-162), PO Box 13087, Austin, TX 78711-3087

I. Company Name _____
(Corporation, Company, Government Agency, Firm, etc.)

Mailing Address _____

Individual Authorized to Act for Registrant: Name _____ Title ____

Address _____ Telephone ( ) _____ Fax ( ) _____

II. PHYSICAL LOCATION OF EXEMPT FACILITY (Latitude and Longitude must be to the nearest second):

Name of Plant or Site _____

Street Address _____

Nearest City _____ Zip Code _____ County _____ Latitude _____ Longitude

SITE REQUIREMENTS: A. Submit a plot plan to scale of the property showing the location of plant bou surrounding area
B. Furnish an area map with a scale showing the facility location relative
C. A physical address or accurate driving directions must be provided on

III. TYPE OF FACILITY:
A. Applicable Exemption Number(s) from TNRCC List _____
B. Name of Facility and Company's Facility Number _____
C. TNRCC Account Identification Number _____
D. Previous Special Exemption or Permit Number _____
E. Operating Schedule: Hours/day _____ Days/week _____ Weeks/year _____
F. Proposed Start of Construction _____ (Date) Operation _____ (Date)
G. Permanent [ ] Portable [ ]
H. Length of time at this site, if portable _____

IV. PROCESS INFORMATION
Description of Process: Please attach a written description of the exempt process and applicable checklists (when available). The description must be in sufficient detail to indicate that the facility will conform to the

V. EMISSIONS DATA: Furnish a description of the basis for emission rates including fugitives. (Calculati

Emission Point Number	Name of Source	Name of Air Contaminant	Emission Rate of Each Air Contaminant			
			lb/hr		tons/yr	
			Gaseous	Particulate	Gaseous	Particulate

VI. The required copy of the registration request has been sent to the Regional Office of the TN
The required copy of the registration request has been sent to the Local Programs (if applica

VII. I, _____
(Name) (Title)
state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. Further state that to the best of my knowledge and belief the project will satisfy the conditions and limitations of the indicated exemption. The facility will operate in compliance with all Regulations of the Texas Natural Resource Conservation Commission and with Federal Environmental Protection Agency Regulations governing air pollution.

DATE _____ SIGNATURE _____

Rev. 11-18-98

APPENDIX B

Form PI-8

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

SPECIAL CERTIFICATION FORM FOR EXEMPTIONS (Chapter 106) AND STANDARD PERMITS (Chapter 116) - FORM PI-8

Note: This form should be used to establish enforceable allowable emission rates which are below those allowed by Chapter 106 or Chapter 116, Section 116.610.

I. Company Name _____
(Corporation, Company, Government Agency, Firm, etc.)

Mailing Address _____

Individual Authorized to Act for Applicant: Name _____ Title _____

Address _____ Telephone _____ FAX # _____

II. LOCATION OF FACILITY:

Name of Plant or Site _____ Name of Facility _____

Street Address _____

Nearest City _____ Zip Code _____ County _____ Latitude _____ Longitude _____

SITE REQUIREMENTS: Include a plot plan of the property drawn to scale that shows the location of plant boundaries, plant equipment, the exempted facility location, and the immediate surrounding area.

III. TYPE OF FACILITY:

A. Exemption or Standard Permit Section Number(s) _____ Account ID _____ - _____ - _____

B. Associated or Previous Special Exemption or Permit Number(s) _____

C. Operating Schedule _____ Hours/day _____ Days/week _____ Weeks/year [ ] Continuous or _____ Hours/year

D. Start of Construction _____ (Date) Start of Operation _____ (Date)

E. [ ] New Source [ ] Modification of Existing Source [ ] Certification of Existing Source

IV. PROCESS DESCRIPTION Submit a summary which describes the construction, process, operation, and compliance of the facility. The description must be in sufficient detail to indicate how the facility conforms to the specified exemption or standard permit and verifies the maximum emission rates indicated below.

V. MAXIMUM EMISSIONS RATE DATA: Submit documentation which demonstrates the basis for each Emission Point Number's maximum emission rates represented below, including fugitives (calculations, emission factors, equipment capacity, sampling, monitoring, etc.)

Emission Point Number	Name of Source	Name of Air Contaminant	Emission Rate of Each Air Contaminant			
			Maximum lb/hr		Actual tons/yr	
			Gaseous	Particulate	Gaseous	Particulate

VI. If required, was a copy of this certification sent to the TNRCC New Source Review Permits Division and the TNRCC Regional Office: [ ] Yes [ ] No

DATE: _____

TNRCC, Office of Air Quality, New Source Review Permits Division (MC-162),
PO Box 13087, Austin, TX 78711-3087, Telephone (512) 239-1250

VII. I, _____ (Name) (Title)

state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I also certify that the maximum emission rates listed on this certification reflect the maximum anticipated emissions due to the operation of this facility. To the best of my knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption or standard permit. The facility will operate in compliance with all Regulations of the Texas Natural Resource Conservation Commission and with Federal Environmental Protection Agency Regulations governing air pollution.

DATE _____ SIGNATURE _____

APPENDIX C

Form OP-CRE1 Instructions And Form

INSTRUCTIONS
Texas Natural Resource Conservation Commission
Form OP-CRE1
Certified Registration of Emissions Form For Potential To Emit

General:

For purposes of determining applicability of the Federal Operating Permit (FOP) Program under Title 30 Texas Administrative Code Chapter 122 (30 TAC Chapter 122), the owner or operator of a site must determine the site's potential to emit (PTE) based on the sum of the PTE of the stationary sources at the site. Under 30 TAC § 122.122, owners or operators of stationary sources without any other federally enforceable emission rate (i.e., grandfather sources and possibly others) may limit the source's PTE by maintaining Form OP-CRE1, "Certified Registration of Emissions Form for Potential to Emit," which is federally enforceable on site. By limiting the PTE of the stationary sources such that the site does not meet the 30 TAC Chapter 122 "major source" definition, the site is not required to obtain an FOP.

In addition, the registration may also be used to limit emissions so that the entire site is not subject to Title 40 Code of Federal Regulations Part 63 (40 CFR Part 63), National Emission Standards for Hazardous Air Pollutants for Source Categories (maximum achievable control technology [MACT] standards), even if the site is still subject to the FOP Program because of criteria pollutant or non-hazardous air pollutant emissions. In this case, any limit established through a certified registration of emissions must be codified in the site's subsequent FOP.

This form should not be used to limit individual emission units solely to avoid an applicable requirement such as 40 CFR 63 where other units at the site are still subject to other MACT standards. However, a site could limit individual emission units to avoid MACT requirements within an issued permit.

Furthermore, it is imperative that Form OP-CRE1, together with any associated controls, be in place when the FOP application is due for the specific stationary source category. If an FOP application has been submitted and it is then established that the site's PTE is less than the 30 TAC Chapter 122 "major source" definition, then this form may be used to certify the updated PTE emission rate. Likewise, this form may also be used to certify an updated PTE emission rate for a site that has established a PTE less than the 30 TAC Chapter 122 "major source" definition after an FOP has been issued. For a site no longer subject to the FOP Program, the applicant may request, through a letter submitted to the Texas Natural Resource Conservation Commission (TNRCC), to withdraw the application or the subsequently issued permit. It is also recommended that a copy of the Form OP-CRE1 be submitted for TNRCC records. Please refer to the TNRCC guidance document entitled "Federal Operating Permit Application Guidance Document" for information regarding submittal procedures.

This form must bear the original signature of the Responsible Official (RO), Duly Authorized Representative (DAR), Designated Representative (DR), or Alternate Designated Representative (ADR). No photocopies, faxes, or signature stamps can be accepted. If RO authority is being delegated, a completed Form OP-DEL, "Delegation of the Responsible Official," must be maintained on site. Under some circumstances, TNRCC approval of the DAR is required. If this is necessary, submit the Form OP-DEL to the TNRCC. Again, please refer to the TNRCC guidance document entitled "Federal Operating Permit Application Guidance Document" for information regarding submittal procedures. This guidance document also contains information relating to the RO, DAR, DR, and ADR, in addition to, submittal of the necessary forms.

This form, all referenced preconstruction authorizations, and records demonstrating compliance with this registration shall be maintained **on site, or at an accessible designated location,** and shall be provided upon request during regular business hours to representatives of the TNRCC, or any other air pollution control agency having jurisdiction. **This form should NOT be submitted to the TNRCC.**

Specific:

Form OP-CRE1 (Page 1):

I. **COMPANY IDENTIFYING INFORMATION**

A. **Company Name:** Enter the name of the company for which the certification is being completed.

B. **Telephone:** Enter the company telephone number with the area code.

C. **Fax:** Enter the company fax number with the area code.

D. **Mailing Address:** Enter the company mailing address, including city, state, and zip code.

II. **RESPONSIBLE OFFICIAL IDENTIFYING INFORMATION**

Note: The RO must be listed in this section, even if the duties will be delegated to a DAR.

A. **Responsible Official Name:** Place an "X" next to the appropriate conventional title (Mr./Mrs./Ms./Dr.). Enter the name of the RO pursuant to 30 TAC § 122.132(e).

B. **Responsible Official Title:** Enter the title of the RO.

C. **Telephone:** Enter the RO telephone number.

D. **Fax:** Enter the RO fax number.

E. **Mailing Address:** Enter the RO mailing address, including city, state, and zip code.

III. **SITE INFORMATION**

A. **Plant/Site Name:** Enter the name of the site for which the certification is being completed.

B. **Street Address:** Enter the street address of the site, if available. Otherwise, provide a description of its physical location (Example: Highway 100, two miles west of County Road 12).

C. **Nearest City:** Enter the city or municipality nearest to the site, or in which the site is located.

D. **Zip Code:** Enter the zip code for the site.

E. **County:** Enter the county in which the site is located.

F. **Primary SIC:** Enter the primary standard industrial classification (SIC) for this site as listed in the most recent emissions inventory.

G. **Primary TNRCC Account No.:** Enter the primary TNRCC account number for this site. This number already exists for most sites. (It may have been previously known as the Texas Air Control Board account number.) It is assigned by the TNRCC to an entire property owned or controlled by an owner/operator at a given location. An example air account number is: JB-1234-R. If the owner/operator does not know the account number, or needs to have one assigned, contact the appropriate TNRCC regional office for assistance.

Most sites have only one account number, however, some sites may have multiple account numbers. If there is more than one account number associated with the application, the primary account number will be used as the main account number for this certification for administrative purposes. The primary account number is generally the largest account or the earliest in chronological order. *(XX-XXXX-X)*

H. **Additional TNRCC Account No(s):** List any other TNRCC account numbers for the site in the spaces provided. Attach additional sheets if necessary.

I. **Latitude (nearest second):** Enter the latitude coordinate for the site. Latitude indicates the angular distance (in degrees) of a location north of the equator and will always be between 25 and 37 degrees in Texas. Coordinates of the site must be shown to the nearest second and can be obtained from most city engineers, U.S. Geological Survey (USGS) maps, or from county maps prepared by the Texas Department of Transportation (TxDOT). *(It is not necessary to supply latitude and longitude if providing Universal Transverse Mercator (UTM) coordinates in Items III.J, K, and L.)*

J. **Longitude (nearest second):** Enter the longitude coordinate for the site. Longitude indicates the angular distance (in degrees) of a location west of the prime meridian, and will always be between 93 and 107 degrees in Texas. Coordinates of the site must be shown to the nearest second, and can be obtained from most city engineers, USGS maps, or from county maps prepared by the TxDOT.

K. **UTM Zone:** Enter the UTM Coordinate Zone. All locations in Texas are in Zone 13, 14, 15.

Note: It is not necessary to supply UTM coordinates if providing latitude and longitude in Items III.H and I.

L. **UTM East (meters):** Enter the East UTM coordinate in meters. This coordinate will always be between 350730 and 449889 meters in Texas.

M. **UTM North (meters):** Enter the North UTM coordinate in meters. This coordinate will always be between 2857089 and 4040410 meters in Texas.

IV. PLOT PLAN

Attach a detailed plot plan showing all emission points, a plant benchmark, true north, and all property lines. The emission points must be located as accurately as possible on the plot plan. The emission point identification numbers on the plot plan must be the same numbers referenced in other parts of the certification and represented in TNRCC Air Emissions Inventory.

V. PROCESS DESCRIPTION

Attach a process description that describes the process, with emphasis on the type of emission units, their applicable requirements (in general), what types of emissions are generated, what air pollution controls are used, and where the emissions enter the atmosphere. Each step in the process should be discussed in detail, and should refer to a process flow diagram, if necessary. When necessary to determine applicable requirements, operating scenarios, concentrations, temperatures, pressures, material flow rates, and production rates should be discussed. Information provided should be focused on the parameters which will affect the applicability of a potentially applicable requirement. The description must be in sufficient detail to verify the maximum potential emission rates indicated on Form OP-CRE1.

Specific:

Form OP-CRE1 (Page 2):

VI. MAXIMUM EMISSIONS RATE DATA

Enter all maximum emission rates in the table as described in the instructions below. (If additional space is required, use the extension page included with this form.) Attach documentation which demonstrates the basis for each emission point number's maximum emission rates including fugitives if the source belongs to one of the 27 source categories listed in 30 TAC § 122.10(a)(c). Additionally, fugitive emissions of hazardous air pollutants (HAPs), as listed in the Federal Clean Air Act (FCAA) § 112(b), must also be included. This includes calculations, emission factors, equipment capacity, fuel consumption rate, sampling, monitoring, and etc.

A. **Emission Point No.:** Enter the identification number (ID No.) for the emission point. Whenever possible, use the ID No. from the Point Source Database (PSDB). If no PSDB number currently exists, a new ID No. that is consistent with the existing numbering system must be provided by the applicant.

B. **Source Name:** Enter a unique name identifying the emission point.

C. **Air Contaminant Name:** Enter the name of the air contaminant being emitted from the emission point. If more than one, list on subsequent lines. *(Examples: NO_x, CO, SO_2, and VOC)*

D. **Air Contaminant Maximum Emission Rates:** Enter the maximum reasonably anticipated short term and annual emission rates for operation of the stationary source. Fugitive emissions must be included if the source belongs to one of the 27 source categories listed in 30 TAC § 122.10(8)(c). Fugitive emissions of HAPs, as listed in the FCAA § 112(b), must also be included. Documentation which demonstrates the basis for each maximum emission rate must be attached. This includes calculations, emission factors, equipment capacity, fuel consumption rate, sampling, monitoring, and etc. (In order to qualify for registrations of emissions, the maximum emission rates listed in the registration must be less than those rates defined for a major source in 30 TAC § 122.10.) If additional space is needed, use Form OP-CRE1 Extension.

Pounds/Hour: Enter the maximum reasonably anticipated short term emission rate for operation of the stationary source.

Tons/Year: Enter the maximum reasonably anticipated annual emission rate for operation of the stationary source.

VII. DEMONSTRATION OF COMPLIANCE

Attach all means that demonstrate compliance with the represented emissions rates. This includes, but is not limited to, production rate or throughput; hours of operation; amount and type of material combusted, stored, or processed; and any other appropriate parameters such as temperature, pressure, flow rate, and etc.

VIII. CERTIFICATION BY RESPONSIBLE OFFICIAL

The appropriate company official (RO, DAR, DR, or ADR) must certify this form, and any accompanying documentation, for truth and accuracy. This certification and all pertinent records shall be maintained on site or at an accessible location and shall be made available, upon request, during regular business hours to representatives of the TNRCC or any air pollution control agency having jurisdiction. Please refer to the TNRCC guidance document entitled "Federal Operating Permit Application Guidance Document" for additional information.

1. **Certifier Name:** Enter the name of the RO, DAR, DR, or ADR certifying this Certified Registration of Emissions.
2. **Documentation Date:** Enter the date shown on documentation.
3. **Signature:** Affix the original signature RO, DAR, DR, or ADR. No photocopies, faxes, or signature stamps can be accepted.
4. **Signature Date:** Enter the date this form was signed by the RO, DAR, DR, or ADR.
5. **Title:** Enter the title of the RO, DAR, DR, or ADR.

TNRCC

Form OP-CRE1 (Page 1)
Certified Registration of Emissions for Potential to Emit
(Title 30 Texas Administrative Code § 122.122)
Federal Operating Permit Program

I. COMPANY IDENTIFYING INFORMATION		
A. Company Name:		
B. Telephone:	C. Fax:	
D. Mailing Address:		
City:	State:	Zip Code:

II. RESPONSIBLE OFFICIAL IDENTIFYING INFORMATION		
A. Responsible Official Name: (__Mr. __Mrs. __Ms. __Dr.)		
B. Responsible Official Title:		
C. Telephone:	D. Fax:	
E. Mailing Address:		
City:	State:	Zip Code:

III. SITE INFORMATION				
A. Plant/Site Name:				
B. Street Address:				
C. Nearest City:			D. Zip Code:	
E. County:			F. Primary SIC:	
G. Primary TNRCC Account No.:				
H. Additional TNRCC Account No(s).:				
I. Latitude (nearest second):		J. Longitude (nearest second):		
K. UTM Zone:	L. UTM East (meters):		M: UTM North (meters):	

IV. PLOT PLAN
Attach a plot plan to scale of the property showing the location of plant boundaries, plant equipment, and the immediately surrounding area.

V. PROCESS DESCRIPTION
Attach a summary which describes the processes and operations at the site. The description must be in sufficient detail to indicate how the facility will verify the reasonably anticipated maximum potential emission rates indicated below.

TNRCC

Form OP-CRE1 (Page 2)
Certified Registration of Emissions for Potential to Emit
(Title 30 Texas Administrative Code § 122.122)
Federal Operating Permit Program

VI. MAXIMUM EMISSIONS RATE DATA

Attach documentation which demonstrates the basis for each emission point number's reasonably anticipated maximum emission rates represented below including fugitives if the source belongs to one of the 27 source categories listed in Title 30 Texas Administrative Code § 122.10 [30 TAC § 122.10(8)(c)]. Fugitive emissions of hazardous air pollutants as listed in the Federal Clean Air Act § 112(b) must also be included. This includes calculations, emission factors, equipment capacity, fuel consumption rate, sampling, monitoring, etc.

All representations in this registration of emissions, with regard to emissions, shall become conditions upon which the stationary source shall operate. The registration of emissions shall include documentation on the basis of emission rates, and that the maximum emission rates listed on the registration reflect the reasonably anticipated maximums for operation of the stationary source. In order to qualify for registrations of emissions, the maximum emission rates listed in the registration must be less than those rates defined for a major source in 30 TAC § 122.10 (relating to General Definitions). Use Form OP-CRE1 Extension, if additional space is necessary.

Emission Point No.	Source Name	Air Contaminant Name	Air Contaminant Maximum Emission Rates	
			Pounds/Hour	Tons/Year

VII. DEMONSTRATION OF COMPLIANCE

The maximum emission rates listed on the registration shall reflect the reasonably anticipated maximums for operation of the stationary source. The certified registration of emissions and records demonstrating compliance with the registration must be maintained on site or at an accessible designated location. This information shall be provided, upon request, during regular business hours to representatives of the Texas Natural Resource Conservation Commission (TNRCC) or any air pollution control agency having jurisdiction.

VIII. CERTIFICATION BY RESPONSIBLE OFFICIAL

All representations in this registration of emissions with regard to emissions shall become conditions upon which the stationary source shall operate. It shall be unlawful for any person to vary from such representation unless the registration is first revised. This registration of emissions shall include documentation of the basis of emission rates and the certification below, in accordance with Title 30 Texas Administrative Code § 122.165 (relating to Certification of a Responsible Official), that the maximum emission rates listed on the registration reflect the reasonably anticipated maximums for operation of the stationary source.

I, _____, certify that, based on information and belief formed after reasonable inquiry, the
(Name printed or typed)

TNRCC

Form OP-CRE1 Extension
Certified Registration of Emissions
for Potential to Emit
(Title 30 Texas Administrative Code § 122.122)
Federal Operating Permit Program

VI. MAXIMUM EMISSIONS RATE DATA *(continued)*				
Emission Point No.	Source Name	Air Contaminant Name	Air Contaminant Maximum Emission Rates	
			Pounds/Hour	Tons/Year

APPENDIX D

Form OP-CRE2 Instructions And Form

INSTRUCTIONS
Texas Natural Resource Conservation Commission
Form OP-CRE2
Certified Registration of Emissions for Referenced Preconstruction Authorizations

General:

For purposes of determining applicability of the Federal Operating Permit (FOP) Program under Title 30 Texas Administrative Code Chapter 122 (30 TAC Chapter 122), the owner or operator of a site must determine the site's potential to emit (PTE) based on the sum of the PTE of the stationary sources at the site. Under 30 TAC § 122.122, emission rates in permits, exemptions, other preconstruction authorizations, and registrations of emissions provided under 30 TAC Chapters 106 and 116 are enforceable emission rates that may be used in determining PTE. By limiting the PTE of the stationary sources such that the site does not meet the 30 TAC Chapter 122 "major source" definition, the site is not required to obtain an FOP.

Registrations of emissions on Form PI-7 are, however, based on the certification statement, not enforceable emission rates. This form provides owners or operators of stationary sources with existing Form PI-7's for exemptions under 30 TAC Chapter 106, a streamlined mechanism to establish enforceable emission limits. The previously completed PI-7 forms, which include specific emission rate limits, become enforceable after being referenced in the Form OP-CRE2 (Certified Registration of Emissions for Referenced Preconstruction Authorizations); and certified by the Responsible Official (RO), Duly Authorized Representative (DAR), Designated Representative (DR), or Alternate Designated Representative (ADR). By allowing the referencing of the PI-7 forms in Form OP-CRE2, owners or operators avoid the burden of completing essentially the same information required in Form PI-8.

In the event that the owner or operator of a site seeking to use a Form OP-CRE2 is authorized under a combination of 30 TAC Chapters 106 and 116 authorizations (i.e., exemptions and permits), Form OP-CRE2 must also reference all exemptions certified under Form PI-8, as well as, previously issued 30 TAC Chapter 116 permits. This is required because the owner or operator must demonstrate that all facilities at the site, when combined, do not trigger 30 TAC Chapter 122 permitting requirements. In addition, if the site has grandfather facilities or facilities authorized without any other mechanism to limit emissions, Form OP-CRE1 (Certified Registration of Emissions Form for Potential to Emit) must also be completed. Please refer to the TNRCC guidance document entitled "Potential to Emit" and the Form OP-CRE1 instructions for additional information.

Currently, Form PI-8 and some older 30 TAC Chapter 116 permits do not explicitly require detailed documentation necessary to demonstrate ongoing compliance. As such, Form OP-CRE2 does not specifically require the owner or operator to maintain records demonstrating that the site is not subject to 30 TAC Chapter 122. However, it is the responsibility of the owner or operator to ensure that appropriate documentation be maintained to demonstrate the site's minor status in the event of an inspection.

Furthermore, it is imperative that Form OP-CRE2, together with any associated controls, be in place when the FOP application is due for the specific stationary source category. If an FOP application has been submitted and it is then established that the site's PTE is less than the 30 TAC Chapter 122 "major source" definition, then this form may be used to certify the updated PTE emission rate for a site that has established a PTE less than the 30 TAC Chapter 122 "major source" definition after an FOP has been issued. For a site no longer subject to the FOP Program, the applicant may request, through a letter submitted to the Texas Natural Resource Conservation Commission (TNRCC), to withdraw the application or the subsequently issued permit. It is also recommended that a copy of the Form OP-CRE1 be submitted for TNRCC records. Please refer to the TNRCC guidance document entitled "Federal Operating Permit Application Guidance Document" for information submittal procedures.

This form must bear the original signature of the RO, DAR, DR, or ADR. No photocopies, faxes, or signature stamps can be accepted. If the RO authority is being delegated, a completed Form OP-DEL (Delegation of Responsible Official) must be maintained on site. Under some circumstances, TNRCC approval of the DAR is required. If this is necessary, submit the Form OP-DEL to the TNRCC. Again, please refer to the TNRCC guidance document entitled "Federal Operating Permit Application Guidance Document" for information regarding submittal procedures. This guidance document also contains information relating to the RO, DAR, DR, and ADR, in addition to, submittal of the necessary forms.
This form, all referenced preconstruction authorizations, and records demonstrating compliance with this registration shall be maintained **on site or at an accessible designated location**, and shall be provided, upon request, during regular business hours to representatives of the TNRCC or any other air pollution control agency having jurisdiction. **This form should NOT be submitted to the TNRCC.**

Specific:

Form OP-CRE2 (Page 1):

I. COMPANY IDENTIFYING INFORMATION

A. **Company Name:** Enter the name of the company for which the certification is being completed.

B. **Telephone:** Enter the company telephone number with the area code.

C. **Fax:** Enter the company fax number with the area code.

D. **Mailing Address:** Enter the company mailing address, including city, state, and zip code.

II. RESPONSIBLE OFFICIAL (RO) IDENTIFYING INFORMATION

(Note: The RO must be listed in this section even if the duties will be delegated to a DAR.)

A. **Responsible Official Name:** Place an "X" next to the appropriate conventional title (Mr./Mrs./Ms./Dr.). Enter the name of the RO pursuant to Title 30 Texas Administrative Code § 122.132(e) [30 TAC § 122.132(e)].

B. **Responsible Official Title:** Enter the title of the RO.

C. **Telephone:** Enter the RO telephone number.

D. **Fax:** Enter the RO fax number.

E. **Mailing Address:** Enter the RO mailing address, including city, state, and zip code.

III. SITE INFORMATION

A. **Plant/Site Name:** Enter the name of the site for which the certification is being completed.

B. **Street Address:** Enter the street address of the site, if available. Otherwise, provide a description of its physical location (Example: Highway 100, two miles west of County Road 12).

C. **Nearest City:** Enter the city or municipality nearest to the site, or in which the site is located.

D. **Zip Code:** Enter the zip code for the site.

E. **County:** Enter the county in which the site is located.

F. **Primary SIC:** Enter the primary standard industrial classification (SIC) for this site as listed in the most recent emissions inventory.

G. **Primary TNRCC Account No.:** Enter the primary TNRCC account number for this site. This number already exists for most sites. (It may have been previously known as the Texas Air Control Board account number.) It is assigned by the TNRCC to an entire property owned or controlled by an owner/operator at a given location. An example air account number is: JB-1234-R. If the owner/operator does not know the account number or needs to have one assigned, contact the appropriate TNRCC regional office for assistance.

Most sites have only one account number, however, some sites may have multiple account numbers. For administrative purposes, if there is more than one account number associated with the application, the primary account number will be used as the main account number for this certification. The primary account number is generally the largest account or the earliest in chronological order. (*XX-XXXX-X*)

H. **Additional TNRCC Account No(s).:** List any other TNRCC account numbers for the site in the spaces provided. Attach additional sheets if necessary.

I. **Latitude (nearest second):** Enter the latitude coordinate for the site. Latitude indicates the angular distance (in degrees) of a location north of the equator and will always be between 25 and 37 degrees in Texas. Coordinates of the site must be shown to the nearest second and can be obtained from most city engineers, U.S. Geological Survey (USGS) maps, or from county maps prepared by the Texas Department of Transportation (TxDOT). *(It is not necessary to supply latitude and longitude if providing Universal Transverse Mercator (UTM) Coordinates in Items III.J, K, and L.)*

J. **Longitude (nearest second):** Enter the longitude coordinate for the site. Longitude indicates the angular distance (in degrees) of a location west of the prime meridian and will always be between 93 and 107 degrees in Texas. Coordinates of the site must be shown to the nearest second and can be obtained from most city engineers, USGS maps, or from county maps prepared by the TxDOT.

K. **UTM Zone:** Enter the Universal Transverse Mercator (UTM) Coordinate Zone. All locations in Texas are in Zones 13, 14, 15. *(It is not necessary to supply UTM Coordinates if providing latitude and longitude in Items III.H and I.)*

L. **UTM East (Meters):** Enter the East UTM Coordinate in meters. This coordinate will always be between 350730 and 449889 meters in Texas.

M. **UTM North (Meters):** Enter the North UTM Coordinate in meters. This coordinate will always be between 2857089 and 4040410 meters in Texas.

IV. PLOT PLAN

Attach a detailed plot plan showing all emission points, a plant benchmark, true north, and all property lines. The emission points must be located as accurately as possible on the plot plan. The emission point identification numbers on the plot plan must be the same numbers referenced in other parts of the certification, and represented in the TNRCC Air Emissions Inventory. Location of emission points must be identified by UTM coordinates or latitude/longitude. These coordinates are used as reference points in the TNRCC Emission Inventory Database, and may be obtained from USGS maps.

V. PROCESS DESCRIPTION

Attach a process description that describes the process with emphasis on the type of emission units, their applicable requirements (in general), what type of emissions are generated, what air pollution controls are used, and where the emissions enter the atmosphere. Each step in the process should be discussed in detail and should refer to the process flow diagram, if necessary. Operating scenarios, concentrations, temperatures, pressures, material flow rates, and production rates should be discussed when it is necessary to determine applicable requirements. Information provided should be focused on the parameters which will affect the applicability of a potentially applicable requirement. The description must be in sufficient detail to indicate how the facility conforms to the specified exemption, and verifies the maximum potential emission rates indicated on Form OP-CRE2.

Form OP-CRE2 (Page 2):

VI. NONENFORCEABLE MAXIMUM EMISSION RATE DATA AND REFERENCE LIST

This section applies to Form PI-7 registrations only. All referenced Form PI-7 registrations to be incorporated into this certified registration are to be referenced in this list, and should provide all emission point numbers, the name of each source, and the name of each air contaminant associated with the source. Also, include the reasonably anticipated maximum emission rate of each air contaminant in pounds per year and tons per year. Attach documentation which demonstrates the basis for a reasonably anticipated maximum emission rate for each emission point. Fugitive emissions must be included if the source belongs to one of the 27 source categories listed in 30 TAC § 122.10(8)(c). Fugitive emissions of hazardous air pollutants, as listed in the Federal Clean Air Act § 112(b), must also be included. Examples of documentation for demonstrating the basis for the reasonably anticipated maximum emission rate include: calculations, emission factors, equipment capacity, fuel consumption rate, sampling, and monitoring. **All maximum emission rate estimations must use methods approved by the TNRCC.**

Prior to March 14, 1997, an exemption list was incorporated by reference into 30 TAC Chapter 116 and each exemption had an assigned number (e.g., 112). Exemptions moved into 30 TAC Chapter 106 on March 14, 1997. Each exemption now resides in a section of 30 TAC Chapter 106 (e.g., § 106.148). Information regarding exemptions may be found on the TNRCC New Source Review's (NSR) Internet site at www.tnrcc.state.tx.us/air/nsr.

Reference Number: Assign a unique reference number to each referenced Form PI-7. The reference number should be the registration number issued by the TNRCC (exemption registration number) or, in the case of exemptions for which registration numbers were not issued, a company assigned number. All reference numbers listed must be present on, and correspond with, all Form PI-7 registrations certified by this registration.

Exemption Identifier: Specify the exemption number and the effective date of that version of the exemption for the corresponding reference number.

As an example of an exemption authorized before March 14, 1997, Exemption Number 6 had an effective date of November 6, 1988. It was then amended with a new effective date of July 20, 1992. The exemption identifier for a compressor engine constructed in 1993 and registered under Exemption Number 6 would be represented as EX-6/07-20-92.

As an example of an exemption authorized on or after March 14, 1997, had an effective date of June 7, 1996. It was then amended and moved to 30 TAC § 106.512 with an effective date of March 14, 1997. The exemption identifier for a compressor engine constructed in 1998 and registered under 30 TAC § 106.512 would be represented as EX-106.512/03-14-97.

Construction Date: Specify the date the facility was constructed or modified to determine the version of the exemption effective at the time of construction or modification. It is not always necessary to ascertain the exact construction date of the unit to determine the version of the appropriate exemption. For example, TNRCC amended Exemption Number 6 effective November 6, 1986 and again effective July 20, 1992. A construction date of "May 1992" would be sufficient to determine the version of the exemption effective date. However, a construction date of "1992" or "July 1992" would not be adequate. The construction date should be represented using the following format: 05-01-92.

Note: If additional space is needed for the reference list, use Form OP-CRE2 Extension A.

VII. ENFORCEABLE MAXIMUM EMISSION RATE DATA AND REFERENCE LIST

This section applies to Form PI-8 certified registrations and 30 TAC Chapter 116 permits only. All referenced Form PI-8 certified registrations and 30 TAC Chapter 116 permits to be incorporated into this certified registration are to be referenced in this list.

Prior to March 14, 1997, an exemption list was incorporated by reference into 30 TAC Chapter 116 and each exemption had an assigned number (e.g., 112). Exemptions moved into 30 TAC Chapter 106 on March 14, 1997. Each exemption now resides in a section of 30 TAC Chapter 106 (e.g., § 106.148). Information regarding exemptions may be found on the TNRCC NSR's Internet site at www.tnrcc.state.tx.us/air/nsr.

Reference Number: A unique reference number should be assigned to each referenced Form PI-8 and each 30 TAC Chapter 116 permit. For exemptions, the reference number should be the registration number issued by the TNRCC (exemption registration number), or in the case of exemptions for which registration numbers were not issued, a company assigned number. For 30 TAC Chapter 116 permits, the reference number should be the permit number. All reference numbers listed must be present on and correspond with all Form PI-8 certified registrations and 30 TAC Chapter 116 permits certified by this registration.

Preconstruction Authorization: If the preconstruction authorization is a 30 TAC Chapter 116 permit, list the permit number. For exemptions, specify the exemption number and the effective date of that version of the exemption for the corresponding referenced Form PI-8.

As an example of an exemption authorized before March 14, 1997, Exemption Number 6 had an effective date of November 6, 1988. It was then amended with a new effective date of July 20, 1992. The exemption identifier for a compressor engine constructed in 1993 and registered under Exemption Number 6 would be represented as EX-6/07-20-92.

As an example of an exemption authorized on or after March 14, 1997, Exemption Number 6 had an effective date of June 7, 1996. It was then amended and moved to 30 TAC § 106.512 with an effective date of March 14, 1997. The exemption identifier for a compressor engine constructed in 1998 and registered under 30 TAC § 106.512 would be represented as EX-106.512/03-14-97.

Construction Date: Specify the date the facility was constructed or modified to determine the version of the exemption effective at the time of construction or modification. It is not always necessary to ascertain the exact construction date of the unit to determine the version of the appropriate exemption. For example, TNRCC amended Exemption Number 6, effective November 6, 1986, and again, effective July 20, 1992. A construction date of "May 1992" would be sufficient to determine the version of the exemption effective date. However, a construction date of "1992" or "July 1992" would not be adequate. The construction date should be represented using the following format: 05-01-92. If the preconstruction authorization is a 30 TAC Chapter 116 permit, list the date the permit was issued.

Note: If additional space is needed for the reference list, use Form OP-CRE2, Extension B.

Form OP-CRE2 (Page 3):

VIII. CERTIFICATION BY RESPONSIBLE OFFICIAL

The appropriate company official (RO, DAR, DR, or ADR) must certify this form and any accompanying documentation for truth and accuracy. This certification and all pertinent records shall be maintained on site or at an accessible location and shall be made available, upon request, during regular business hours to representatives of TNRCC or any air pollution control agency having jurisdiction. (Please refer to the TNRCC guidance document entitled "Federal Operating Permit Application Guidance Document" for more details.)

1. **Certifier Name:** Enter the name of the RO, DAR, DR, or ADR certifying this Certified Registration of Emissions.

2. **Documentation Date:** Enter the date shown on documentation.

3. **Signature:** Affix the original signature of the RO, DAR, DR, or ADR. No photocopies, faxes, or signature stamps can be accepted.

4. **Signature Date:** Enter the date this form was signed by the RO, DAR, DR, or ADR.

5. **Title:** Enter the title of the RO, DAR, DR, or ADR.

TNRCC

Form OP-CRE2 (Page 1)
Certified Registration of Emissions for Referenced Preconstruction Authorizations Federal Operating Permit Program

I. COMPANY IDENTIFYING INFORMATION

A. Company Name:		
B. Telephone:	C. Fax:	
D. Mailing Address:		
City:	State:	Zip Code:

II. RESPONSIBLE OFFICIAL (RO) IDENTIFYING INFORMATION

A. Responsible Official Name: (__Mr. __Mrs. __Ms. __Dr.)		
B. Responsible Official Title:		
C. Telephone:	D. Fax:	
E. Mailing Address:		
City:	State:	Zip Code:

III. SITE INFORMATION

A. Plant/Site Name:					
B. Street Address:					
C. Nearest City:			D. Zip Code:		
E. County:			F. Primary SIC:		
G. Primary TNRCC Account No.:					
H. Additional TNRCC Account No(s).:					
I. Latitude (nearest second):			J. Longitude (nearest second):		
K. UTM Zone:	L. UTM East (Meters):		M. UTM North (Meters):		

IV. PLOT PLAN

Attach a plot plan (to scale) of the property showing the location of plant boundaries, plant equipment, and the immediate surrounding area.

V. PROCESS DESCRIPTION

Attach a summary which describes the referenced processes and operations at the site. The description must be in sufficient detail to indicate how the facility will verify all reasonably anticipated maximum potential emission rates referenced below.

TNRCC

Form OP-CRE2 (Page 2)
Certified Registration of Emissions for Referenced Preconstruction Authorizations Federal Operating Permit Program

VI. NONENFORCEABLE MAXIMUM EMISSION RATE DATA AND REFERENCE LIST *(Form PI-7)*

Attach documentation which demonstrates the basis for a reasonably anticipated maximum emission rate for each emission point represented below, including fugitives, if the source belongs to one of the 27 source categories listed in Title 30 Texas Administrative Code §122.10 (30 TAC §122.10). Fugitive emissions of hazardous air pollutants as listed in the Federal Clean Air Act §112(b) must also be included. This includes calculations, emission factors, equipment capacity, fuel consumption rate, sampling, monitoring, etc. All maximum emission rate estimations must use methods approved by the Texas Natural Resource Conservation Commission (TNRCC).

All representations referenced by this registration of emissions with regard to emissions shall become conditions upon which all referenced facilities shall operate. The registration of emissions shall include documentation on the basis of emission rates, and that the maximum emission rates listed on the registration reflect the reasonably anticipated maximums for operation of the referenced facilities.

The reference list shall contain all Form PI-7 exemption registrations which are to be included in this certified registration. A reference number shall identify each referenced Form PI-7. The reference number shall be either the registration number issued by the TNRCC (exemption registration number) or a company assigned number. All reference numbers listed below must be present on, and correspond with, all Form PI-'s certified by this registration. If additional space is needed, use OP-CRE2 Extension A.

Reference Number	Exemption Identifier	Construction Date	Reference Number	Exemption Identifier	Construction Date

VII. ENFORCEABLE MAXIMUM EMISSION RATE DATA AND REFERENCE LIST (Form PI-8 and 30 TAC Chapters 106 and 116)

The reference list shall contain all special certification forms for exemptions subject to 30 TAC §106.6 (Form PI-8) and 30 TAC Chapter 116 permits which are to be included in this registration. The reference number shall identify each referenced authorization. A reference number shall be either the registration number issued by the TNRCC (exemption registration number or permit number) or a company assigned number. All reference numbers listed below must be present on, and correspond with, all preconstruction authorizations (e.g., PI-8 and 30 TAC Chapter 116 permit) certified by this registration. If additional space is needed, use Form OP-CRE2 Extension B.

Reference Number	Preconstruction Authorization	Construction Date	Reference Number	Preconstruction Authorization	Construction Date

VIII. CERTIFICATION BY RESPONSIBLE OFFICIAL

All representations in this registration of emissions with regard to emissions shall become conditions upon which all referenced facilities shall operate. The referenced facilities will satisfy the conditions and limitations of the indicated preconstruction authorizations. The referenced facilities will operate in compliance with all regulations of the TNRCC and with the U.S. Environmental Protection Agency regulations governing air pollution. It shall be unlawful to vary from such representation, unless the affected referenced preconstruction authorizations or certified registrations and this registration are first revised. This registration of emissions shall include documentation on the basis of emission rates, the certification below that the maximum emission rates referenced in this registration reflects the reasonably anticipated maximums for operation of all referenced facilities, and records demonstrating compliance with the indicated preconstruction authorizations. All referenced preconstruction authorizations shall be incorporated by reference into this certified registration.

I, _____, certify that, based on information and belief formed after reasonable inquiry, the
(Name printed or typed)

TNRCC

Form OP-CRE2 Extension A
Certified Registration of Emissions for Referenced Preconstruction Authorizations
Federal Operating Permit Program

VI. NONENFORCEABLE MAXIMUM EMISSION RATE DATA AND REFERENCE LIST (Form PI-7)

The reference list shall contain all Form PI-7 exemption registrations which are to be included in this certified registration. The reference number shall identify each referenced Form PI-7. A reference number shall be either the registration number issued by the TNRCC (exemption registration number) or a company assigned number. All reference numbers listed below must be present on, and correspond with, all Form PI-7s certified by this registration.

Reference Number	Exemption Identifier	Construction Date	Reference Number	Exemption Identifier	Construction Date

TNRCC

Form OP-CRE2 Extension B
Certified Registration of Emissions for Referenced Preconstruction Authorizations
Federal Operating Permit Program

VII. ENFORCEABLE MAXIMUM EMISSION RATE DATA AND REFERENCE LIST (Form PI-8 and New Source Review Permits)

The reference list shall contain all special certification forms for exemptions subject to 30 TAC §106.6 (Form PI-8) and 30 TAC Chapter 116 permits which are to be included in this registration. The reference number shall identify each referenced authorization. A reference number shall be either the registration number issued by the TNRCC (exemption registration number or permit number) or a company assigned number. All reference numbers listed below must be present on, and correspond with, all preconstruction authorizations (e.g., PI-8 and 30 TAC Chapter 116 permit) certified by this registration.

Reference Number	Preconstruction Authorization	Construction Date	Reference Number	Preconstruction Authorization	Construction Date

APPENDIX E

New Source Review Mailout Request Form

Texas Natural Resource Conservation Commission
New Source Review Permits Division - Office of Air Quality
Mailout Request Form

Attn: Glenda Thompson
NSR Division
MC 162
TNRCC
P.O. Box 13087
Austin, TX 78711

___ Bus: (512) 239-1250
Fax: (512) 239-1300

Mail To:_____
_____
_____
_____
_____

For In-house Use Only
Request Date:_____
Request From: _____

Phone:(____) _____

TNRCC Rules and Regulations

___ Chapter 101-General Rules (12-23-97)
___ Chapter 106 - Stdex. List (09-09-98)
___ Chapter 111 - Reg. I (9-16-96)
___ Chapter 112 - Reg. II (7-16-97)
___ Chapter 113 - Reg. III .(10-29-98)
___ Chapter 114 - Reg. IV (08-20-98)
___ Chapter 115 - Reg. V (09-20-98)
___ Chapter 116 - Reg. VI (07-08-98)
___ Chapter 117 - Reg. VII (06-10-98)
___ Chapter 118 - Reg. VIII (5-26-89)
___ Chapter 119 - Reg. IX (5-7-79)
___ Chapter 120 - Reg. X (4-19-96)
___ Chapter 122 - Reg. XII (4-8-98)

Facility Information Tables:

___ 1(a) Emission Sources (12-94)
___ 2 Material Balance (10-93)
___ 3 Data Sht (Gaseous Abatement)(9-93)
___ 4 Combustion (2 Pages) (9-93)
___ 5 Solid Waste Inciner. (10-93)
___ 6 Boilers & Heaters (8-93)
___ 7 Storage Tank (2-95)
___ 8 Flare Systems (05-96)
___ 9 Particle Size (10-93)
___ 10 Cyclones (9-93)

Nonattainment Review Tables

___ 1N Netting Summary (10/98)
___ 2N Proj. Contemporaneous Chg.(10/98)
___ 3N Creditable Reductions (10/98)

Application/Instruction Forms

___ PI-1 Permit Application (1-96)
___ PI-1 Admin. CORE Checklist (5-96)
___ PI-1 Permit Instruction Manual (6-96)
___ PI-1 Small Business Instructions (9-93)
___ PI-1R Renewal Application (1-96)
___ PI-1R Admin. CORE Checklist (1-96)
___ PI-1R Renewal Instr. Manual (1-96)
___ PI-1S Std Permit Application (10-95)
___ PI-1S Admin. CORE Checklist (3-96)
___ PI-7 Std. Exemption Registr. (10/98)
___ PI-7 (436) Auto Body Registr.(10/98)
___ PI-7 Std. Exemption Instr. (10-95)
___ PI-8 Certification of Enforceable Emission Limits (6-98)
___ PI-E Notification of Changes (3-96)

___ 11 Fabric Filters (10-93)
___ 12 ESPs (10-93)
___ 13 Scrubber (10-93)
___ 14 Absorbers (10-93)
___ 15 Adsorbers (10-93)
___ 16 Data Sht (Dust Collectors) (10-93)
___ 17 Rock Crushing (1-94)
___ 18 Spray Booths (9-93)
___ 19 In-Line Lint Filter (9-93)
___ 20 Concrete Batch (1-94)
___ 21 Furnace Data (9-93)

___ 4N Initial LAER Determination (10/98)
___ 5N Compliance Certification (10/98)
___ 6N Alternate Site Analysis (10/98)

Miscellaneous Information
___ Consultant's List (9-98)
___ Local Air Pollution Programs (3-97)
___ Regional Office List (8-96)

Miscellaneous Documents
___ Air Quality Modeling Guidelines (1-96)
___ BACT Guidance Document (No Date)
___ Compliance History (1-96)
___ Effects Screening List (4-96)
___ Interim T&RA/ModelingGuid (1-94)
___ Modifications .... SB 1126 (4-96)
___ Nonattainment NSR Manual (7/97)

___ 22 Asphalt Batch Plant (9-93)
___ 23 Tank Battery (10-93)
___ 24 Dust Collectors/Cotton Gin (9-93)
25 N/A
___ 26 Heat Exchanger (10-93)
___ 27 Abrasive Blast Cleaning (8-93)
28 N/A
___ 29 Reciprocating Engines (9-93)
___ 30 Est.Cap.Cost & Certification(11-95)
___ 31 Combustion Turbines (10-93)
___ 32 Screen Model Data (9-93)

___ 7N Construction/Modification (10/98)
___ 8N Descrip.Of Creditable Offset(10/98)
___ 9N Signature Verification (10/98)

See back of form for Technical Guidance Instructional Packages & Supplemental Information Documents

Verification of Mailout:

Date:_____ By: _____

Revised 11/98

Technical Guidance/Standardization Packages

Process/Facility Type NSR Section

___ Anhydrous Ammonia Agricultural (12-94)
___ Cotton Gins Agricultural (12-94)
___ Cottonseed Delinting Agricultural (3-96)
___ Dairies Agricultural (12-94)
___ Dry Bulk Fertilizer Handling Agricultural (12-94)
___ FeedLots Agricultural (12-94)
___ FeedMills Agricultural (12-94)
___ Grain Elevators Agricultural (10-95)

___ Absorbtion Units Chemical (5-95)
___ Bulk Gasoline Terminals Chemical (12-94)
___ Bulk Liquid Storage Terminals Chemical (2-95)
___ Carbon Adsorbtion Systems Chemical (12-94)
___ Cooling Towers Chemical (12-94)
___ Equipment Leak Fugitives Chemical (3-95)
___ Flares and Vapor Oxidizers Chemical (6-98)
___ Fluid Catalytic Cracking Units Chemical (10-95)
___ Loading Operations Chemical (1-95)
___ Polyethyl/Polyprop Manf. Chemical (9-96)
___ Storage Tanks Chemical (2-95)
___ Sulfur Recovery Units Chemical (3-95)
___ Tank Truck/Rail Car Cleaning Chemical (12-94)

Process/Facility Type NSR Section

___ Gasoline Terminal Loading Chemical (6-95)

TNRCC Regulatory Guidance
___ RG-117 Air Quality Regulations in Texas
___ RG-118 Universal Transverse Mercator Coordinate System
___ RG-119 CORE Section
___ RG-120 Confid. Information in Air Permit Applications
___ RG-121 What is "Start of Construction?"
___ RG-122 After Your Permit is Issued

Technical Notes/Supplemental Information Packets:

___ Anhydrous Ammonia Storage Agricultural (10-95)
___ Bulk Fertilizer Handling Agricultural (10-95)
___ Grain Elevators/FeedMills Agricultural (10-95)
___ Poultry Agricultural (1-95)
___ Rendering Plants Agricultural (10-95)
___ Smokehouses Agricultural (1-95)
___ Swine Feeding Agricultural (1-95)

___ Abrasive Blast Cleaning
Coatings (1-95)
___ Fiberglass Plastic/Cult. Marble
Coatings (12-94)
___ Flexographic Printing
Coatings (3-95)
___ Heatset Printing Coatings (6-95)
___ Non-heatset Offset Printing
Coatings (12-94)
___ Paint Manufacturing
Coatings (3-95)
___ Solvent Degreasing Coatings (3-95)
___ Spray Painting/Dip Coating
Coatings (12-94)

***Please See Note for Combustion Section
___ Boilers/Heaters Combustion (3-95)
___ Incinerators Combustion (3-95)
___ Reciprocating Engine
Combustion (3-95)
___ Soil Remediation Combustion (10-95)
___ Stationary Turbines Combustion (2-95)

___ Overview-Mechanical Contacts
Mechanical (12-94)
___ Asphalt Concrete Plants
Mechanical (5-95)
___ Chromium Plating Facilities
Mechanical (4-95)
___ Concrete Batch Plants
Mechanical (12-94)
___ Ethylene Oxide Sterilizers
Mechanical (1-94)
___ Hot Dip Galvanizing Mechanical (3-95)
___ Lead Acid Battery Mfg
Mechanical (3-95)
___ Metal Spraying Mechanical (3-95)
___ Oriented Strandboard Mills
Mechanical (12-94)
___ Rock Crushers Mechanical (12-94)

___ Abrasive Blasting-Water Tanks
Coatings (1-95)
___ Autobody Shops/Std. Ex. #124
Coatings (1-95)

___ Asphalt Blowing/Roofing
Mechanical (N/D)
___ Furnaces
Mechanical (3-95)
___ Material Handling Mechanical (N/D)
___ Woodchip Handling Mechanical (4-95)
___ Zinc Melting Pot Furnace
Mechanical (12-92)

___ RG-128 Permits Review Process
___ RG-129 Determination of Federally Significant Modifications
___ RG-130 Air Quality Permit Requirements in Texas
___ RG-136 Enforcement Authority of Local Governments
___ RG-139 Legal Division

*** If Combustion Package is requested, please check if PI-1 Instruction Manual needs to be sent.

* Dates in parenthesis indicate latest revision date.

Verification of Mailout:

Date:_____ By:_____

Revised 11/98
Electronic: C:\nsrforms\fm\mailout.re

APPENDIX F

TNRCC Response to the EPA May 16, 1995 Memo

Mr. John Seitz, Director
Office of Air Quality Planning and Standards
U.S. ENVIRONMENTAL PROTECTION AGENCY (MD-12)
Research Triangle Park, North Carolina 27711

Re: Potential to Emit for Maximum Achievable Control Technology (MACT) Standards - Guidance on Timing Issues Memorandum

Dear Mr. Seitz:

This letter concerns your memorandum, "Potential to Emit for MACT Standards - Guidance on Timing Issues" dated May 16, 1995. Many of the issues addressed in the memorandum are consistent with current Texas Natural Resource Conservation Commission (TNRCC) policies and practices. However, some issues in the guidance have raised concerns within our agency, particularly the TNRCC Small Business Advocate's (SBA) Office which believes that implementation of these policies may be critical to small businesses in Texas.

In an enclosure to this letter, staff of the Operating Permits Division (OPD) and SBA of the TNRCC provide the U.S. Environmental Protection Agency (EPA) suggestions to clarify the guidance. We request that TNRCC staff comments be considered prior to rulemaking that may result due to these issues.

The enclosed comments address the specific concerns of the TNRCC staff which include the following:

(1) the "once in, always in" policy as it relates to Title V applicability;

(2) the "once in, always in" policy as it relates to MACT applicability; and

(3) the timing for obtaining potential to emit restrictions. The TNRCC staff believes that an adequate analysis and incorporation of recommendations will help the EPA develop practical and effective rules concerning MACT standards and potential to emit.

The enclosure is a summary of our staff comments on the guidance memorandum. Thank you for the opportunity to comment on this guidance.

Sincerely,

Dan Pearson
Executive Director (MC 109)
Texas Natural Resource Conservation Commission

Enclosure

cc: Ms. Beverly Hartsock, Deputy Director, Office of Policy and Regulatory Development
Mr. Jeffrey A. Saitas, P.E., Deputy Director, Office of Air Quality
Ms. Tamra-Shae Oatman, Small Business Advocate
Ms. Karen N.T. Olson, P.E., Director, Operating Permits Division, Office of Air Quality
Mr. Robert M. Todd, P.E., Manager, Air Toxics Development, Operating Permits Division

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION (TNRCC) STAFF COMMENTS TO THE MAY 16, 1995 MEMORANDUM, "POTENTIAL TO EMIT FOR MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY (MACT) STANDARDS - GUIDANCE ON TIMING ISSUES"

On May 16, 1995, the U.S. Environmental Protection Agency (EPA) issued a memorandum, "Potential to Emit for MACT Standards - Guidance on Timing Issues". This document contains the TNRCC Operating Permits Division (OPD) and Small Business Advocate staffs' comments to the May 16, 1995 guidance.

Comment Item No. 1
"Once in, always in" Interpretation

The EPA Statement:

"EPA is today clarifying that facilities that are major sources for HAPs on the 'first compliance date' are required to comply permanently with the MACT standard to ensure that maximum achievable reductions in toxic emissions are achieved and maintained... Additionally, the Act requires all major sources to obtain a Part 70 operating permit. Section 501(2) provides that any source that is major under section 112 will also be major under title V. It follows that a source that is major for purposes of any MACT standard will be subject to title V as a major source."

Comment:

We are concerned about the "once in, always in" interpretation as it relates to Title V applicability. A major source subject to Title V as defined in Section (§)501(2)(A) is, "a major source as defined in section 112." A major source under § 112 is defined as, "any stationary source...that emits or has the potential to emit considering controls, in the aggregate of 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants." Consequently, a source whose potential to emit (PTE) has reduced to less than 10/25 tons per year (tpy) as a result of complying with the MACT is not a major source under § 501(2)(A) since it does not trigger the 10/25 tpy criteria. Therefore, we believe that extending the "once in, always in" policy to include Title V applicability is an inaccurate interpretation of the definition of "major source" under § 501(2)(A).

We are concerned that many sources that were major for hazardous air pollutants (HAPs) in the past would be required to obtain a Title V permit although the PTE of such sources is well below 10/25 tpy at the time they are subject to Title V. It is expected that there would be little benefit in requiring a source whose PTE is less than major source threshold trigger to obtain a Part 70 permit exclusively for the purpose of establishing additional federally enforceable limits, beyond those which are placed in the standard itself, that will preclude such sources from "backsliding". We believe that it would be burdensome for small businesses to obtain a Title V permit in addition to having to comply with the MACT standard, especially when these sources are emitting less than "major" quantities of HAPs. Additionally, there are many existing state processes that can be used in place of Part 70 permits to effectively limit PTE. We feel that future MACT standards should include provisions that would allow sources to limit their PTE in a practical manner. Each standard would need to be examined for the most appropriate method but some examples of workable provisions would be committing to a limitation on hours of operation of HAP emitting equipment, documentation of an enforceable inventory of HAP emissions on the site, and use of appropriate

"screening" equations such as the one contained in the Stage I Gasoline Distribution MACT Standard. Use of these provisions would effectively limit a source's PTE in a federally enforceable manner without full Part 70 permitting. Therefore, the TNRCC requests the EPA to review § 501(2) and § 112 of the Federal Clean Air Act and allow sources, especially small businesses, other options to establish emission limitations that would preclude the need to obtain a Part 70 permit or meet major source control requirements.

Comment No. 2
"Once in, always in" Interpretation

The EPA Statement:

"A once in, always in policy ensures that MACT emissions reductions are permanent, and that the health and environmental protection provided by MACT standards is not undermined."

Comment:

We believe that the "once in, always in" condition may dissuade companies from pursuing innovative pollution control and pollution prevention technologies that could significantly reduce emissions. If a company can reduce emissions and, as a result, have less stringent requirements such as recordkeeping, reporting and testing, the company will have an incentive to make reductions a serious part of future production and equipment changes.

Additionally, the EPA has not addressed specific situations where sources may employ pollution prevention practices after the first substantive compliance date. For example, under the "once in, always in "policy a source emitting 28 tpy of HAPs which missed the first compliance deadline will permanently be subject to the MACT standard. However, this source later decides to switch to a water-based substitute to completely eliminate the emissions of HAPs. In such instances, it is unclear to the TNRCC as to what requirements this source would be subject to, if any, under the current language in the general provisions (Title 40 Code of Federal Regulations, Part 63, Subpart A) or in the language of a specific MACT standard. Therefore, we suggest that in future MACT standards the EPA explicitly define means for such sources to avoid requirements to apply controls and implement monitoring, recordkeeping, and testing that would be ineffective and inappropriate after employing pollution prevention techniques.

Comment No. 3
Timing For Obtaining Potential to Emit Restrictions

The EPA Statement:

"Today's guidance clarifies that facilities may switch to area source status at any time until the 'first compliance date' of the standard. The 'first compliance date' is defined as the first date a source must comply with an emission limitation or other substantive regulatory requirement (i.e., leak detection and repair programs, work practice measures, housekeeping measures, etc..., but not a notice requirement) in the applicable MACT standard."

Comment:

We are concerned that small businesses subject to MACT standards may not be able to limit their PTE if adequate time is not provided from the promulgation date to the first "substantive" compliance date. For future MACT standards that could potentially affect significant numbers of small businesses, we request, the EPA consider the resource limitations of small businesses prior to establishing compliance dates for those MACTs. The current practice of establishing a three-year

time frame for compliance may not allow smaller businesses adequate time to purchase, install, and operate control equipment that would reduce their total HAP emissions below the 10/25 tpy trigger. Furthermore, it may also be too short a time for a smaller business to develop alternate business practices that would eliminate HAP emissions entirely. Therefore, we feel that the compliance dates should provide adequate time that will "better" allow such sources to utilize the options provided by the EPA to acquire area source status.

In addition, we also feel that this portion of EPA's guidance will create needless inequities between sources that limit their PTE before the compliance date and those that choose to become area sources after the compliance date. The EPA should treat all area sources in the same manner regardless of whether area source status is achieved before or after the final compliance date.

APPENDIX B
CSSA AIR QUALITY PERMIT NO. 29466

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

AIR QUALITY PERMIT

A PERMIT IS HEREBY ISSUED TO

DEPARTMENT OF THE ARMY-CAMP STANLEY

AUTHORIZING THE CONSTRUCTION AND OPERATION OF A

Cold Solvent Cleaning Facility

LOCATED AT

Boerne, Bexar County, Texas

LATITUDE 29° 40' 35" *LONGITUDE* 098° 37' 52"

1. **The facilities** covered by this permit shall be constructed and operated as specified in the application for the permit. All representations regarding construction plans and operation procedures contained in the permit application shall be conditions upon which the permit is issued. Variations from these representations shall be unlawful unless the permit holder first makes application to the Executive Director of the Texas Natural Resource Conservation Commission (TNRCC or Commission) to amend this permit in that regard and such amendment is approved. (30 TAC 116.116)

2. **Voiding of Permit.** A permit or permit amendment is automatically void if the holder fails to begin construction within 18 months of date of issuance, discontinues construction for more than 18 consecutive months prior to completion, or fails to complete construction within a reasonable time. Upon request, the Executive Director may grant a onetime 18-month extension of the date to begin construction. (30 TAC 116.115(b)(1))

3. **Construction Progress.** Start of construction, construction interruptions exceeding 45 days, and completion of construction shall be reported to the appropriate regional office of the TNRCC not later than 15 working days after occurrence of the event. (30 TAC 116.115(b)(2))

4. **Start-up Notification.** The appropriate Air Program Regional Office of the Commission shall be notified prior to the commencement of operations of the facilities authorized by the permit in such a manner that a representative of the TNRCC may be present. Phased construction, which may involve a series of units commencing operations at different times, shall provide separate notification for the commencement of operations for each unit. (30 TAC 116.115(b)(3))

5. **Sampling Requirements.** If sampling of stacks or process vents is required, the permit holder shall contact the TNRCC Office of Air Quality prior to sampling to obtain the proper data forms and procedures. All sampling and testing procedures must be approved by the Executive Director and coordinated with the regional representatives of the Commission. The permit holder is also responsible for providing sampling facilities and conducting the sampling operations or contracting with an independent sampling consultant. (30 TAC 116.115(b)(4))

6. **Equivalency of Methods.** It shall be the responsibility of the permit holder to demonstrate or otherwise justify the equivalency of emission control methods, sampling or other emission testing methods, and monitoring methods proposed as alternatives to methods indicated in the conditions of the permit. Alternative methods shall be applied for in writing and must be reviewed and approved by the Executive Director prior to their use in fulfilling any requirements of the permit. (30 TAC 116.115(b)(5))

7. **Recordkeeping.** A copy of the permit along with information and data sufficient to demonstrate compliance with the permit shall be maintained in a file at the plant site and made available at the request of personnel from the TNRCC or any air pollution control program having jurisdiction. For facilities that normally operate unattended, this information shall be maintained at the nearest staffed location within Texas specified by the permit holder in the permit application. This information shall include, but is not limited to, production records and operating hours. Additional recordkeeping requirements may be specified in special conditions attached to the permit. Information in the file shall be retained for at least two years following the date that the information or data is obtained. (30 TAC 116.115(b)(6))

8. **Maximum Allowable Emission Rates.** The total emissions of air contaminants from any of the sources of emissions listed in the table entitled "Emission Sources - Maximum Allowable Emission Rates" shall not exceed the values stated on the table attached to the permit. (30 TAC 116.115(b)(7))

9. **Maintenance of Emission Control.** The facilities covered by the permit shall not be operated unless all air pollution emission capture and abatement equipment is maintained in good working order and operating properly during normal facility operations. Notification for upsets and maintenance shall be made in accordance with §101.6 and §101.7 of this title (relating to Notification Requirements for Major Upset and Notification Requirements for Maintenance). (30 TAC 116.115(b)(8))

10. **Compliance with Rules.** Acceptance of a permit by a permit applicant constitutes an acknowledgement and agreement that the holder will comply with all rules, regulations, and orders of the Commission issued in conformity with the Texas Clean Air Act and the conditions precedent to the granting of the permit. If more than one state or federal rule or regulation or permit condition are applicable, then the most stringent limit or condition shall govern and be the standard by which compliance shall be demonstrated. Acceptance includes consent to the entrance of Commission employees and agents into the permitted premises at reasonable times to investigate conditions relating to the emission or concentration of air contaminants, including compliance with the permit. (30 TAC 116.115(b)(9))

11. This **permit may be appealed** pursuant to Section 263.36 of the General Rules of the TNRCC and Section 382.032 of the TCAA. Failure to take such appeal constitutes acceptance by the applicant of all terms of the permit. (Tex. Gov't. Code Ann. § 2001, et seq.)

12. This **permit may not be transferred**, assigned or conveyed by the holder except as provided by rule. (30 TAC 116.110(c))

13. This **permit expires 10 years** from date of issuance unless renewed as provided in Section 382.055 of the TCAA unless a shorter time period is specified in the special conditions of this permit.

14. There may be **additional special conditions** attached to a permit upon issuance or modification of the permit. Such conditions in a permit may be more restrictive than the requirements of Title 30 of the Texas Administrative Code. (30 TAC 116.115(c))

15. **Emissions** from this facility must not cause or contribute to a condition of 'air pollution' as defined in Section 382.003(3) of the Texas Clean Air Act (TCAA) or violate Section 382.085 of the TCAA. If the Executive Director determines that such a condition or violation occurs, the holder shall implement additional abatement measures as necessary to control or prevent the condition or violation.

PERMIT 29466

DATE 2-15-96

PERMIT.GEN

Dan Pearson
Executive Director
Texas Natural Resource Conservation Commission

SPECIAL CONDITIONS

Permit No. 29466

GENERAL

1. This permit authorizes the construction and operation of a Weapons Cleaning Room at Building 90 in Boerne, Bexar County. Sources covered by this permit include Solvent Vat Nos. 1 through 4, the Volatile Corrosion Inhibitor (VCI) Vat, the Fingerprint Remover (FR) Tank, and the Solvent Recovery Unit.

   This permit does not cover the other sources of emissions at this site including two paint booths, five storage tanks, two steel shot abrasive cleaners, the gun bluing shop, four standby generators, three boilers, wastewater treatment equipment, and the gun room. These other sources of emissions are covered by Standard Exemptions 75, 86, 102, 41, 5, 7, and 61, respectively. The gun room is a grandfathered source.

2. Within 30 days of the date of this permit, all emission points corresponding to the emission point identification numbers on the maximum allowable emission rates table (MAERT) shall be physically identified (by tagging, labeling, engraving, etc).

EMISSION LIMITS

3. Opacity of emissions from any emission point must not exceed 5 percent averaged over a six-minute period, except for those periods described in 30 TAC Section 111.111(a)(1)(E) of Regulation I. Opacity shall be determined using Environmental Protection Agency Reference Method 9.

OPERATIONAL LIMITATIONS

4. Solvent Vat Nos. 1 through 4, the VCI, and the FR Tank (hereafter referred to as "the cleaners") shall be equipped as follows:

   A. Covers shall be provided for the cleaners which shall be kept closed whenever parts are not being handled in the cleaners.

   B. An internal cleaned parts drainage rack shall be provided for enclosed draining under the cover.

   C. The solvent spray system shall produce a solid stream and not an atomized or shower spray. The spray system shall operate at a pressure of 10 pounds per square inch gauge or less, as necessary, to prevent splashing above the freeboard.

D. The solvents used in the cleaners shall not be heated above 120 °F.

5. The cleaners shall be operated as follows:

A. A permanent, conspicuous label with the following operating procedures shall be posted on or near the cleaning units. These operating procedures shall be strictly followed.

(1) Covers shall be closed at all times except when processing workloads through the cleaning units.

(2) Parts shall be allowed to dry within the cleaner freeboard area for at least 15 seconds or until visibly dry.

(3) Waste solvents shall not be disposed of or transferred to another party such that the waste solvent will evaporate into the atmosphere. Waste solvent shall be stored only in covered containers.

B. All doors and other openings leading from the weapons cleaning area in Building 90 shall be kept closed at all times except to allow transit of equipment and personnel.

CHEMICAL FLEXIBILITY

6. This permit allows the substitution of volatile organic compounds (VOC)-containing products that meet the following conditions:

A. Any new or replacement compound is listed on the TNRCC Toxicology and Risk Assessment effects screening level (ESL) list dated April 10, 1995.

B. Any new or replacement compound emitted at rates of less than 0.04 pounds per hour (lb/hr) shall be exempt from parts A and C of this condition.

C. Emissions of new or replacement VOC and particulate compounds shall satisfy the following equation:

$$ER_1 * 1250\ \mu g/m^3 + ER_2 * 1477\ \mu g/m^3 + ER_3 * 869\ \mu g/m^3 + ER_4 * 1074\ \mu g/m^3 + ER_5 * 1117\ \mu g/m^3 \leq ESL$$

where:

ER_1 = Maximum hourly emission rate of new compound from the VCI Vat and Cleaning Vat No. 1.

ER_2 = Maximum hourly emission rate of new compound from Cleaning Vat Nos. 2 and 3.

ER_3 = Maximum hourly emission rate of new compound from Cleaning Vat No. 4.

ER_4 = Maximum hourly emission rate of new compound from the Fingerprint Remover Tank.

ER_5 = Maximum hourly emission rate of new compound from the Solvent Recovery Unit.

ESL = The 30-minute ESL of the new compound.

D. This condition allows for changes in product formulations and does not allow for any increase in total emissions from any emission point listed on the MAERT.

RECORDKEEPING

7. A recordkeeping system shall be devised and implemented which demonstrates compliance with the emission limits on the MAERT. At a minimum, records shall contain the following information:

   A. Material Safety Data Sheets for materials currently in use and those used during the previous two years. Records are only required for materials with the potential to emit air contaminants.

   B. Records shall indicate material usages of all raw materials specified in part A of this condition.

   C. Information from parts A and B of this condition shall be used to generate a monthly report containing the following information:

      (1) The VOC emissions from all emission point numbers in pounds per hour on a daily basis and tons per year over the previous 12 months. Hourly emission rates may be calculated as daily VOC usage divided by actual hours of operation.

      (2) Total material usage for the previous 12 months.

(3) Calculations to demonstrate that any products substituted for those in the original application will meet the chemical flexibility requirements in Special Condition No. 6.

8. All records shall be maintained for the most recent 24 months in a central location at Building 90.

HOUSEKEEPING

9. All chemical spills shall be cleaned up promptly using appropriate cleanup procedures.

10. All equipment covered by this permit shall be operated and maintained in accordance with the manufacturer's instructions.

11. Materials that have been used for cleaning shall be stored in sealed containers for proper disposal.

Dated 4-4-96

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

Permit No. 29466

This table lists the maximum allowable emission rates and all sources of air contaminants on the applicant's property covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these sources.

AIR CONTAMINANTS DATA

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates * lb/hr	TPY
EPN 1	VCI Vat and Cleaning Vat No. 1	VOC	0.70	1.28
EPN 2	Cleaning Vat Nos. 2 and 3	VOC	0.34	0.58
EPN 3	Cleaning Vat No. 4	VOC	0.29	0.48
EPN 4	Fingerprint Remover Tank	VOC	0.28	0.53
EPN 5	Solvent Recovery Unit	VOC	0.11	0.18

(1) Emission point identification
(2) Specific point source name
(3) VOC - volatile organic compounds as defined in General Rule 101.1

* Emission rates are based on and the facilities are limited by the following maximum operating schedule:

Hrs/day 24 Days/week 7 Weeks/year 52 or Hrs/year

Dated 2-15-96

APPENDIX C
EXEMPTION REGISTRATION
NOS. 32405, 32406, 62407

DATE: 04-28-99 PERMIT APPLICATION SUMMARY PAGE: 1
TIME: 18:10:59

***GENERAL PERMIT INFORMATION
PERMIT: 32405 ENGR: MURPHY, TERRANCE / GROUP: CHEM ID:BG0841S
ISSUED TO: DEPT OF THE ARMY, CAMP STANLEY STORA
UNIT NAME: SVE
OPERATING SCHEDULE: 24.0 HRS/DAY 7 DAYS/WK 52 WKS/YR
LAT: 29-42-34 LONG: 098-36-51 REGION: 13 COUNTY: BEXAR
NEAR CITY: BOERNE LOC: 25800 RALPH FAIR ROAD

***PERMIT/SITE CONTACT INFORMATION:
PERSON: LT. DEAN C. SCHMELLING ADDR1: 25800 RALPH FAIR ROAD
TITLE: POST COMMANDER ADDR2: BOERNE
CITY: BOERNE STATE: TX ZIP: 78006 PHONE: (210)221-7461

** CONSTRUCTION **		** OPERATING **		** CONTINUANCE **	
TYPE APPL(C,S,X):	(X)	OPERATION START :		NOTICE MAILED	:
APPL RECD	: 06-03-96	OPER APPL RECD :		APPL RECD	:
DEFIC LTR SNT	:	OPER APPL CMPLT :		DEFIC LTR SNT	:
SUPP INFO REQ	:	DISP(I,D): ( )		SUPP INFO REQ	:
SUPP INFO RECD	:	OPR TYPE(R,S)	: ( )	SUPP INFO RECD	:
APPL CMPLT	:	**********		APPL CMPLT	:
COMP LTR SNT	:	*	*	COMP LTR SNT	:
PUB NTC SNT	:	* I= ISSUED D=DENIED	*	PUB NTC SNT	:
PUB NTC PUB	:	* E=EXPIRED	*	PUB NTC PUB	:
PUB HEAR (R,H)	: ( )	* C=CNST S=SPECIAL	*	PUB HEAR(R,H)	: ( )
CNST TYPE(C,X,S):	(X)	* X=EXEMPT R=OPER	*	DISP(I,D,E):	( ) :
DISP (I)	: 07-01-96	**********			
CNST START DATE :					

***EMISSIONS CHANGED :

***REMARKS:RESUBM 1/22/99 & ISSUED 2/19/99.

***OTHER PERMIT DATES:
APP/PERMIT VOIDED: REASON:
APP ON HOLD UNTIL: REASON:
CONST STOPPED UNTIL:

VOID/HOLD CODES: PD-PLT DISMANTLED
CR-COMPANY REQUEST TI-TIME EXPIRED
DD-DATA DELAY TD-TECH DIFFICULTY
RE-REISSUED NR-NO RESPONSE

***PERMIT TYPES/STANDARDS:
NEW MAJ SOURCE:> 100 TPY: SIC: 9999
MAJOR MODIFICATION: PORTABLE: RELATED PERMITS: SUFFIX REASON
NON-ATTAIN REVIEW: NSPS: TACB: CHG LOC:
INSIGNIFICANT EMISSIONS: NESHAP: PSD-TX: CHG OWN:
FUEL CONVERSION: TOXIC MATERIALS: STD EX NO.: 068

***AIR CONTAMINANT INFORMATION:

NAME	CODE	MAX ALLOWABLE RATE LBS/HR	TONS/YR	ACTUAL TONS/YR

***ABATEMENT EQUIPMENT:

FILE/DM

Robert J. Huston, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Jeffrey A. Saitas, *Executive Director*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

February 22, 1999

Lieutenant Colonel Ernest N. Roberson, Jr.
Post Commander
Department of The Army, Camp Stanley
25800 Ralph Fair Road
Boerne, Texas 78015-4800

Re: Exemption Registration No. 32405
Soil Vapor Extraction System
Boerne, Bexar County
Account ID No. BG-0841-S

Dear Lieutenant Colonel Roberson:

This is in response to your request to register the change in operation of a soil vapor extraction system at your facility in Bexar County. We understand that the system will now operate at a maximum flow rate of 110 standard cubic feet per minute and with no air abatement equipment. You have estimated that emissions of the contaminant of greatest concern at the site, vinyl chloride, will not exceed 0.25 pounds per hour. You have also documented the placement of the emissions point at least 3,000 feet away from the nearest off-site receptor.

Accordingly, and after evaluating the entirety of your submittal, we have determined that this project conforms to the criteria of 30 Texas Administrative Code (TAC) Sections 106.533 and 106.262, if constructed and operated as described in your application. The Texas Natural Resource Conservation Commission (TNRCC) Executive Director authorized these exemptions pursuant to 30 TAC Chapter 106. We have included copies of the exemptions in effect at the time of this registration. You must operate in accordance with all of their requirements.

We remind you that regardless of whether a permit is required, you must maintain these facilities in compliance with all air quality rules and regulations of the TNRCC and of the U.S. Environmental Protection Agency at all times.

Re: Exemption Registration No. 32405

We appreciate your cooperation in this matter. If you have any questions concerning these exemptions, please call Mr. Terry Murphy of our New Source Review Permits Division at (512) 239-1587 or write him at Texas Natural Resource Conservation Commission, Office of Air Quality, New Source Review Permits Division (MC-162), P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

Tammy Villarreal
for Manager, Chemical Section
New Source Review Permits Division

TV/TM/gg

Enclosures

cc: Mr. Leo Butler, Air Program Manager, San Antonio

Record No. 63949

CHEMICAL DIVISION
EXEMPTION REGISTRATION REVIEW

Company: Department of the Army, Camp Stanley

Record Number: 63949 Registration Number: 32405

Contact Name: Brian Vanderglas, Parsons Engineering Science, Inc.

Phone: (512) 719-6000 Fax: 6099

Description of Overall Unit: Soil remediation

Description of Facilities/Processes Claimed in this Registration and Exemptions Claimed: See prior Review. The registrant 533.

Sources, Emissions and Control Summary: See prior Review. The registrant has increased the number of recovery wells to 18. This allows for a maximum flow rate of 110 scfm. This represents less than a 1/3 increase over the prior level. Since the registrant estimated worst case emissions in the prior submittal at 52% of the allowable, the new configuration should not cause emissions to exceed the limits. Vinyl chloride is the contaminant of greatest concern at this site, and will most likely continue to remain below the 0.25 lb/hr. limit.

Emissions Reductions Due to NSRP: None

Requires PSD or Nonattainment Netting? No

Meets All General and Specific Conditions.

Reviewed By: Terry Murphy TM Team Leader: Duncan Stewart DS
Date: February 17, 1999 Date: 2/19/99

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

TNRCC

REGISTRATION FORM FOR EXEMPTIONS
FORM PI-7

Please mail to: TNRCC, Office of Air Quality, New Source Review Permits Division (MC-162), PO Box 13087, Austin, TX 78711-3087

I. Company Name Department of the Army, Camp Stanley Storage Activity
(Corporation, Company, Government Agency, Firm, etc.)

Mailing Address 25800 Ralph Fair Road, Boerne, TX 78015-4800

Individual Authorized to Act for Registrant: Name LTC Ernest N. Roberson, Jr. Title Post Commander

Address 25800 Ralph Fair Road, Boerne, TX 78015-4800 Telephone (210)221-7461 Fax ( )

II. PHYSICAL LOCATION OF EXEMPT FACILITY (Latitude and Longitude must be to the nearest second):

Name of Plant or Site Department of the Army, Camp Stanely Storage Activity

Street Address 25800 Ralph Fair Road, Boerne, TX 78015-4800

Nearest City Boerne Zip Code 78015 County Bexar Latitude 29°42'34" Longitude 98°36'51"

SITE REQUIREMENTS: A. Submit a plot plan to scale of the property showing the location of plant boundaries, plant equipment, and surrounding area
B. Furnish an area map with a scale showing the facility location relative to highways and towns.
C. A physical address or accurate driving directions must be provided on all registrations.

III. TYPE OF FACILITY:
A. Applicable Exemption Number(s) from TNRCC List 106.262; 106.533
B. Name of Facility and Company's Facility Number Soil Vapor Extraction System
C. TNRCC Account Identification Number BG-0841-5
D. Previous Special Exemption or Permit Number 32405
E. Operating Schedule: Hours/day 24 Days/week 7 Weeks/year 52
F. Proposed Start of Construction _____ (Date) Operation _____ (Date)
G. Permanent [X] Portable [ ]
H. Length of time at this site, if portable _____

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IV. PROCESS INFORMATION
Description of Process: Prepare and attach a written description of the exempt process and applicable checklists (when available). The description must be in sufficient detail to indicate that the facility will conform to the specified exemption.

V. EMISSIONS DATA Furnish a description of the basis for emission rates including fugitives. (Calculations, emission factors, measurement, NSPS, etc.)

Emission Point Number	Name of Source	Name of Air Contaminant	Emission Rate of Each Air Contaminant			
			lb/hr		tons/yr	
			Gaseous	Particulate	Gaseous	Particulate
	B-3 SVE System	TCE	1.10		4.8	
		DCE	0.42		1.8	
		Vinyl chloride	0.017		0.075	

VI. The required copy of the registration request has been sent to the Regional Office of the TNRCC: [X]Yes [ ]No
The required copy of the registration request has been sent to the Local Programs (if applicable): NA [ ]Yes [ ]No

VII. I, LTC Ernest N. Roberson, Jr. (Name) Post Commander (Title)
state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption. The facility will operate in compliance with all Regulations of the Texas Natural Resource Conservation Commission and with Federal Environmental Protection Agency Regulations governing air pollution.

DATE 22 Jan 1999 SIGNATURE [signature]

ENGINEERING-SCIENCE, INC.

8000 Centre Park Drive, Suite 200 • Austin, Texas 78754 • (512) 719-6000 • Fax: (512) 719-6099

true receive. date

January 20, 1998

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JAN 28 1999
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Via Certified Mail

Tammy Villarreal
Manager, Chemical Section, MC-162
TNRCC, New Source Review Division
PO Box 13087
Austin, TX 78711-3087

Re: Notice of Modification to Standard Exemption Registration No. 32405 for Soil vapor Extraction System at Camp Stanley Storage Activity
Boerne, Bexar County, Texas
TNRCC Account ID No. BG-0841-S

Dear Ms. Villarreal:

The subject soil vapor extraction (SVE) system at Camp Stanley Storage Activity (CSSA) is currently authorized under Standard Exemption Registration No. 32405. As referenced in my letter to you of December 20, 1996, we have made modifications to the layout of the SVE system and wish to incorporate those changes into the exemption registration representations at this time. There are now eighteen wells in the SVE system, which may be evacuated at a maximum blower rate of 110 SCFM. Exhaust concentrations from the SVE system are unchanged from previous representations since the original six wells are located in the areas of highest contaminant concentration.

This standard exemption registration is intended to replace the previous representations in their entirety. Information required for your review of the exemption application under 30 TAC §106.4, §106.262, and §106.533 is included. If you require any additional information or have questions/comments you may contact me directly, or Mr. Brian Murphy of CSSA at 210/698-5208.

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Sincerely,

Brian Vanderglas

Parsons Engineering Science, Inc.
Brian Vanderglas
Task Manager

xc: Air Program Manager, TNRCC Region 13, San Antonio
JoJean Mullen – AFCEE
Mr. Brian Murphy, CSSA

PARSONS

Texas Natural Resource Conservation Commission Standard Exemption Registrations, Revision 2

SWMU B-3 SVE Site

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

January 1999

Texas Natural Resource Conservation Commission
Standard Exemption Registrations, Revision 2
SWMU B-3 SVE Site

January 1999

Prepared for

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

Prepared by

PARSONS ENGINEERING SCIENCE
8000 Centre Park Drive, Suite 200
Austin, Texas 78754

Project Number 728487.05010

Tony St Clair 1/13/99

STATE OF TEXAS
TONY RAY ST. CLAIR
58935
REGISTERED
PROFESSIONAL ENGINEER

Printed on Recycled Paper

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INTRODUCTION

Camp Stanley Storage Activity (CSSA), Boerne, Texas is a subinstallation of the US Army Red River Depot (RRAD), located in Texarkana, Texas. The primary mission of CSSA is receipt, storage, and issuance of ordnance, as well as quality assurance testing and maintenance of military weapons and ammunition. CSSA is located in northwestern Bexar County, approximately 19 miles northwest of downtown San Antonio (see area map). Bexar County is an attainment county for all pollutants.

The Texas Natural Resource Conservation Commission (TNRCC) has issued an Air Quality Permit for the operation of a cold solvent cleaning facility to CSSA (permit no. 29466, account ID no. BG-0841-S) and approved standard exemption (no. 32405) for operation of a soil vapor extraction (SVE) system for treatability testing of one of its solid waste management units (SWMUs). This report includes the second revision of this existing standard exemption registration for soil remediation activities at CSSA. This registration is intended to replace the current exemption registration for the same facility. This registration is required because changes are being made to the physical layout of the SVE system, and also to update the emission calculations based on new data. A plot plan of the entire installation showing all boundaries is provided in this report. All stationary emission sources are indicated on this plot plan, including exempt sources as well as permitted sources.

The exempt source represented by this registration meets all requires of 30 TAC §106.4 and the respective exemption requires of 30 TAC §106.533 (Water and Soil Remediation) and 30 TAC §106.262 (Facilities Emission and Distance Limitations).

This registration includes all necessary data for determining the applicability of the standard exemption requirements for the soil vapor extraction (SVE) system installed at Solid Waste Management Unit (SWMU) Burn Area 3 (B-3).

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Source:
U.S. Geological Survey, 7.5 Minute Quadrangle, Van Raub, Texas

Area Map

Camp Stanley Storage Activity

PARSONS ENGINEERING SCIENCE, INC.

728487 CSSA-AREA.DWG

PLOT PLAN

FORM PI-7

PROCESS DESCRIPTION

PROCESS DESCRIPTION

SOIL VAPOR EXTRACTION (SVE) SYSTEM

In March 1996, CSSA conducted SVE pilot and treatability tests on soils located in Solid Waste Management Unit Burn Area 3 (SWMU B-3). The purpose of the pilot tests was to determine if SVE is a viable alternative for soil remediation at SWMU B-3 and to collect sufficient data to design a full-scale SVE system to be used for soil remediation. The basic theory of soil vapor extraction is to apply a negative pressure, or vacuum, to the subsurface to create a pressure gradient. This gradient produces advective airflow, which will remove vapor-phase compounds and also promote continued volatilization of organic compounds adsorbed in site soils. The vacuum is created by using blowers or vacuum pumps, and is applied to the subsurface soils through extraction wells. Specific objectives of the SVE pilot and treatability tests were to estimate the following variables:

- Soil permeability to vapor flow
- Radius of influence of the extraction well
- Vacuum variability with depth
- Vapor concentrations before, during and after the test
- Contaminant removal rates from each extraction well.

The primary activities performed during the tests included siting and construction of the SVE system, soil sampling, soil gas sampling, air permeability testing, air emission sampling, and blower optimization. The original configuration of the SVE system (six wells) was registered under standard exemption in April 1996. The purpose of this new standard exemption registration is to update the system layout and operational parameters.

The layout of the expanded SVE pilot test system is shown in Figure 1.

SOIL GAS EMISSIONS

During the pilot testing of the original six wells, samples were collected for VOC analysis from a sampling port located on the exhaust of the blower to estimate the rate and volume of VOC removal and to assess the quantity of contaminants that may be discharged to the atmosphere during normal operation of a full-scale SVE system. To quantify the mass removal rate during the pilot test, eight exhaust air samples were collected at the blower outlet for laboratory VOC analysis. Emission samples from the operating system were collected at thirty minutes after

initiating air injection, after 2 hours of operation, 5 hours, 11 hours, 23 hours, 47 hours, 95 hours and 140 hours. VOC measurements from the exhaust port were coupled with airflow rate measurements to estimate the cumulative mass of VOC removal taking place over time. Periodic monitoring with a hydrocarbon meter was also conducted at the vapor outlet port to evaluate emissions.

Vapor emission samples were collected by attaching the Summa® canister directly to a sample port located on the exhaust pipe with flexible tubing and opening the canister valve. The vacuum inside the canister pulls the sample from the exhaust stream directly into the canister. For direct reading instruments, the instrument probes were attached directly to a sample port on the exhaust pipe. Target laboratory analytes included TCE, PCE, and DCE, and were measured by EPA Method TO-14, whereas the direct read instruments measured total volatile hydrocarbons (TVH) levels calibrated to isopropyl alcohol. Since the highest contaminant concentrations in exhaust emissions were observed during the first 30 minutes of evacuation, these concentrations were used as the basis for the air emission estimates. This greatly over-estimates the actual contaminant emission rate to the atmosphere. The conservatively calculated rates are still within acceptable limits for standard exemption registration.

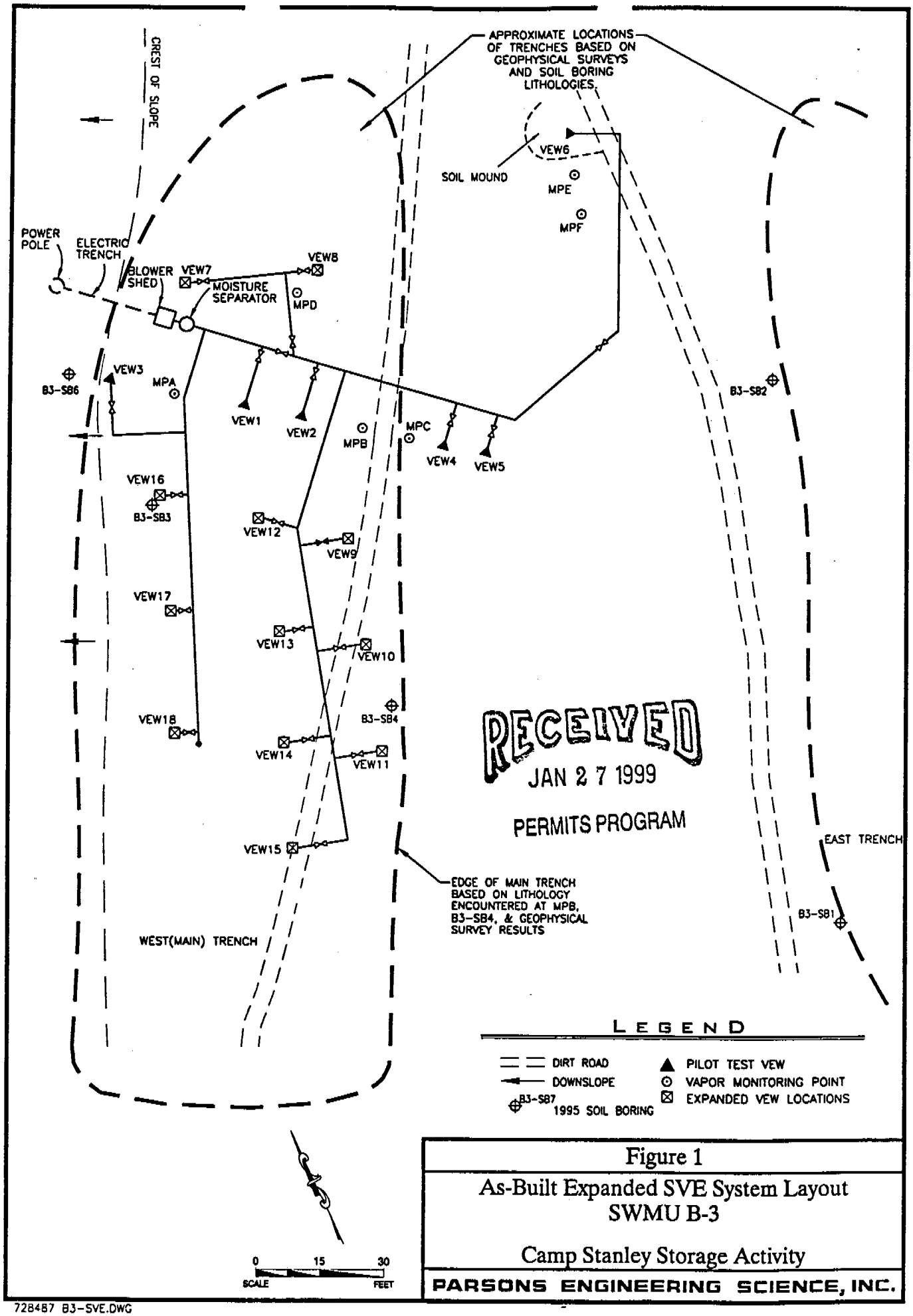

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Figure 1

As-Built Expanded SVE System Layout
SWMU B-3

Camp Stanley Storage Activity

PARSONS ENGINEERING SCIENCE, INC.

728487 B3-SVE.DWG

PROCESS FLOW DIAGRAM

PROCESS FLOW DIAGRAM

The process flow diagram provided with the original standard exemption registration package still represents the basic setup of the system. However, instead of six wells as used in the pilot test configuration, the expanded system includes 18 wells (see Figure 1) and may be evacuated up to 110 standard cubic feet per minute (scfm).

EMISSIONS DATA

EMISSIONS DATA

SOIL VAPOR EXTRACTION (SVE) SYSTEM STANDARD EXEMPTION §106.262 EMISSION CALCULATIONS

The speciated chlorinated hydrocarbon emission rates and calculated emission limits derived from Standard Exemption No. 262 are presented in the table below. Also shown is the equation for calculating the emission rate.

In order to compare a conservative scenario with the emission limits established in the applicable Standard Exemption, the maximum 30-minute soil gas concentrations will be used in the calculations. During an SVE operation, the soil gas concentrations typically start at a maximum concentration and decrease asymptotically to steady state conditions. Therefore, the soil gas concentrations presented in the emission calculations are the maximum concentrations of chemical compounds in the SVE vent 30 minutes after the pilot system was turned on. In addition, emission rates were calculated using the maximum flow rate of 110 standard cubic feet per minute (SCFM).

Chemical constituent emission limits (E) for Standard Exemption No. 262 are calculated by using the equation E = L/K, where L and K are derived from tables presented in Standard Exemption No. 262. As specified in Standard Exemption No. 262, no VOC emissions may exceed 6 lb./hr. However, a calculated maximum emission rate is provided as referenced by the Standard Exemption No. 262 checklist.

Calculated vs. Exempted Emission Rates

Chemical Compound	Soil gas conc. (ppmv)	Air Displacement (SCFM)	Molecular Weight (lb/lb-mole)	Calculated emission rate (lb/hr)	Calculated emission rate (tons/yr)	L (mg/M^3)	E-Exempted emission rate (lb/hr)
TCE	480	110	131.4	1.10	4.8	135	16.875
DCE	250	110	97.0	.042	1.8	79	9.8750
Vinyl chloride	16	110	62.5	0.017	0.075	2	0.25

Emission Rate Equation

Chlorinated hydrocarbon emission rate (lb/hr) = (contaminant concentration ppmv) x (contaminants molecular weight in lb/lb-mole) x (air pump rate in cubic feet per minutes) x (1.581×10^{-7} lb-mole-min/ft^3 – ppmv-hr). For calculation of yearly emission rates, it is assumed that the SVE system will operate 24 hours a day, 7 days a week, 52 weeks per year at the 30-minute soil gas concentrations.

Conclusion

The calculated emission rates are compared with E, the emission limit rate expressed in Standard Exemption No. 262. As seen in the table above, the soil vapor extraction test system satisfies the requirements of Standard Exemption No. 262.

STANDARD EXEMPTION APPLICABLE CHECKLISTS

Company Name: Department of the Army, Camp Stanley Storage Activity Checklist completed by: TRS Date: 1/12/99
Facility Type: Soil Vapor Extraction System Exemption(s) claimed: §106. 262 & 533
Project Description: Revise well configuration and increase blower rate

(including equipment, materials, and brief process description)

List the maximum annual emission rates, in **TONS PER YEAR (TPY)**, for this project:

CO : _____ NO_x: _____ PM : _____
SO_2: _____ VOCs: 6.68 Other: _____ _____

The following questions require a "Yes" or "No" answer to be indicated for this exemption claim:

A. §106.4(a)(5): Current Exemption Requirements

Yes ✓ No ___ Have you checked to determine if this exempt project is being claimed under the current version of 30 TAC 106?
If "Yes", continue to next question
If "No", please contact the TNRCC NSRP Division for a copy of the current exemption to be claimed.

B. §106.4(a)(7): Exemption prohibition check

Yes ___ No ✓ Are there any air permits under the same account containing permit conditions which prohibit or restrict the use of standard exemptions?
If "No", continue to next question
If "Yes", exemptions may not be used or their use must meet the restrictions of the permit.
A new permit or permit amendment may be required. ***List permit number(s):*** _____.

C. §106.4(b): Circumvention check

§106.4(b) states "No person shall circumvent by artificial limitations the requirements of §116.110 of this title (covering permitting)." Circumvention by artificial limitations may include but is not limited to:

1. *dividing a complete project into separate segments to circumvent §106.4(a)(1) limits;*
2. *claiming feed or production rates below the physical capacity of the project's equipment in order to begin constructing facilities before a permit or permit amendment is approved for full scale operations, particularly when the unit will not be economically viable at less than permitted capacity;*
3. *claiming a limited chemical list in order to begin constructing facilities before a permit or permit amendment is approved for additional chemicals, particularly when the unit will not be economically viable until the additional chemicals are authorized.*

Yes ___ No ✓ Does your project meet any of the criteria listed above?
If "No", continue to next rule question
If "Yes", an exemption may not be claimed

D. §106.4(c) - (d): Compliance with all Rules

Yes ✓ No ___ Will the facility comply with all rules and regulations of the TNRCC, the intent of the Texas Clean Air Act, and any local permitting or registration requirements?
If "Yes", continue to next rule question
If "No", an exemption may not be claimed.

E. §106.4(a)(1): Emission limits check

Yes ✓ No ___ The maximum emissions from all facilities at the site, including this exemption claim, are less than 25 tpy of any contaminant.
If the answer to this questions is "Yes", no further review is needed to complete this checklist.
Forward all information needed to verify your exemption claim to the TNRCC.
If "No", please continue through the remaining applicable pages of the checklist.

Exemption §106.533 Checklist
(Previously Standard Exemption 68)

Contaminated Water and Soil Remediation Equipment

REGISTRATION IS REQUIRED BEFORE CONSTRUCTION OF FACILITIES COVERED BY THIS EXEMPTION MAY BEGIN

The following checklist is designed to help you confirm that you meet Exemption §106.533, previously standard exemption 68 (STDX 68), requirements. Any "no" answers indicate that the claim of exemption may not meet all requirements for the use of Exemption §106.533, previously standard exemption 68. If you do not meet all the requirements, you may alter the project design/operation in such a way that all the requirements of the exemption are met or obtain a construction permit.

YES	NO	NA	DESCRIPTION
✓	—	—	Have you included a description of how this exemption claim meets the general rule for the use of exemptions (§106.4 checklist is available)?
✓	—	—	Will the remediation be at the property where the contamination originally occurred or at a nearby property secondarily affected by the contamination?
—	—	✓	Is the total emissions rate of petroleum hydrocarbons (except benzene) less than or equal to one (1) pound per hour? Attach calculations and supporting data such as soil/water contaminant concentrations.
—	—	✓	Do benzene emissions meet the emissions limits of §106.262, previously STDX 118(c)? Attach calculations, contaminant concentrations, and a scaled map showing the emission(s) point(s) and nearby off-property receptors.
✓	—	—	Do chemical emissions other than those from petroleum hydrocarbons meet the requirements of §106.262, previously STDX 118(b) and (c)? Attach calculations, contaminant concentrations, and a scaled map showing the emission(s) point(s).
✓	—	—	Will the handling, processing, and conditioning of contaminated and remediated soil be free of visible emissions (except for moisture)?
—	—	✓	If you use abatement equipment to meet the exemption's emissions limits, does it completely satisfy one of the conditions stated in §106.533, previously STDX 68(e)(1)-(4)? Which one? _____ Describe the abatement process in an attachment.

Revised 3/97

Exemption §106.262 Checklist
(Previously Standard Exemption 118)

Facilities and Modifications

A PI-7 WITH REQUIRED ATTACHMENTS MUST BE SUBMITTED WITHIN TEN DAYS OF INSTALLATION OR MODIFICATION OF FACILITIES UNDER THIS EXEMPTION

The following checklist has been designed to help you confirm that you meet Exemption §106.262, previously Standard Exemption 118 (STDX 118), requirements. Any "no" answers indicate that the claim of exemption may not meet all the requirements for the use of Exemption §106.262, previously 118. If you do not meet all the requirements, you may alter the project design/operation in such a way that all requirements of the exemption are met or obtain a construction permit.

YES	NO	NA	DESCRIPTION
✓	—	—	Have you included a description of how this exemption claim meets the general rule for the use of standard exemptions (§106.4 checklist is available)?
✓	—	—	Have you reviewed all other exemptions to determine that none authorize the proposed construction or change had all requirements been met?
—	—	✓	If this claim is to qualify the use of other chemicals at a facility authorized by another exemption, are all the requirements of that specific exemption met? Have you included a description of how that exemption's requirements are met?
✓	—	—	Is each emission source located at least 100 feet from any recreational area, residence, or other structure not occupied or used solely by the owner or operator of the facilities or the owner of the property upon which the facilities are located? Attach a scaled map.
✓	—	—	Do all the chemicals that will be part of new or changed emissions at the facility appear in Table 118A or in the 1985-86 version of the list of Threshold Limit Values (TLV) published by the American Conference of Governmental Industrial Hygienists? List the compounds and their L value from Table 118A or their TLV.
✓	—	—	Are the calculated new or increased emissions, including fugitives, for each chemical less than or equal to 5 tons per year? Attach calculations.
✓	—	—	Are the calculated new or increased emissions, including fugitives, for each chemical less than or equal to "E" pounds per hour as determined using the formula in §106.262(3), previously STDX 118(c) or 6 pounds per hour, whichever is lower? Attach both the "E" and emissions calculations for each compound.
✓	—	—	Have you attached to the PI-7 a complete description of the project?
—	—	✓	Are all the facilities, in which the compounds listed in §106.262(e), previously STDX 118(5) are handled, located at least 300 feet from the nearest property line and 600

feet from the nearest off-property receptor? Your attached scaled map should show the effected facilities, the nearest fence lines, and receptors.

—	—	✓	Are the total on-property quantities of each compound listed in §106.262(5), previously STDX 118(e) always less than or equal to 500 pounds? This requirement does not apply to permit authorizations.
—	—	✓	Are all compounds listed in §106.262(5), previously STDX 118(e) handled only in unheated containers operated in compliance with U.S. Department of Transportation Regulations (49 CFR 171 through 178)?
—	—	✓	Are procedures and equipment in place to ensure that containers containing chemicals listed in §106.262(5), previously STDX 118(e) never vent to, or are never opened directly to, the atmosphere? Attach descriptions as necessary.
—	—	✓	For physical changes or modifications to existing facilities, does all air pollution abatement equipment remain unchanged (i.e. no change or addition is allowed)? (This requirement does not mean that new facilities may not have control equipment.)
✓	—	—	Will all visible emissions, except uncombined water, have opacity less than or equal to 5 percent in any five-minute period?

Associate w/ file

PARSONS ENGINEERING SCIENCE, INC.
A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC.

8000 Centre Park Drive, Suite 200 • Austin, Texas 78754-5140 • (512) 719-6000 • Fax: (512) 719-6099

December 20, 1996

Via certified mail

Tammy Villarreal
Manager, Chemical Section
TNRCC, New Source Review Division
PO Box 13087
Austin, Texas 78711-3087

Re: Notice of Alteration to
Standard Exemption Registration No. 32405 for
Soil Vapor Extraction System at
Camp Stanley Storage Activity
Boerne, Bexar County, Texas
TNRCC Account ID No. BG-0841-S

Dear Ms. Villarreal:

We appreciate your previous approval of our standard exemption registration for a soil vapor extraction (SVE) system at Camp Stanley Storage Activity (CSSA) located in Boerne, Texas. On behalf of our client, CSSA, Parsons Engineering Science is notifying your office of intent to alter the physical layout of the existing SVE system. Within the next month, we intend to drill twelve additional wells, bringing the total number of wells up to eighteen. Between February 3 and June 13, 1997, we will perform a series of tests on different extraction configurations, but will not extract from more than six wells at any one time. This alternate representation of our system will not increase any emissions, as the extraction equipment will just be connected to six wells at a time.

Estimated emissions represented on the existing PI-7 registration are still valid, and no new pollutants are expected. At the conclusion of the tests, we will prepare recommendations for full-scale operation of the system and will prepare a formal modification to the existing exemption registration, should the test results indicate the necessity of such.

If you require any additional information or have questions/comments you may contact me directly, or Mr. Brian Murphy of CSSA at 210-698-5208.

Sincerely,

Brian Vanderglas

Parsons Engineering Science, Inc.
Brian Vanderglas
Task Manager

xc: Mr. James Menke, Air Program Manager, TNRCC Region 13 San Antonio
Lt. Col. Dean C. Schmelling, Post Commander, CSSA
Mr. Brian Murphy, CSSA

*GENERAL PERMIT INFORMATION
PERMIT: 32405 ENGR: MURPHY, TERRANCE / GROUP: CHEM ID:BG0841
ISSUED TO: DEPT OF THE ARMY, CAMP STANLEY STORA
UNIT NAME: SVE
OPERATING SCHEDULE: 24.0 HRS/DAY 7 DAYS/WK 52 WKS/YR
LAT: 29-42-34 LONG: 098-36-51 REGION: 13 COUNTY: BEXAR
NEAR CITY: BOERNE LOC: 25300 RALPH FAIR ROAD

***PERMIT/SITE CONTACT INFORMATION:
PERSON: LT. DEAN C. SCHMELLING ADDR1: 25800 RALPH FAIR ROAD
TITLE: POST COMMANDER ADDR2: BOERNE
CITY: BOERNE STATE: TX ZIP: 78006 PHONE: (210)221-7461

** CONSTRUCTION **		** OPERATING **		** CONTINUANCE **	
TYPE APPL(C,S,X):	(X)	OPERATION START :		NOTICE MAILED :	
APPL RECD :	06-03-96	OPER APPL RECD :		APPL RECD :	
DEFIC LTR SNT :		OPER APPL CMPLT :		DEFIC LTR SNT :	
SUPP INFO REQ :		DISP(I,D): ( )		SUPP INFO REQ :	
SUPP INFO RECD :		OPR TYPE(R,S) : ( )		SUPP INFO RECD :	
APPL CMPLT :		**********		APPL CMPLT :	
COMP LTR SNT :		* *		COMP LTR SNT :	
PUB NTC SNT :		* I= ISSUED D=DENIED *		PUB NTC SNT :	
PUB NTC PUB :		* E=EXPIRED *		PUB NTC PUB :	
PUB HEAR (R,H) :	( )	* C=CNST S=SPECIAL *		PUB HEAR(R,H) :	( )
CNST TYPE(C,X,S):	(X)	* X=EXEMPT R=OPER *		DISP(I,D,E):( ) :	
DISP (I) :	07-01-96	**********			
CNST START DATE :					

EMISSIONS CHANGED :

***REMARKS:

***OTHER PERMIT DATES:
APP/PERMIT VOIDED: REASON:
APP ON HOLD UNTIL: REASON:
CONST STOPPED UNTIL:

VOID/HOLD CODES: PD-PLT DISMANTLED
CR-COMPANY REQUEST TI-TIME EXPIRED
DD-DATA DELAY TD-TECH DIFFICULTY
RE-REISSUED NR-NO RESPONSE

***PERMIT TYPES/STANDARDS:
NEW MAJ SOURCE:> 100 TPY: SIC: 9999
MAJOR MODIFICATION: PORTABLE: RELATED PERMITS: SUFFIX REASON
NON-ATTAIN REVIEW: NSPS: TACB: CHG LOC:
INSIGNIFICANT EMISSIONS: NESHAP: PSD-TX: CHG OWN:
FUEL CONVERSION: TOXIC MATERIALS: STD EX NO.: 068

***AIR CONTAMINANT INFORMATION:

NAME	CODE	MAX ALLOWABLE RATE LBS/HR	TONS/YR	ACTUAL TONS/YR

***ABATEMENT EQUIPMENT:

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

June 28, 1996

Lieutenant Colonel Dean C. Schmelling
Post Commander
DEPARTMENT OF THE ARMY, CAMP STANLEY
25800 Ralph Fair Road
Boerne, Texas 78006

Re: Standard Exemption
Registration No. 32405
Soil Vapor Extraction System
Boerne, Bexar County
Account ID No. BG-0841-S

Dear Lieutenant Colonel Schmelling:

This is in response to your request to register the operation of a soil vapor extraction system under Standard Exemption at your facility in Bexar County. We understand that the system will operate at a maximum flow rate of 80 standard cubic feet per minute and with no air abatement equipment. You have estimated that emissions of the contaminant of greatest concern at the site, vinyl chloride, will not exceed 0.25 pounds per hour. You have also documented the placement of the emissions point at least 3,000 feet away from the nearest off-site receptor.

Accordingly, and after evaluating the entirety of your submittal, we have determined that your operation conforms to the criteria of Standard Exemptions 68 and 118, if constructed and operated as described in your application. We remind you that regardless of whether a permit is required, you must maintain these facilities in compliance with all air quality rules and regulations of the TNRCC and of the U.S. Environmental Protection Agency at all times.

Re: Standard Exemption
Registration No. 32405

We appreciate your cooperation in this matter. If you have any questions concerning this exemption, please contact Mr. Terry Murphy of our New Source Review Division at (512) 239-1587.

Sincerely,

Tammy Villarreal
for Manager, Chemical Section
New Source Review Division
Texas Natural Resource Conservation Commission

TV/TM/rl

Enclosures

cc: Mr. James Menke, Air Program Manager, San Antonio

Record No. 43850

Resubmittal

CHEMICAL DIVISION
STANDARD EXEMPTION REGISTRATION REVIEW

Company: Dept. of the Army, Camp Stanley

Registration Number: 32405 Record Number: 42868

Contact Name: LTC Dean Schmelling

Phone: (210) 221-7461

Description of Overall Unit: Soil remediation

Description of Facilities/Processes Claimed in this Registration and Exemptions Claimed: This is a SVE system that draws vapors from multiple wells and vents directly to the atmosphere. The applicant claims STDX 68.

Sources, Emissions and Control Summary: The soil at this site is contaminated with chlorinated compounds (DCE, TCE, and VC). The applicant has now submitted a map documenting the EPs' distance to off-site receptors (4,750 feet). He also confirms that a pilot study was performed w/o benefit of registration, and he has now stated that he understands the registration requirement and will comply in all future submittals. The applicant has now provided data on historical soil sampling, soil gas analyses, and pilot test results. Vinyl chloride is the contaminant of greatest concern at this site, both in terms of its levels and its L value. There is a discrepancy in the pilot test results for vinyl chloride, and one of the soil gas analyses for VC shows one area potentially high enough, if drawn upon alone, to cause a 118(c) VC exceedance. Nevertheless, the applicant has given enough data elaboration to ensure that VC emissions will most likely remain below the 0.25 lb/hr. limitation. The pilot test data, for example, shows - at worst - a 170 ppmv level for VC. At 80 scfm, the resultant emissions would be .13 lbs/hr., or 52% of the allowable.

Requires PSD or Nonattainment Netting? No

Meets All General and Specific Conditions.

viewed By: Terry Murphy Team Leader: D Stewart

Date: 7/1/96 Date: 7/1/96

DEPARTMENT OF THE ARMY
CAMP STANLEY STORAGE ACTIVITY, RRAD
25800 RALPH FAIR ROAD, BOERNE, TX 78015-4800

May 31, 1996

Office of the Commander

SUBJECT: Standard Exemption Registration No. 32405
Soil Vapor Extraction System
Account ID No. BG-0841-S
Response to Insufficiencies, Camp Stanley Storage Activity, Boerne, Bexar Co., Texas

Ms. Tammy Villarreal
Manager, Chemical Section
TNRCC, New Source Review Division
PO Box 13087
Austin, Texas 78711-3087

Dear Ms. Villarreal:

In response to your evaluation of our Standard Exemption Registration for a Soil Vapor Extraction (SVE) system at Camp Stanley Storage Activity (CSSA) located in Boerne, Texas, we have revised the Standard Exemption request for the SVE system,incorporating information required in your letter dated May 10, 1996. In order to expedite your review, a written response to all insufficiencies noted by the TNRCC is also enclosed.

If you have additional questions or any other comments, you may contact Mr. Brian Murphy at (210) 698-5208.

Sincerely,

Dean C. Schmelling
Lieutenant Colonel, U.S. Army
Commanding Officer

Enclosures

Copy Furnished:

Mr. James Menke, Air Program Manager,
TNRCC Region 13, San Antonio, Texas

RECEIVED
JUN 03 1996
PERMITS PROGRAM

Printed on Recycled Paper

Standard Exemption Registration of SVE system
at Camp Stanley Storage Activity
Response to Insufficiencies from TNRCC New Source Review Division

Insufficiency 1: Provide a to-scale map that shows the emission point and the distance to the nearest off-site receptor.

Response: *A to-scale map locating the SVE system (EPN 8) and the nearest off-site receptor is included in the standard exemption registration revision 1 for the SVE system. A copy of this map was included in the original submittal which also included Building 200 and Building 27 Paint Booth exemption registrations.*

Insufficiency 2: Please furnish the date of operation of the system. We note that the pilot test was conducted without prior registration. For future reference, we consider any emissions into the atmosphere from remediation projects, even pilot tests, as subject to provision (f) of Standard Exemption 68. Also for future reference, please note that, in no case, may emissions of trichlorethylene and dichloroethylene exceed six pounds per hour.

Response: *The SVE system began pilot operation on March 6, 1996. CSSA provided the TNRCC with a work plan for the SVE pilot test system, February 9, 1996 to Richard Clarke of the Corrective Action Section, which included an estimation of air emissions and the applicability of Standard Exemption 68. In the future, any new activities which may emit pollutants in the atmosphere will be properly registered with the TNRCC. CSSA understands that maximum emission rates of trichlorethylene and dichloroethylene are limited to six pounds per hour, of which the emissions from the current SVE system are 0.79 lb/hr and 0.31 lb/hr, respectively.*

Insufficiency 3: If you have any soil analyses, please discuss these as they may relate to the pilot test results.

Response: *Soil analyses as well as soil gas analyses were conducted during the SVE construction and pilot testing. We feel that a better representation of actual emissions from the SVE system is through utilization of soil gas analyses. Soil analyses are used to quantify the contamination within SWMU B-3. A discussion of the soil analyses relating to the SVE system has been included in the process description of standard exemption registration revision 1 for the SVE system.*

tile

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

May 10, 1996

Lieutenant Colonel Dean C. Schmelling
Post Commander
DEPARTMENT OF THE ARMY, CAMP STANLEY
25800 Ralph Fair Road
Boerne, Texas 78006

Re: Standard Exemption
Registration No. 32405
Soil Vapor Extraction System
Boerne, Bexar County
Account ID No. BG-0841-S

Dear Lieutenant Colonel Schmelling:

This is in response to your request to register the operation of a soil vapor extraction system under Standard Exemption at your facility in Bexar County. We have evaluated the information you have submitted in support of your request, and we find that a number of insufficiencies prevent us from determining whether you have met all the requirements of the standard exemption claimed in your registration request and/or of 30 TAC §116.211 (Regulation VI). Therefore, we cannot confirm your claim of this exemption at this time.

Insufficiencies are summarized below:

Please provide a to-scale site map that shows the emissions points and the distance to the nearest off-site receptor.

Please furnish the date of operation of the system. We note that the pilot test was conducted without prior registration. For future reference, we consider any emissions into the atmosphere from remediation projects, even pilot tests, as subject to provision (f) of Standard Exemption 68. Also for future reference, please note that, in no case, may emissions of trichloroethene and dichloroethene exceed six pounds per hour.

If you have any soil analyses, please discuss these as they may relate to the pilot test results.

Re: Standard Exemption
Registration No. 32405

Please submit any new information or modification proposals as a new standard exemption registration request. To expedite the process at that time, please include a copy of this letter. We remind you that Sections 382.0518(a) and 382.057 of the Texas Clean Air Act, Texas Health and Safety Code, Chapter 382, provide that you must obtain a construction permit or fully comply with a standard exemption before you begin work on the construction of a new facility or modify an existing facility that may emit air contaminants.

We appreciate your cooperation in this matter. If you have any questions concerning this exemption, please contact Mr. Terry Murphy of our Office of Air Quality, New Source Review Division at (512) 239-1587.

Sincerely,

Tammy Villarreal
for Manager, Chemical Section
New Source Review Division
Texas Natural Resource Conservation Commission

TV/TM/al

cc: Mr. James Menke, Air Program Manager, San Antonio

Record No. 42868

CHEMICAL DIVISION
STANDARD EXEMPTION REGISTRATION REVIEW

Company: Dept. of the Army, Camp Stanley

Registration Number: 32405 Record Number: 42868

Contact Name: LTC Dean Schmelling

Phone: (210) 221-7461

Description of Overall Unit: Soil remediation

Description of Facilities/Processes Claimed in this Registration and Exemptions Claimed: This is a SVE system that draws vapors from multiple wells and vents directly to the atmosphere. The applicant claims STDX 68.

Sources, Emissions and Control Summary: The soil at this site is contaminated with chlorinated compounds (DCE, TCE, and VC). The applicant has not submitted a map documenting the EPs' distance to off-site receptors. He also indicates a pilot study was performed w/o benefit of registration, and he has not stated when this system has, or will, go into normal operation. He has used the pilot test results to predict emissions. We will ask for the results of any soil testing so that we can more accurately analyze the pilot test's findings relative to emissions predictions.

Requires PSD or Nonattainment Netting? No

Does Not Meet All General and Specific Conditions.

Reviewed By: Team Leader: [signature]

Date: Date: 5/9/96

TEXAS NAT AL RESOURCE CONSER ION COMMISSION

REGISTRATION FORM FOR STANDARD EXEMPTIONS

FORM PI-7

Please mail to: TNRCC, Office of Air Quality, New Source Review Division (MC-162), PO Box 13087, Austin, TX 78711-3087

I. Company Name Department of the Army, Camp Stanley
(Corporation, Company, Government Agency, Firm, etc.)

Mailing Address 25800 Ralph Fair Road, Boerne, TX 78006

Individual Authorized to Act for Applicant: Name LTC Dean C. Schmelling Title Post Commander

Address 25800 Ralph Fair Road, Boerne, TX 78006 Telephone (210) 221-7461 Fax ( )

II. LOCATION OF EXEMPT FACILITY (Latitude and Longitude must be to the nearest second):

Name of Plant or Site Department of the Army, Camp Stanley

Street Address 25800 Ralph Fair Road, Boerne, TX 78006

Nearest City Boerne County Bexar Latitude 29° 42' 34" Longitude 98° 36' 51"

SITE REQUIREMENTS: A. Submit a plot plan to scale of the property showing the location of plant boundaries, plant equipment, and surrounding area.
B. Furnish an area map with a scale showing the facility location relative to highways and towns.

III. TYPE OF FACILITY:

A. Applicable Standard Exemption Number(s) from TNRCC List Exemption Number 68, 118 3 405
B. Name of Facility and Company's Facility Number
C. TNRCC Account Identification Number BG 0341S
D. Previous Special Exemption or Permit Number
E. Operating Schedule: Hours/day 24 Days/week 7 Weeks/year 52
F. Proposed Start of Construction (Date) Operation (Date)
G. Permanent [X] Portable [ ]
H. Length of time at this site, if portable

IV. PROCESS INFORMATION

Description of Process: Prepare and attach a written description of the exempt process and applicable checklists (when available). The description must be in sufficient detail to indicate that the facility will conform to the specified exemption.

V. EMISSIONS DATA Furnish a description of the basis for emission rates including fugitives. (Calculations, emission factors, measurement, NSPS, etc.)

Emission Point Number	Name of Source	Name of Air Contaminant	Emission Rate of Each Air Contaminant			
			lb/hr		tons/yr	
			Gaseous	Particulate	Gaseous	Particulate
EPN 8	B-3 SVE System	TCE	0.79		3.5	
		DCE	0.31		1.34	
		Vinyl Chloride	0.13		0.59	

VI. The required copy of the application has been sent to the Regional Office of the TNRCC: [X]Yes [ ]No
The required copy of the application has been sent to the Local Programs (if applicable): [X]Yes [ ]No

VII. I, LTC Dean C. Schmelling Post Commander
(Name) (Title)
state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption. The facility will operate in compliance with all Regulations of the Texas Natural Resource Conservation Commission and with Federal Environmental Protection Agency Regulations governing air pollution.

DATE 4/11/96 SIGNATURE

Rev. 9-15-95

DEPARTMENT OF THE ARMY
CAMP STANLEY STORAGE ACTIVITY, RRAD
25800 RALPH FAIR ROAD, BOERNE, TX 78015-4800

April 16, 1996

Office of the Commander

Ms. Karen M. Bullard
TNRCC Office of Air Quality
NSR Division/Coatings Section
P.O. Box 13087
Austin, TX 78711-3087

32405

Dear Ms. Bullard,

Enclosed is the Standard Exemption Registration for our Air Permit.

Enclosure

Dean C. Schmelling
Lieutenant Colonel, U.S. Army
Commanding Officer

Copy furnished:

TNRCC San Antonio Regional Office

Printed on Recycled Paper

SWMU B-3 SOIL VAPOR EXTRACTION (SVE) SYSTEM EXEMPTION REGISTRATION

22405

Section 3

Table of Contents

PI-7 Form

Process Description

Process Flow Diagrams

Applicable Checklists

Emissions Data

SWMU B-3 SVE

FORM PI-7

SWMU B-3 SVE

PROCESS DESCRIPTION

Soil Vapor Extraction (SVE) System

CSSA has conducted a SVE pilot test on soils located in Solid Waste Management Unit (SWMU) B-3. The purpose of the pilot test is to determine if SVE is a viable alternative for soils remediation at SWMU B-3 and to collect sufficient data to design a full-scale SVE system to be used for soil remediation. The basic theory of soil vapor extraction is to apply a negative pressure, or vacuum, to the subsurface to create a pressure gradient. This gradient produces advective air flow which will remove vapor-phase compounds and also promote continued volatilization of organic compounds adsorbed in site soils. the vacuum is created by using blowers or vacuum pumps, and is applied to the subsurface soils through extraction wells. Specific objectives of the SVE pilot test are to estimate the following variables:

- Soil permeability to vapor flow;
- Radius of influence of the extraction well;
- Vacuum variability with depth;
- Vapor concentration before, during, and after the test.

The SVE pilot test system extracted primarily, trichloroethylene (TCE), and *cis*-1,2, dichloroethylene (DCE), from surrounding soils. Soil gas samples taken from SWMU B-3 revealed the presence of chlorinated hydrocarbons at the following maximum soil gas concentrations:

Chemical Compound	Soil gas concentration (ppmv)
TCE	480
DCE	250
Vinyl Chloride	170

SWMU B-3 SVE SYSTEM

PROCESS FLOW DIAGRAMS

PARSONS ENGINEERING SCIENCE, INC.

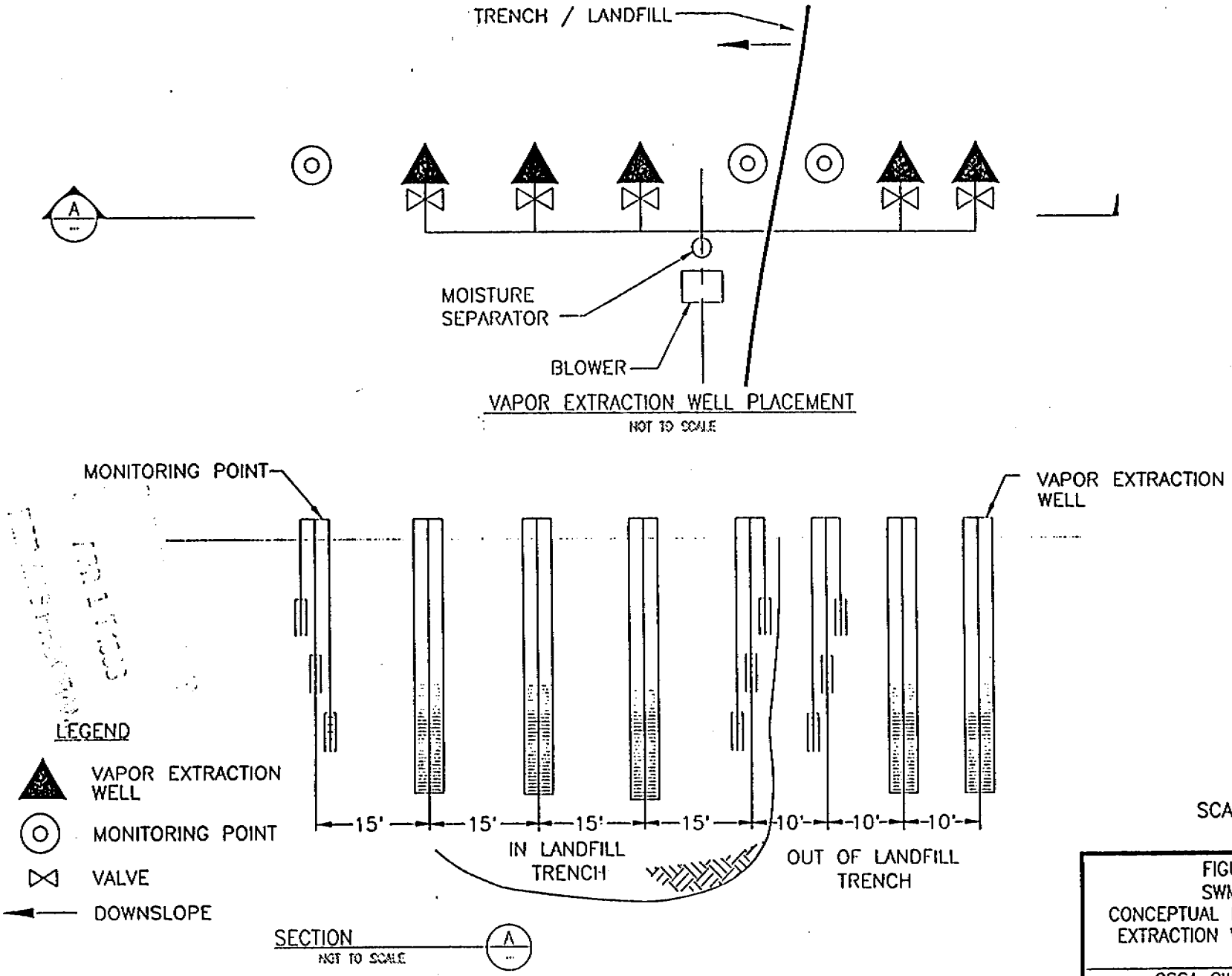
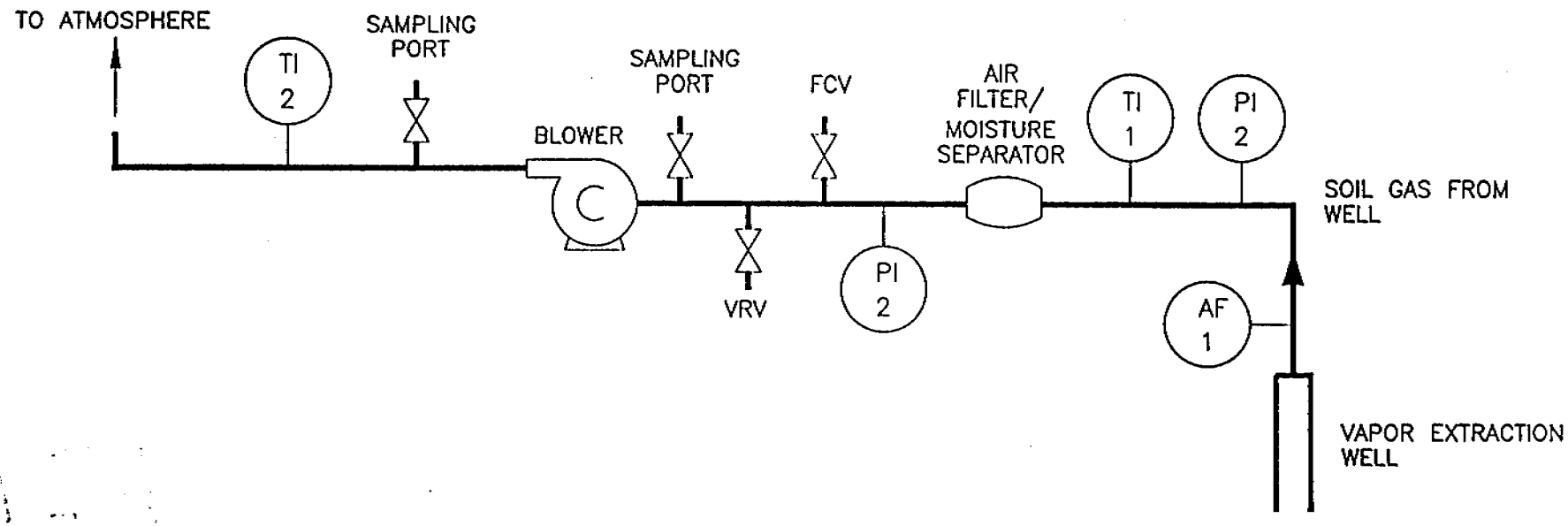


FIGURE 3.1
SWMU B-3
CONCEPTUAL DESIGN OF VAPOR EXTRACTION WELL PLACEMENT

CSSA GW EVALUATION

February 1996

PARSONS ENGINEERING SCIENCE, INC.



LEGEND

AF 1	AIR FLOW INDICATOR
PI 2	PRESSURE INDICATOR
TI 1	TEMPERATURE INDICATOR
FCV	FLOW CONTROL VALVE
VRV	VACUUM RELIEF VALVE

FIGURE 3.4
PROPOSED BLOWER SYSTEM
INSTRUMENTATION DIAGRAM

CSSA GW EVALUATION

DETLCSS 1/4/96

SWMU B-3 SVE
EMISSION DATA

Soil Vapor Extraction (SVE) System

Standard Exemption 118 (c) Emission Calculations

The speciated chlorinated hydrocarbon emission rates and calculated emission limits derived from Standard Exemption No. 118(c) are presented in the table below. Also shown is the equation for calculating the emission rate.

In order to compare the worst case scenario with the emission limits established in the applicable Standard Exemption, the maximum soil gas concentrations will be used in the calculations. During an SVE operation, the soil gas concentrations typically start at a maximum concentration and decrease asymptotically to steady state conditions. Therefore, the soil gas concentrations presented in the emission calculations are the maximum concentrations of chemical compounds in the initial soil gas 30 minutes after the pilot system was turned on. In addition, emission rates were calculated using the maximum flow rate of 80 standard cubic feet per minute (SCFM).

Chemical constituent emission limits (E) for Standard Exemption 118(c) are calculated by using the equation E = L/K, where L is the value as listed in table 118A and K is the value from standard exemption list 118(c).

Calculated VS. Exempted Emission Rates

Chemical Compound	Soil gas conc. (ppmv)	Air Displacement (SCFM)	Molecular Weight (lb/lb-mole)	Calculated emission rate (lb/hr)	Calculated emission rate (tons/yr)	L (mg/M^3)	E - Exempted emission rate (lb/hr)
TCE	480	80	131.4	0.79	3.5	135	~~16.875~~ 6
DCE	250	80	97.0	0.31	1.34	79	~~9.8750~~ 6
Vinyl Chloride	170	80	62.5	0.13	0.59	2	0.25

.25 = 2/K

K = .125

D = 73,000

Emission Rate Equation

Chlorinated hydrocarbon emission rate (lb/hr) = (contaminant concentration) x (contaminants molecular weight in lb/lb-mole) x (air pump rate in cubic feet per minute) x (1.581×10^{-7} lb-mole-min./ft^3-ppmv-hr). For calculation of yearly emission rates, it was assumed that the SVE system will operate 24 hours a day, 7 days a week, 52 weeks per year at the 30 minute soil gas concentrations.

Conclusion

The calculated emission rates are compared with E, the emission limit rate expressed in Standard Exemption 118. As seen in the table above, the soil vapor extraction test system satisfies the requirements of Standard Exemption No. 118(c).

STANDARD EXEMPTION 68

APPLICABLE CHECKLISTS

Standard Exemption 68
Checklist

Contaminated Water and Soil Remediation Equipment

REGISTRATION IS REQUIRED BEFORE CONSTRUCTION OF FACILITIES COVERED BY THIS STANDARD EXEMPTION MAY BEGIN

The following checklist is designed to help you confirm that you meet Standard Exemption 68 (STDX 68) requirements. Any "no" answers indicate that the claim of exemption may not meet all requirements for the use of Standard Exemption 68. If you do not meet all the requirements, you may alter the project design/operation in such a way that all the requirements of the exemption are met or obtain a construction permit.

YES	NO	NA	DESCRIPTION
x			Have you included a description of how this exemption claim meets the general rule for the use of standard exemptions (§116.211 checklist is available)?
x			Will the remediation be at the property where the contamination originally occurred or at a nearby property secondarily affected by the contamination?
		x	Is the total emissions rate of petroleum hydrocarbons (except benzene) less than or equal to one (1) pound per hour? Attach calculations and supporting data such as soil/water contaminant concentrations.
		x	Do benzene emissions meet the emissions limits of STDX 118(c)? Attach calculations, contaminant concentrations, and a scaled map showing the emission(s) point(s) and nearby off-property receptors.
x			Do chemical emissions other than those from petroleum hydrocarbons meet the requirements of STDX 118(b) and (c)? Attach calculations, contaminant concentrations, and a scaled map showing the emission(s) point(s).
x			Will the handling, processing, and conditioning of contaminated and remediated soil be free of visible emissions (except for moisture)?
		x	If you use abatement equipment to meet the exemption's emissions limits, does it completely satisfy one of the conditions stated in STDX 68(e)(1)-(4)? Which one? _ _ Describe the abatement process in an attachment.

Revised 10/95

Standard Exemption 118
Checklist
Facilities and Modifications

APR 1 7 1995

A PI-7 WITH REQUIRED ATTACHMENTS MUST BE SUBMITTED WITHIN TEN DAYS OF INSTALLATION OR MODIFICATION OF FACILITIES UNDER THIS EXEMPTION

The following checklist has been designed to help you confirm that you meet Standard Exemption 118 (STDX 118) requirements. **Any "no" answers indicate that the claim of exemption may not meet all the requirements for the use of Standard Exemption 118.** If you do not meet all the requirements, you may alter the project design/operation in such a way that all requirements of the exemption are met or obtain a construction permit.

YES	NO	NA	DESCRIPTION
x	—	—	Have you included a description of how this exemption claim meets the general rule for the use of standard exemptions (§116.211 checklist is available)?
x	—	—	Have you reviewed all other exemptions to determine that none authorize the proposed construction or change had all requirements been met?
—	—	x	If this claim is to qualify the use of other chemicals at a facility authorized by another exemption, are all the requirements of that specific exemption met? Have you included a description of how that exemption's requirements are met?
x	—	—	Is each emission source located at least 100 feet from any recreational area, residence, or other structure not occupied or used solely by the owner or operator of the facilities or the owner of the property upon which the facilities are located? Attach a scaled map.
x	—	—	Do all the chemicals that will be part of new or changed emissions at the facility appear in Table 118A or in the 1985-86 version of the list of Threshold Limit Values (TLV) published by the American Conference of Governmental Industrial Hygienists? List the compounds and their L value from Table 118A or their TLV.
x	—	—	Are the calculated new or increased emissions, including fugitives, for each chemical less than or equal to 5 tons per year? Attach calculations.
x	—	—	Are the calculated new or increased emissions, including fugitives, for each chemical less than or equal to "E" pounds per hour as determined using the formula in STDX 118(c) or 6 pounds per hour, whichever is lower? Attach both the "E" and emissions calculations for each compound.
x	—	—	Have you attached to the PI-7 a complete description of the project?
x	—	—	Are all the facilities, in which the compounds listed in STDX 118(e) are handled, located at least 300 feet from the nearest property line and 600 feet from the nearest

off-property receptor? Your attached scaled map should show the effected facilities, the nearest fence lines, and receptors.

_	_	x	Are the total on-property quantities of each compound listed in STDX 118(e) always less than or equal to 500 pounds? This requirement does not apply to permit authorizations.
_	_	x	Are all compounds listed in STDX 118(e) handled only in unheated containers operated in compliance with U.S. Department of Transportation Regulations (49 CFR 171 through 178)?
_	_	x	Are procedures and equipment in place to ensure that containers containing chemicals listed in STDX 118(e) never vent to, or are never opened directly to, the atmosphere? Attach descriptions as necessary.
_	_	x	For physical changes or modifications to existing facilities, does all air pollution abatement equipment remain unchanged (i.e. no change or addition is allowed)? (This requirement does not mean that new facilities may not have control equipment.)
x	_	_	Will all visible emissions, except uncombined water, have opacity less than or equal to 5 percent in any five-minute period?

Revised 10/95

Texas Natural Resource Conservation Commission Standard Exemption Registrations, Revision 1: SWMU B-3 SVE Site

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

June 1996

Texas Natural Resource Conservation Commission
Standard Exemption Registrations, Revision 1:
SWMU B-3 SVE Site

June 1996

Prepared for

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

Prepared by

Parsons Engineering Science
8000 Center Park Drive, Suite 200
Austin, TX 78754

Project Number 721397.09

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INTRODUCTION

Camp Stanley Storage Activity (CSSA), Boerne, Texas is a subinstallation of the US Army Red River Depot (RRAD), located in Texarkana, Texas. The primary mission of CSSA is receipt, storage, and issuance of ordnance, as well as quality assurance testing and maintenance of military weapons and ammunition. CSSA is located in northwestern Bexar County, approximately 19 miles northwest of downtown San Antonio (see area map). Bexar County is an attainment county.

The Texas Natural Resource Conservation Commission (TNRCC) has issued an Air Quality Permit for the operation of a cold solvent cleaning facility to CSSA (permit no. 29466, account ID no. BG-0841-S). This report includes standard exemption registration revision 1 for soil remediation activities (standard exemptions 68 and 118) at CSSA. A plot plan of the entire installation showing all boundaries is provided in this report. All stationary emission sources are indicated on this plot plan, including exempt sources as well as permitted sources.

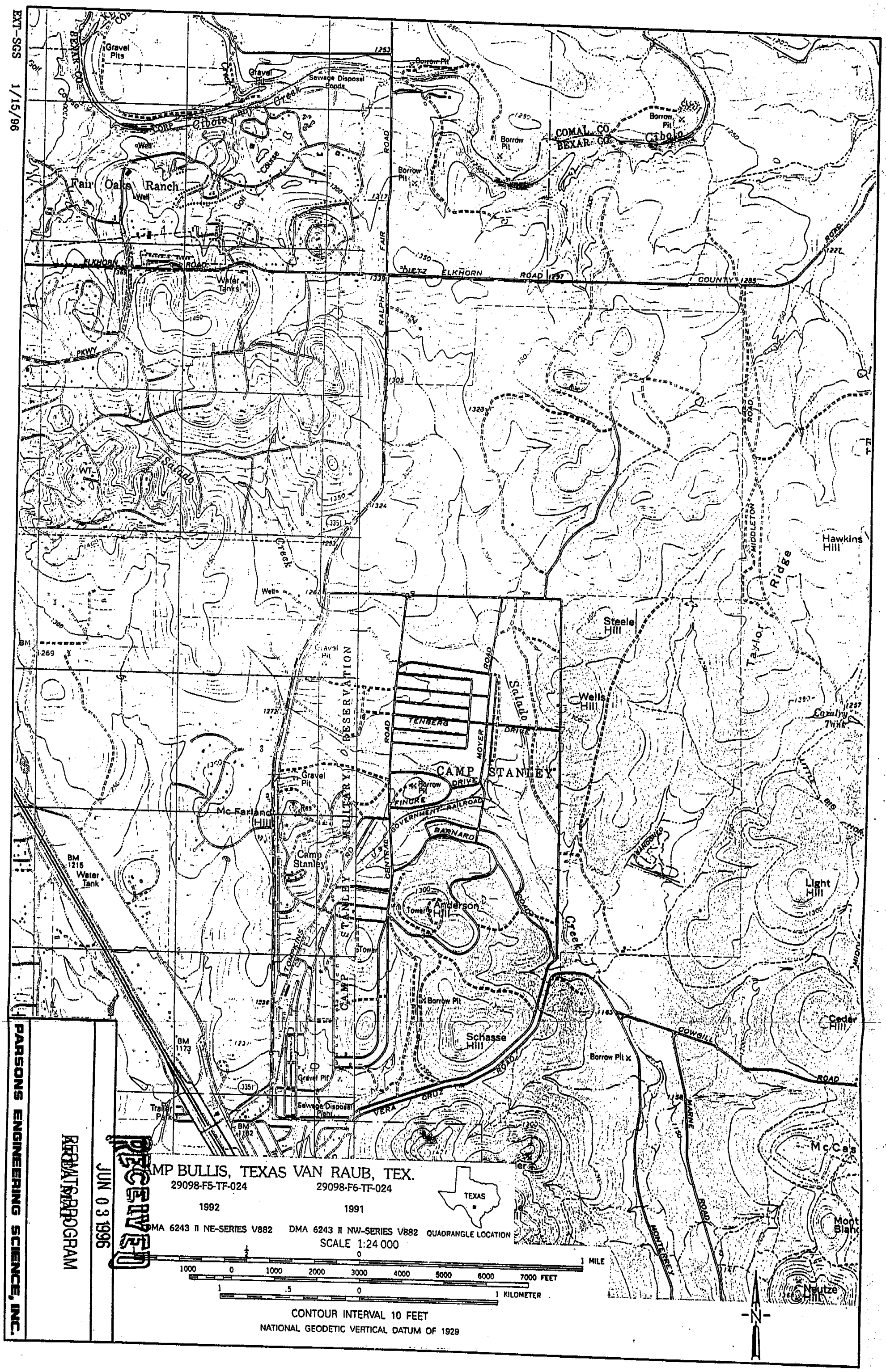
The exempt source represented by this registration meets all requirements of 30 TAC 116.211 and the respective exemption requirements.

This registration includes all necessary data for determining the applicability of the standard exemption requirements for the soil vapor extraction (SVE) system installed at solid waste management unit (SWMU) B-3. Also included is a copy of a letter dated May 10, 1996 from the TNRCC identifying the insufficiencies of the previous SVE registration submitted in April of 1996.

AREA MAP

XREF: BASE

EXT-SGS 1/15/96



CAMP BULLIS, TEXAS VAN RAUB, TEX.

29098-F5-TF-024 29098-F6-TF-024

1992 1991

DMA 6243 II NE-SERIES V882 DMA 6243 II NW-SERIES V882 QUADRANGLE LOCATION

TEXAS

SCALE 1:24 000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

PARSONS ENGINEERING SCIENCE, INC.

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PLOT PLAN

FORM PI-7

TEXAS NATI AL RESOURCE CONSERV. ION COMMISSION

REGISTRATION FORM FOR STANDARD EXEMPTIONS

FORM PI-7

Please mail to: TNRCC, Office of Air Quality, New Source Review Division (MC-162), PO Box 13087, Austin, TX 78711-3087

I. Company Name Department of the Army, Camp Stanley Storage Activity
(Corporation, Company, Government Agency, Firm, etc.)

Mailing Address 25800 Ralph Fair Road, Boerne, TX 78015-4800

Individual Authorized to Act for Applicant: Name LTC Dean C. Schmelling Title Post Commander

Address 25800 Ralph Fair Road, Boerne, TX 78015-4800 Telephone (210) 221-7461 Fax ( )

II. LOCATION OF EXEMPT FACILITY (Latitude and Longitude must be to the nearest second):

Name of Plant or Site Department of the Army, Camp Stanley Storage Activity

Street Address 25800 Ralph Fair Road, Boerne, TX 78015-4800

Nearest City Boerne County Bexar Latitude 29° 42' 34" Longitude 98° 36' 51"

SITE REQUIREMENTS: A. Submit a plot plan to scale of the property showing the location of plant boundaries, plant equipment, and surrounding area.
B. Furnish an area map with a scale showing the facility location relative to highways and towns.

III. TYPE OF FACILITY:

A. Applicable Standard Exemption Number(s) from TNRCC List Exemption Number 68, 118
B. Name of Facility and Company's Facility Number
C. TNRCC Account Identification Number BG-0841-5
D. Previous Special Exemption or Permit Number 32405
E. Operating Schedule: Hours/day 24 Days/week 7 Weeks/year 6
F. Proposed Start of Construction (Date) Operation
G. Permanent [X] Portable [ ]
H. Length of time at this site, if portable

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IV. PROCESS INFORMATION
Description of Process: Prepare and attach a written description of the exempt process and applicable checklists (when available). The description must be in sufficient detail to indicate that the facility will conform to the specified exemption.

V. EMISSIONS DATA Furnish a description of the basis for emission rates including fugitives. (Calculations, emission factors, measurement, NSPS, etc.)

Emission Point Number	Name of Source	Name of Air Contaminant	Emission Rate of Each Air Contaminant			
			lb/hr		tons/yr	
			Gaseous	Particulate	Gaseous	Particulate
	B-3 SVE System	TCE	0.79		3.5	
		DCE	0.31		1.34	
		Vinyl Chloride	0.01		0.06	

VI. The required copy of the application has been sent to the Regional Office of the TNRCC: [X]Yes [ ]No
The required copy of the application has been sent to the Local Programs (if applicable): [X]Yes [ ]No

VII. I, LTC Dean C. Schmelling (Name) Post Commander (Title)
state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption. The facility will operate in compliance with all Regulations of the Texas Natural Resource Conservation Commission and with Federal Environmental Protection Agency Regulations governing air pollution.

DATE 5/31/96 SIGNATURE

Rev. 9-15-95

PROCESS DESCRIPTION

Soil Vapor Extraction (SVE) System

CSSA has conducted a SVE pilot test on soils located in SWMU B-3. The purpose of the pilot test is to determine if SVE is a viable alternative for soils remediation at SWMU B-3 and to collect sufficient data to design a full-scale SVE system to be used for soil remediation. The basic theory of soil vapor extraction is to apply a negative pressure, or vacuum, to the subsurface to create a pressure gradient. This gradient produces advective air flow which will remove vapor-phase compounds and also promote continued volatilization of organic compounds adsorbed in site soils. The vacuum is created by using blowers or vacuum pumps, and is applied to the subsurface soils through extraction wells. Specific objectives of the SVE pilot test are to estimate the following variables:

- Soil permeability to vapor flow;
- Radius of influence of the extraction well;
- Vacuum variability with depth;
- Vapor concentrations before, during, and after the test.

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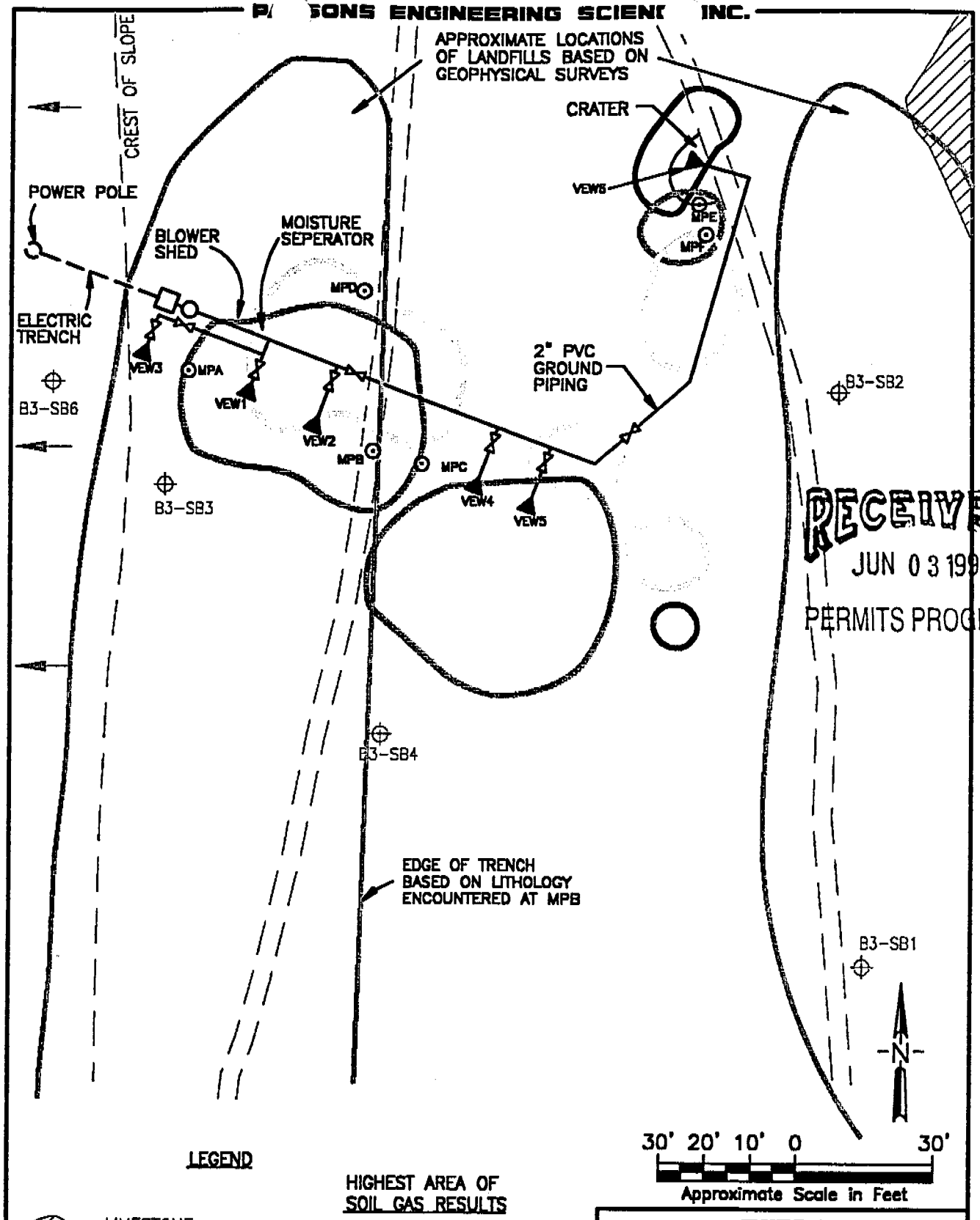
The SVE pilot test system was constructed and tested during early March, 1996 at SWMU B-3. The primary activities performed were siting and construction of the SVE system, soil sampling, soil gas sampling, air permeability testing, air emission sampling, and blower optimization. Construction of vapor extraction well(s) (VEW) and vapor monitoring point(s) (VMP) are described in this process description. General soil, soil gas, and air emission sampling procedures are also described. The SVE system layout and results of the pilot system are discussed below.

Site Layout

The layout of the installed SVE pilot test system is shown on Figure 1. The locations of the VEWs and VMPs were selected using the following criteria:

- Based on GC headspace analysis and soil gas survey results, soil vapor concentrations are highest in this area;
- Boring log descriptions from borings completed in this area indicate the depth to competent limestone is at least 10 feet and that subsurface soils are representative of the landfilled trenches and surrounding lithologies;
- Surface geophysical survey data from this area indicate the probable boundary of a primary landfill trench is close to this area, which allows for testing to be performed on subsurface soils inside and outside the trench limits; and
- If necessary and appropriate, the site layout (pilot test VEWs and VMPs) could easily be incorporated into a full-scale SVE system to remediate the site.

A total of six VEWs and six multi-depth VMPs were placed within the B-3 landfill area. As shown on Figure 1, three VEWs and two VMPs (identified as VEW-1, VEW-2, VEW-3, MPA, and MPD) were placed within the main B-3 landfill trench area limits, one



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LEGEND

LIMESTONE OUTCROP
DIRT ROAD
DOWNSLOPE
B3-SB7 SOIL BORING

HIGHEST AREA OF SOIL GAS RESULTS
DCE = 100ppb
PCE = 100ppb
TCE = 1000ppb
VAPOR EXTRACTION WELL
VAPOR MONITORING POINT

FIGURE 1

LAYOUT OF INSTALLED SVE PILOT TEST SYSTEM SWMU B-3

JUNE 1996

CAMP STANLEY STORAGE ACTIVITY

B3-STX1.DWG 5/16/96

VMP (MPB) was installed in the transition zone on the edge of the main trench boundary, and one VMP (MPC) and two VEWs (VEW-4 and VEW-5) were installed in limestone material outside the landfill limits. All of these VMPs and VEWs, except MPD, were installed in a line that traverse the portion of the landfill exhibiting the greatest contaminant concentrations during the soil gas survey. MPD was constructed approximately 30 feet north of the line. A second test system was installed northeast of the primary test line in an isolated area that also exhibited high levels of contamination in soil gas. This system consists of one VEW (VEW-6) and two VMPs (MPE and MPF).

Construction of Test System

The system consists of a vacuum regenerative blower, a moisture separator (knock out pot), an air filter, flow control and air bleed valves, pressure and temperature gauges, a flow measurement port, sampling ports, and 2-inch PVC pipe manifolded to the top of five of the six VEWs. The vacuum blower used for the pilot test is a Gast[R] Regenair R5 Series Model R5325A-2.

The VEWs were connected to the blower using 2-inch schedule 40 PVC with all connections and flow control valves placed above ground level to allow easy access. An electric fence was placed around the test site to protect the aboveground pipe from free roaming cattle in the area surrounding SWMU B-3 and to prevent vehicles from traversing the site. CSSA electricians connected power from the electric service pole west of the site to a control box and power monitor for the operation of the electric fence.

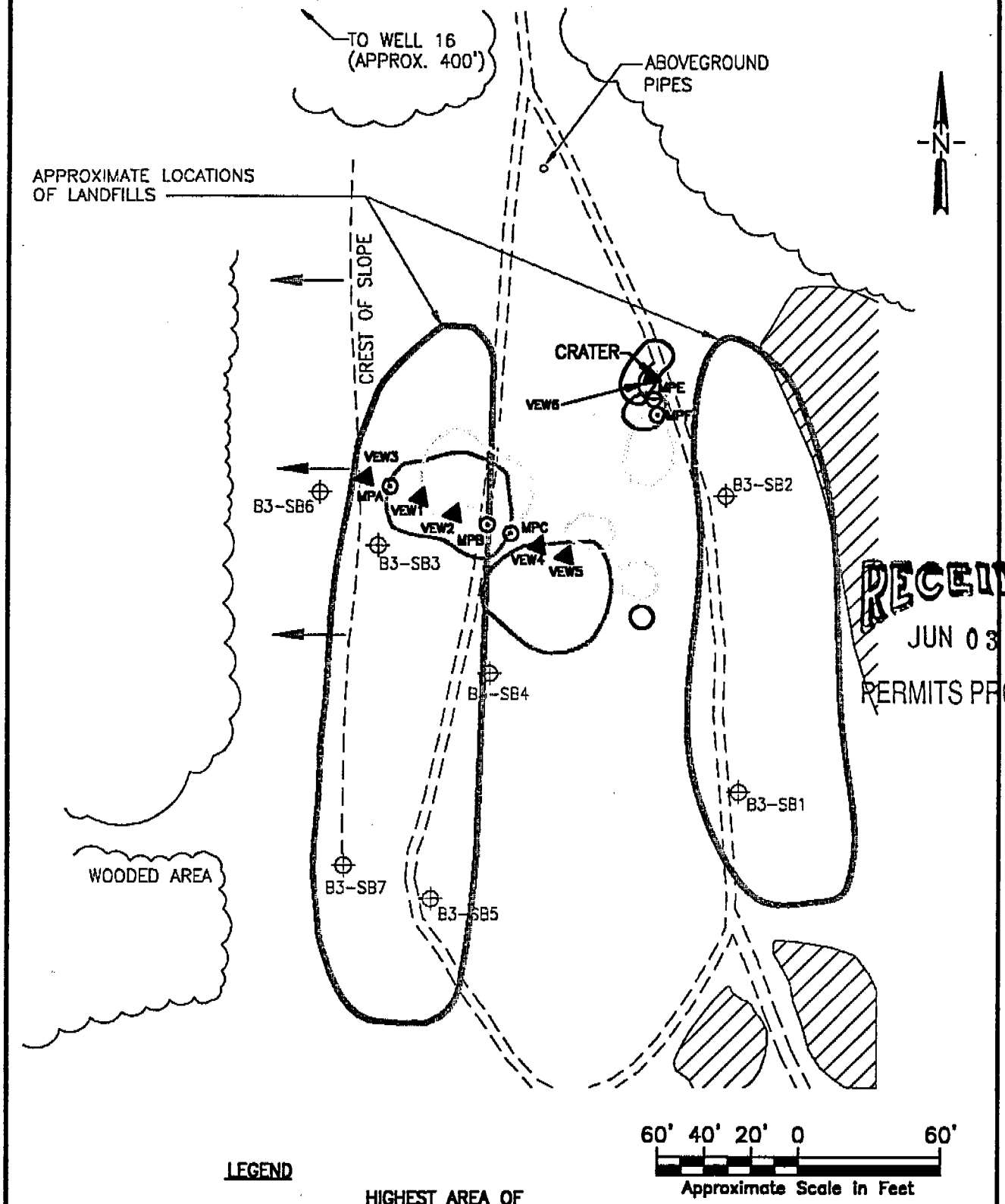
As shown on Figure 1, the VEWs are manifolded together with individual control valves to turn on and off the vacuum to each VEW. Each VEW was also constructed with a pressure monitoring port to allow measurement of pressure responses in the VEW when not being utilized as an extraction well. This flexibility in the system design allowed extraction from any or all of the VEWs and collection of data from the disturbed landfill trenches and undisturbed soils outside the trenched areas.

The 2.5 hp blower unit was mounted in a small shed on the west side of SWMU B-3. The moisture separator and filter system with appropriate gauges and pressure relief controls for the blower system are located outside the blower shed. Electrical power is wired to the blower from an electric service pole located approximately 45 feet west of the blower shed. CSSA electricians connected power and a control box for the blower.

The as-built construction layout of the SVE pilot test system is shown on Figure 2 relative to the SWMU boundary as determined by the geophysical surveys and the locations of soil gas "hot spots".

SVE Pilot Test and Characterization Results

The results of soil and soil gas sampling performed to support the pilot study and the results of air emissions sampling are described in below. The results of soil and soil gas chemistry are also discussed in this process description.



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LEGEND

LIMESTONE OUTCROP
DIRT ROAD
DOWNSLOPE
B3-SB7 SOIL BORING

HIGHEST AREA OF SOIL GAS RESULTS
DCE = 100ppb
PCE = 100ppb
TCE = 1000ppb
VAPOR EXTRACTION WELL
VAPOR MONITORING POINT

FIGURE 2

LOCATIONS OF VEW AND VMPs AT SWMU B-3

JUNE 1996
CAMP STANLEY STORAGE ACTIVITY

B3-STX2.DWG 5/14/96

Soil Chemistry

Soils in the B-3 trench area consist of clay and silty clays with white caliche fragments near the surface, progressing with depth to massive limestone. The depth to limestone is variable across the site. Towards the eastern portion of the site, the limestone becomes shallow and is exposed at the surface east of the pilot test layout. The cap and fill material encountered in the main trench consisted of dark brown, reddish brown, and black material with fragments of limestone, plastic and metal debris, and charred wood mixed with poorly sorted coarse sand with very nonplastic clay.

Outside the trench limits, the soils consisted of dark brown silty clay and clay soils from the surface to the top of limestone. The limestone appeared highly weathered, pale yellow to gray with occasional hard massive limestone interbedded. Intervals of vugs, some with calcite growths, bedding, bioturbation, and fracturing were observed. Some interbedding of clay and weathered shale was also observed in the core samples evaluated. No moisture was encountered in any of the soil borings drilled, and none accumulated in any of the VEWs constructed.

Fifteen soil samples were collected at the site from ten of twelve soil borings drilled for VEW or VMP construction. Samples were not collected from the two VEW borings located outside the trench area (VEW-4 and VEW-5) because no evidence of contamination was indicated during drilling. Another factor in the decision was the need to use air rotary coring to penetrate the limestone to the planned depth of the VEWs. The test methods for these soil samples are discussed above. The analytical results of the soil samples are presented on Table 1. Geotechnical results are provided on Table 2.

Only five VOCs were detected in the fifteen samples analyzed by method SW-8260, chlorobenzene, *cis*-1,2,-dichloroethene (DCE), perchloroethene (PCE), toluene, and trichloroethene (TCE). The highest concentrations were detected in VEW-1, VEW-2, MPA, and MPD, which are all located within the limits of the main landfill trench. In borings with multiple sample depths, the greatest VOC concentrations were detected in samples collected from deeper depths. Samples collected from 13 to 15 feet below ground level (bgl) had the greatest levels of VOC contamination of all samples collected within the limits of the B-3 trench.

Samples collected from the soil borings drilled northeast of the main test area had significantly less VOC contamination than those in the main trench area. VEW-6, MPE, and MPF encountered fill material to a depth of 6 feet with numerous discolorations and debris observed in the samples, however, the micro-tip hydrocarbon instrument did not indicate significant levels of VOCs during screening of the soil core samples.

Delineation of Volatile Organic Compounds

Based on the results of collected data, the estimated area of the B-3 landfill trench that requires treatment for VOCs is 15,000 square feet (150 feet by 100 feet). The estimated thickness of this potentially contaminated soil is 15 feet, which totals 225,000 cubic feet (or 8333 cubic yards). The average porosity of the fill material in the trench

Table 1 Analytical Results for Soil Samples

SWMU B-3, Camp Stanley Storage Activity, Texas

Constituents / Sample ID: / Depth (feet) / Date Collected	VEW-1 (9-11) 2/20/96	VEW-1 (13-14) 2/20/96	VEW-2 (14-15) 2/22/96	VEW-3 (15-17) 2/23/96	VEW-6 6-8 feet 2/20/96
Volatile Organic Compounds, SW8260A (in µg/kg)					
Chlorobenzene	2,000 U	2,000	2,000 U	20 U	20 U
cis-1,2-Dichloroethene	27,800	5,000	9,200	20 U	7.44
Tetrachloroethane	2,500 U	25,000 U	2,500 U	25 U	167
Toluene	1,500 U	12,3000	1,500 U	15 U	15 U
Trichloroethene	1,000 U	222,000	68,500	10 U	2,143
Total Metals (in mg/kg)					
Arsenic, SW7060A	1.4	NA	1.4	1.8	15.0
Barium, SW6010A	37.0	NA	13.0	18.0	160.0
Chromium, SW6010A	8.0	NA	4.5	5.8	120.0
Copper, SW6010	45.0	NA	6.6	8.0	580.0
Nickel, SW6010A	6.5	NA	5.8	8.9	100.0
Zinc, SW6010A	63.0	NA	110.0	6.9	850.0
Cadmium, SW7131	1.2	NA	0.3	0.1 U	12.0
Lead, SW7421	1,600.00	NA	8.0	5.7	8,700.0
Mercury, SW7471A	0.1 U	NA	0.1 U	0.1 U	0.21

NA - Not Analyzed
U - Estimated Value

Table 1 Analytical Results for Soil Samples, continued

Constituents / Sample ID / Depth (feet) / Date Collected	MPA (4-5) 2/22/96	MPA (9.5-11) 2/22/96	MPA (14-15) 2/22/96	MPB (8-9) 2/22/96	MPC (4-6) 2/23/96	MPD (4-6) 2/22/96	MPD (8-10) 2/22/96
Volatile Organic Compounds, SW8260A (in µg/kg)							
Chlorobenzene	200 U	4.0 U	2,000 U	200 U	20 U	200 U	200 U
cis-1,2-Dichloroethene	200 U	4.0 U	2,900	200 U	20 U	200 U	200 U
Tetrachloroethane	250 U	5.0 U	2,500 U	250 U	25 U	250 U	250 U
Toluene	150 U	3.0 U	1,500 U	150 U	15 U	150 U	150 U
Trichloroethene	370	16.0	16,800	220	155	1,200	2,500
Total Metals (in mg/kg)							
Arsenic, SW7060A	NA	NA	1.7	0.8	1.8	NA	6.7
Barium, SW6010A	NA	NA	16.0	30.0	39.0	NA	93.0
Chromium, SW6010A	NA	NA	6.4	6.7	9.3	NA	30.0
Copper, SW6010	NA	NA	6.7	7.3	12.0	NA	160.0
Nickel, SW6010A	NA	NA	10.0	5.2	8.2	NA	29.0
Zinc, SW6010A	NA	NA	8.2	18.0	21.0	NA	4,200.0
Cadmium, SW7131	NA	NA	0.2	0.2	0.7	NA	11.0
Lead, SW7421	NA	NA	7.2	21.0	31.0	NA	980.0
Mercury, SW7471A	NA	NA	0.1 U	0.1 U	0.1 U	NA	0.1 U

NA - Not Analyzed
U - Estimated Value

Table 1 Analytical Results for Soil Samples, continued

Constituents / Sample ID / Depth (feet) / Date Collected	MPD (14-15) 2/22/96	MPE (7-9) 2/21/96	MPF (5-6) 2/21/96
Volatile Organic Compounds, SW8260A (in µg/kg)			
Chlorobenzene	2,000 U	200 U	220
cis-1,2-Dichloroethene	20,500	360	200 U
Tetrachloroethane	<2,500 U	650	250 U
Toluene	1,500 U	150 U	<150 U
Trichloroethene	16,900	4,200	100 U
Total Metals (in mg/kg)			
Arsenic, SW7060A	NA	NA	1.5
Barium, SW6010A	NA	NA	43.0
Chromium, SW6010A	NA	NA	12.0
Copper, SW6010	NA	NA	31.0
Nickel, SW6010A	NA	NA	6.8
Zinc, SW6010A	NA	NA	140.0
Cadmium, SW7131	NA	NA	0.9
Lead, SW7421	NA	NA	120.0
Mercury, SW7471A	NA	NA	<0.1

NA - Not Analyzed
U - Estimated Value

Table 2
Geotechnical and Physical Property Results of Soil Samples Collected at SWMU B-3

Camp Stanley Storage Activity, Texas

Parameter / Sample ID: / Depth (feet) / Date Collected	VEW-1 (13-14) 2/20/96	VEW-2 (8-10) 2/22/96	VEW-3 (13-14) 2/23/96	VEW-6 (6-8) 2/20/96	MPA (9.5-11) 2/22/96
Soil pH	8.2	8.0	8.1	7.3	7.9
Total Organic Carbon (mg/kg)	1,020	15,200	2,700	78,200	3,960
Total Phosphate (mg/kg)	224	1,020	230	860	405
Total Kjeldahl Nitrogen (mg/kg)	63	260	170	410	260
Moisture Content (percent)	7.8	14.1	27.2	26.6	15.6
Measured Porosity (percent)	34.5	29.4	27.3	26.9	18.3
Measured Bulk Density (g/cm^3)	1.90	1.86	2.01	1.55	2.36
Particle Size (percent)					
Sand (>0.002 in)	10	25	3	54	6
Silt (0.00.2-0.00015 in)	45	53	67	39	63
Clay (<0.00015 in)	45	22	30	7	31

Table 2, Geotechnical and Physical Property Results, continued

Parameter / Sample ID: / Depth (feet) / Date Collected	MPB (8-9) 2/22/96	MPC (4-6) 2/23/96	MPD (8-10) 2/22/96	MPE (6.5-7) 2/21/96	MPF (5-6) 2/21/96
Soil pH	7.8	7.8	8.3	8.0	7.8
Total Organic Carbon (mg/kg)	13,700	24,300	12,300	2,020	29,400
Total Phosphate (mg/kg)	743	912	768	246	820
Total Kjeldahl Nitrogen (mg/kg)	690	1,200	290	130	210
Moisture Content (percent)	8.25	14.3	14.5	22.4	24.3
Measured Porosity (percent)	34.9	31.4	34.1	25.6	32.6
Measured Bulk Density (g/cm^3)	1.76	1.94	2.05	1.86	2.23
Particle Size (percent)					
Sand (>0.002 in)	4	1	21	5	15
Silt (0.00.2-0.00015 in)	67	64	47	59	64
Clay (<0.00015 in)	29	35	32	36	21

was 30 percent, which converts into a bulk density of 1.85 g/cm^3 (or 115 lb/ft^3). Based on these assumptions, the total mass of fill material in the trench requiring treatment is approximately 25,875,000 pounds (11,747,250 kilograms) of solid material.

The two VOCs requiring treatment based on the comparison to applicable criteria (i.e. TNRCC Risk Reduction Rules) are TCE and DCE. The average concentrations of these compounds are 32.9 mg/kg and 6.6 mg/kg, respectively. Based on these estimates, the total quantities of TCE and DCE needed to be extracted from the main trench area are 386 kilograms (850 pounds) TCE and 78 kilograms (170 pounds) DCE. These estimates are based on the limited characterization data that was collected. Additional characterization data may be necessary to obtain more accurate estimates of the mass of contamination requiring treatment to determine the required treatment duration.

Soil Gas Chemistry

During the performance of the SVE pilot test, initial soil gas was screened at each VMP interval and VEW location for oxygen, carbon dioxide, and total volatile hydrocarbons (TVH). Soil gas screening was also performed following approximately 96 hours of system operation to assess the changes in soil gas chemistry. Soil gas samples were collected by attaching a vacuum pump to the sampling point using flexible tubing and pulling soil gas from the soil formation through the screened intervals of the VMPs and VEWs. Before collecting each sample, the sample point was purged to remove at least the casing and gravel pack volume to ensure a representative and consistent sample of soil gas from the surrounding formation was obtained. A 30-second purge was used for each VMP interval, and the VEWs were purged for 5 minutes.

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After purging the VMP, the flexible tubing was attached to a vacuum sampling chamber (dessicater). An air sampling Tedlar™ bag was connected to the sampling tube within the sampling chamber. A vacuum pump was attached to the vacuum sampling chamber to create a low pressure system within the dessicater, causing air to be drawn up from the screened interval into the sample bag. Once full, the sample in the Tedlar™ bag was connected to field instruments to measure oxygen, carbon dioxide, and TVH. The oxygen and carbon dioxide were measured using a GasTech 3252 OX meter and the TVH was measured with a Microtip meter.

Based on the screening results, soil gas sample points were selected for analytical testing to confirm the actual contaminant concentrations present in the soil gas. The analytical sample collection procedures are similar to the screening sampling procedures except that the full Tedlar™ bag was transferred to a 6-liter Summa^R canister. This transfer was accomplished by connecting the bag to a special fitting on the top of the canister. The canister, which possesses a vacuum of up to 6 liters, is opened, and the vacuum inside the canister pulls the sample from the bag. The samples were analyzed for VOCs.

Soil gas samples were collected from the six VMPs and six VEWs installed at the site for initial field screening measures. Each VMP has three screened sampling intervals

whereas each VEW has only one screened interval. The VMPs have screened intervals of less than one foot, so they provide more discrete sampling points with regard to depth than the VEWs. Each VEW is screened across approximately 10 feet of the formation. The sample points were initially field screened for oxygen, carbon dioxide, and TVH to determine which points would be most suitable for collection of soil gas samples for analytical laboratory testing. Table 3 lists the results from the initial field screening. Also listed in Table 3 are measurements of the vacuum pressures exerted on each sample point during sample point purging. This pressure data provides information on the apparent tightness of the screened formation being tested.

The field screening results indicate that anaerobic conditions exist at several of the subsurface locations. The majority of these locations are within the limits of the main landfill trench at depths of 10 feet or greater. These anaerobic conditions are indicative of biological activity, most likely caused by the biodegradation activities of organic carbon (including organic contaminants) in the trench. Carbon dioxide, a byproduct of organic compound degradation, was also encountered at high levels in the anoxic soils to further support the presence of biological activity. The only low oxygen level encountered outside the trench was in MPC at a depth of 14 feet. This VMP was set in an interval of weathered limestone outside the trench limits. The low oxygen level suggests that subsurface pathways may exist that allow communication of the trench to some portions of the natural limestone surrounding the trench. According to the results, the most depleted oxygen levels appear to be associated with the deeper zones of the trench located at VEW-1, and extend west to MPA and VEW-3 and north to MPD. The oxygen levels increase as sample points move east from VEW-1 to VEW-2 and MPB. The differences observed in MPC-14 and MPB-13 suggest that little or no communication exists between these two VMPs.

TVH levels were measured to assess the approximate range of contamination present at different portions of the site. In general, high TVH readings were encountered in deeper soils within the landfill trench. High TVH readings were observed at each point where low oxygen levels were encountered. In addition, high TVH readings were also measured at VEW-2 and MPB. Both of these points had relatively high oxygen levels.

Soil gas samples were collected at four of the screened points to quantify and characterize the VOCs present in the soil gas. These samples were collected in Summa™ canisters for analytical laboratory testing. The points sampled were selected based on the results of the initial field screening effort and included VEW-01, MPA-15, MPD-15, and MPE-04. The samples from within the main trench area provide data for assessing contamination in fill material. The sample collected from MPE-04 provides data to assess the fill material encountered northeast of the main trench. These two areas do not appear to interconnected by subsurface air pathways. The analytical results of the VOCs detected for the initial soil gas are shown on Table 4. The primary contaminants encountered include TCE, DCE, and vinyl chloride. This data supports the occurrence of TCE bioremediation at the site. DCE and vinyl chloride are intermediary breakdown products of TCE.

Table 3 Initial Soil Gas Chemistry, Screening Results
SWMU, B-3, Camp Stanley Storage Activity, Texas

Sample Location	Oxygen (%)	Carbon Dioxide (%)	TVH (ppm)	Vacuum (in. H_2O)
MPA-5	7.0	14.0	395	30
MPA-10	3.5	13.0	>2500	63
MPA-15	6.0	13.0	>2500	45
MPB-5	17.5	2.5	890	50
MPB-9	18.0	2.5	1100	55
MPB-13	18.0	2.5	>2500	60
MPC-5	17.0	8.0	260	35
MPC-9.5	18.0	7.5	320	35
MPC-14	1.5	15.0	>2500	40
MPD-4.5	16.5	4.5	760	35
MPD-10	15.0	5.0	1631	40
MPD-15	1.0	15.0	>2500	75
MPE-4	18.0	2.5	550	35
MPE-8	17.0	3.8	890	35
MPE-12	11.0	6.5	1348	50
MPF-4.5	18.0	4.0	600	35
MPF-8.5	13.0	7.0	855	>150
MPF-12.5	9.0	10.5	1500	95
VEW-01	1.0	20.0	2000	30
VEW-02	12.0	8.0	>2500	40
VEW-03	4.0	17.0	520	30
VEW-04	6.0	17.5	822	>150
VEW-05	5.0	18.0	1196	30
VEW-06	17.0	4.0	922	40

Table 4 Initial Soil Gas Chemistry, Analytical Results

Camp Stanley Storage Activity, Texas

Constituents Sample ID:	VEW-01	MPA-15	MPD-15	MPE-04
Volatile organic compounds, EPA TO-14 (in ppbv)				
1,2,4-Trimethylbenzene	17,000 U	40,000	33,000	890 U
1,3,5-Trimethylbenzene	17,000 U	26,000	16,000 U	890 U
cis-1,2-Dichloroethene	830,000	1,800,000	2,300,000	41,000
Tetrachloroethene	17,000 U	17,000 U	16,000 U	5,400
Trichloroethene	140,000	520,000	510,000	36,000
Vinyl chloride	100,000	490,000	68,000	890 U

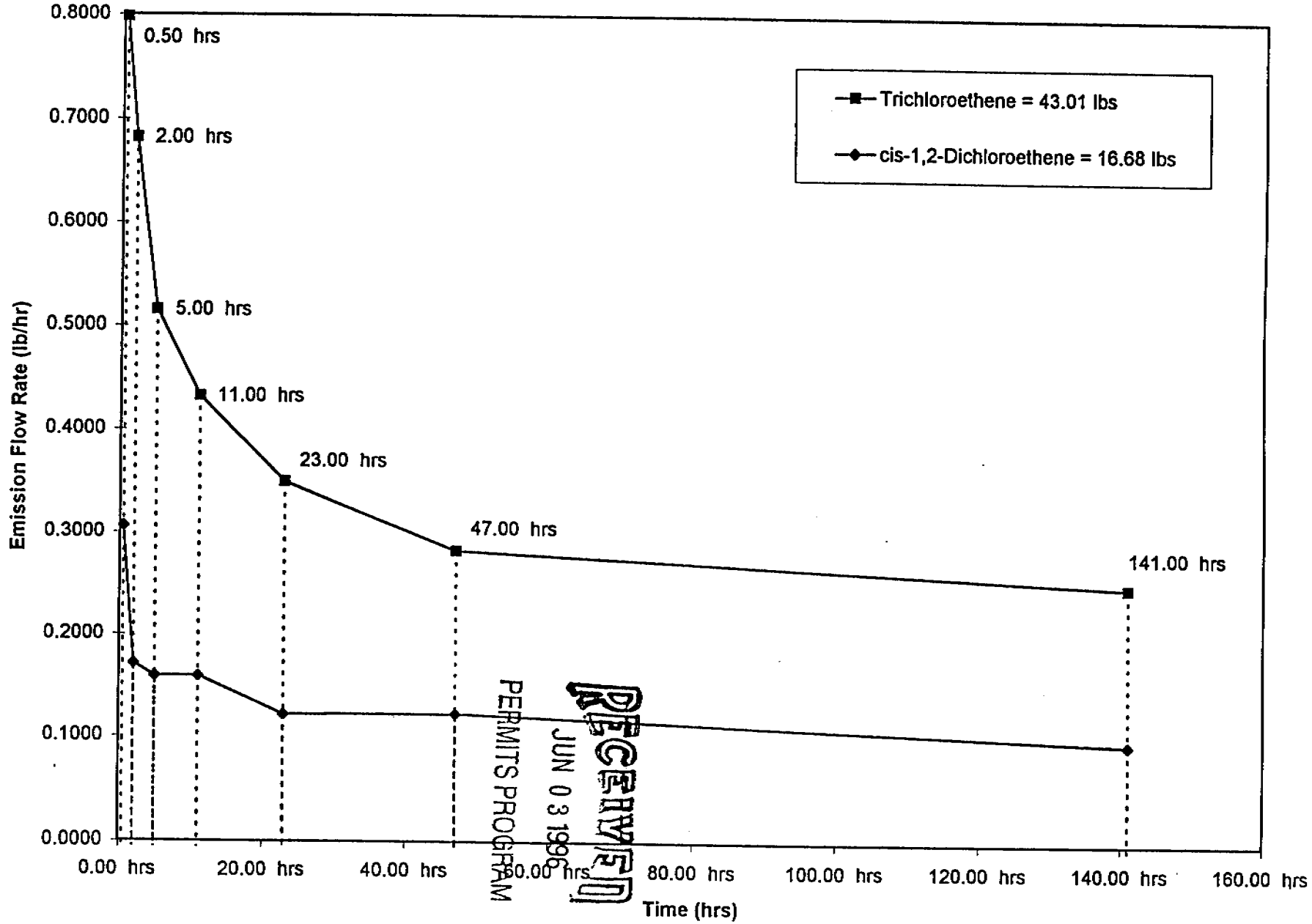
Notes: ppbv - Parts per billion volume
U - Compound not detected at detection limit

Soil Gas Emissions

Samples were collected for VOC analysis from a sampling port located on the exhaust of the blower to estimate the rate and volume of VOC removal and to assess the quantity of contaminants that may be discharged to the atmosphere during normal operation of a full-scale SVE system. To quantify the mass removal rate during the pilot test, eight exhaust air samples were collected at the blower outlet for laboratory VOC analysis. Emission samples from the operating system were collected at thirty minutes after initiating air injection, after 2 hours of operation, 5 hours, 11 hours, 23 hours, 47 hours, 95 hours, and 140 hours. VOC measurements from the exhaust port were coupled with air flow rate measurements to estimate the cumulative mass of VOC removal taking place over time. Periodic monitoring with a hydrocarbon meter was also conducted at the vapor outlet port to evaluate emissions.

Vapor emission samples were collected by attaching the Summa^R canister directly to a sample port located on the exhaust pipe with flexible tubing and opening the canister valve. The vacuum inside the canister pulls the sample from the exhaust stream directly into the canister. For direct reading instruments, the instrument probes were attached directly to a sample port on the exhaust pipe. Target analytes included TCE, PCE, and DCE, and were measured by EPA Method TO-14. Figure 3 charts SVE system calculated air contaminant emission rate vs. time resulting from the SVE pilot testing operations.

Figure 3
CSSA SWMU B-3 SVE Air Contaminant Emission Rates



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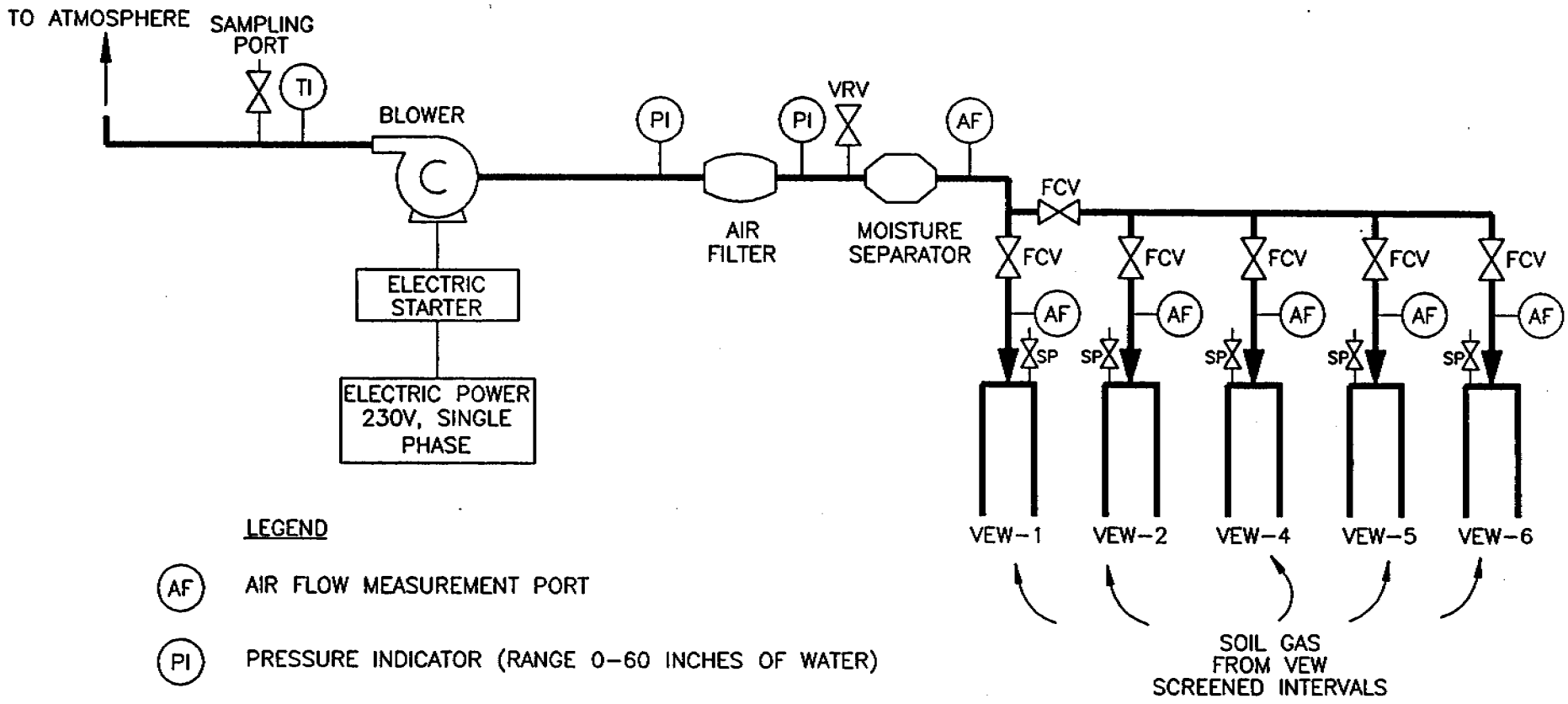
PROCESS FLOW DIAGRAMS

PARSONS ENGINEERING SCIENCE, INC.



LEGEND

AF	AIR FLOW MEASUREMENT PORT
PI	PRESSURE INDICATOR (RANGE 0–60 INCHES OF WATER)
TI	TEMPERATURE INDICATOR
FCV	FLOW CONTROL VALVE AIR FILTER SOLBERG F-30P-200
PRV	VACUUM RELIEF VALVE
BLOWER	2.5 hp GAST REGENAIR R5 SERIES MODEL R5325A-2
▭	SAMPLING PORT
⬡	MOISTURE SEPARATOR (30 gal.)

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FIGURE 3.8-2

INSTRUMENTATION DIAGRAM FOR INSTALLED SVE BLOWER SYSTEM SWMU B-3

MAY 1996

CAMP STANLEY STORAGE ACTIVITY

DETLCSSA.DWG 5/29/96

EMISSIONS DATA

Soil Vapor Extraction (SVE) System

Standard Exemption 118 (c) Emission Calculations

The speciated chlorinated hydrocarbon emission rates and calculated emission limits derived from Standard Exemption No. 118(c) are presented in the table below. Also shown is the equation for calculating the emission rate.

In order to compare a conservative scenario with the emission limits established in the applicable Standard Exemption, the maximum 30 minute soil gas concentrations will be used in the calculations. During an SVE operation, the soil gas concentrations typically start at a maximum concentration and decrease asymptotically to steady state conditions. Therefore, the soil gas concentrations presented in the emission calculations are the maximum concentrations of chemical compounds in the SVE vent 30 minutes after the pilot system was turned on (Figure 3). In addition, emission rates were calculated using the maximum flow rate of 80 standard cubic feet per minute (SCFM).

Chemical constituent emission limits (E) for Standard Exemption 118(c) are calculated by using the equation E = L/K, where L is the value as listed in table 118A and K is the value from standard exemption list 118(c). As specified in standard exemption 118, no VOC emissions may exceed 6 lb/hr. However, a calculated maximum emission rate is provided as referenced by the standard exemption 118 checklist.

Calculated VS. Exempted Emission Rates

Chemical compound	Soil gas conc. (ppmv)	Air displacement (SCFM)	Molecular weight (lb/lb-mole)	Calculated emission rate (lb/hr)	Calculated emission rate (tons/yr)	L (mg/M^3)	E - Exempted emission rate (lb/hr)
TCE	480	80	131.4	0.79	3.5	135	16.875
DCE	250	80	97.0	0.31	1.34	79	9.8750
Vinyl chloride	16	80	62.5	0.01	0.06	2	0.25

Emission Rate Equation

Chlorinated hydrocarbon emission rate (lb/hr) = (contaminant concentration) x (contaminants molecular weight in lb/lb-mole) x (air pump rate in cubic feet per minute) x (1.581×10^{-7} lb-mole-min./ft^3-ppmv-hr). For calculation of yearly emission rates, it was assumed that the SVE system will operate 24 hours a day, 7 days a week, 52 weeks per year at the 30 minute soil gas concentrations.

Conclusion

The calculated emission rates are compared with E, the emission limit rate expressed in Standard Exemption 118. As seen in the table above, the soil vapor extraction test system satisfies the requirements of Standard Exemption No. 118(c).

STANDARD EXEMPTION
APPLICABLE CHECKLISTS

30 TAC CHAPTER 116, SECTION 116.211
PERMIT EXEMPTIONS - APPLICABILITY CHECKLIST

This checklist is designed to help you confirm that you meet the general rule for using standard exemptions. Whether or not you use this checklist, your claim must be shown to meet all appropriate general requirements, as well as those in each standard exemption (STDX) you are claiming.

1. Description of overall activities at this location: See Introduction

2. Are there any numbered air permits under the same account number? [x] YES [ ] NO
   If yes, do any permit conditions prohibit or restrict the use of standard exemptions (§116.211[a][6])? [ ] YES [x] NO
   (1) If yes, which permit numbers:_____
   (2) If yes, standard exemptions may not be used or their use must meet the restrictions of the permit. A new permit or permit amendment may be required.

3. Emissions check for this STDX claim (§116.211(a)(1)) (see Note 1)

Calculated Tons Per Year		
CO: 0	NO_x: 0	SO_x: 0
PM: 0	VOC: 4.9	Other: 0

Note 1: List all emissions for this project (include point and equipment fugitive emissions from new or modified facilities as well as increases upstream and downstream that result from this project.)

Are SO_x, PM, VOC, and other emissions shown above each less than 25 TPY?
[x] YES [ ] NO

Are the NO_x and CO emissions shown above each less than 250 TPY? [x] YES [ ] NO

If the answer to either question is "NO," a standard exemption cannot be claimed.

4. Site exemption emissions check (§116.211[a][3]):
   Are total SO_x, PM, VOC and other emissions claimed under standard exemption at the site each less than 25 TPY? [x] YES [ ] NO

   Are total NO_x and CO emissions claimed under standard exemption at the site each less than 250 TPY? [x] YES [ ] NO

If either question is answered "NO," determine if one facility at the property has had public notification and comment as required in Subchapter B or D of 30 TAC 116 or the applicable procedures of Chapter 116 in effect at the time of registration. If public notice has occurred, what permit or STDX required this action? _____

If public notice has not occurred, a permit may be required for the proposed facility.

5. Nonattainment Check (§116.211[a][2]):
   Is the facility located in a nonattainment county/area (see listing below)? No
   If "NO," skip to paragraph 6.
   If "YES," which county/area?_____

Show the actual increases (defined as new allowables minus old actuals - see Nonattainment New Source Review Manual) in emissions, without regard for any decreases, which result from this standard exemption claim for the following pollutants: NO_x:_____ VOC:_____ CO:_____ PM10:____

Is the site an existing major source? (See §116.012) [ ] YES [ ] NO
Is the modification major? (See §116.012, Table I) [ ] YES [ ] NO

You may be required to provide documentation of nonattainment new source review applicability. If you have determined these requirements apply at your site for this exemption claim, enclose the necessary netting documentation (See Nonattainment New Source Review Manual).

6. Prevention of Significant Deterioration (PSD) Check (§116.211[b]):
An overall emissions rate of 100 (for a named source) or 250 tons per year or more on-site, or a significant modification for any single air contaminant for which a NAAQS has been issued may indicate a need for PSD review under 40 CFR 52. If you have determined that the netting requirements of 40 CFR 52 are triggered by this exemption claim, enclose the necessary documentation.

7. If any EPA New Source Performance Standards (NSPS) or National Emissions Standards for Hazardous Air Pollutants (NESHAPS) are applicable for the facility covered by the exemption(s) claimed (§116.211[a][5]), list them here: NA

8. §116.211(c) states "No person shall circumvent by artificial limitations the requirements of §116.110 of this title (covering permitting)." Circumvention by artificial limitations may include:

   (a) dividing a complete project into separate segments to circumvent §116.211(a)(1) limits;
   (b) claiming feed or production rates below the physical capacity of the project's equipment in order to begin constructing facilities before a permit or permit amendment is approved for full scale operations.

Ensure that any exemption claim is free of circumvention by means of artificial limits such as these.

9. If all §116.211 requirements are met, we suggest use of the appropriate standard exemption worksheet(s) or checklist(s).

NONATTAINMENT AREAS

FOR OZONE (VOC OR NOx) Brazoria, Chambers, Collin, Dallas, Denton, El Paso, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Montgomery, Orange, Tarrant, and Waller Counties for VOC and NO_x as precursors to ozone; and, Victoria County for VOC only.

FOR LEAD: Section of Collin County

FOR PARTICULATE MATTER (PM 10): El Paso County

FOR CARBON MONOXIDE: Section of El Paso County

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Standard Exemption 68
Checklist

Contaminated Water and Soil Remediation Equipment

REGISTRATION IS REQUIRED BEFORE CONSTRUCTION OF FACILITIES COVERED BY THIS STANDARD EXEMPTION MAY BEGIN

The following checklist is designed to help you confirm that you meet Standard Exemption 68 (STDX 68) requirements. Any "no" answers indicate that the claim of exemption may not meet all requirements for the use of Standard Exemption 68. If you do not meet all the requirements, you may alter the project design/operation in such a way that all the requirements of the exemption are met or obtain a construction permit.

YES	NO	NA	DESCRIPTION
x			Have you included a description of how this exemption claim meets the general rule for the use of standard exemptions (§116.211 checklist is available)?
x			Will the remediation be at the property where the contamination originally occurred or at a nearby property secondarily affected by the contamination?
		x	Is the total emissions rate of petroleum hydrocarbons (except benzene) less than or equal to one (1) pound per hour? Attach calculations and supporting data such as soil/water contaminant concentrations.
		x	Do benzene emissions meet the emissions limits of STDX 118(c)? Attach calculations, contaminant concentrations, and a scaled map showing the emission(s) point(s) and nearby off-property receptors.
x			Do chemical emissions other than those from petroleum hydrocarbons meet the requirements of STDX 118(b) and (c)? Attach calculations, contaminant concentrations, and a scaled map showing the emission(s) point(s).
x			Will the handling, processing, and conditioning of contaminated and remediated soil be free of visible emissions (except for moisture)?
		x	If you use abatement equipment to meet the exemption's emissions limits, does it completely satisfy one of the conditions stated in STDX 68(e)(1)-(4)? Which one? _ _ Describe the abatement process in an attachment.

Revised 10/95

Standard Exemption 118
Checklist
Facilities and Modifications

A PI-7 WITH REQUIRED ATTACHMENTS MUST BE SUBMITTED WITHIN TEN DAYS OF INSTALLATION OR MODIFICATION OF FACILITIES UNDER THIS EXEMPTION

The following checklist has been designed to help you confirm that you meet Standard Exemption 118 (STDX 118) requirements. Any "no" answers indicate that the claim of exemption may not meet all the requirements for the use of Standard Exemption 118. If you do not meet all the requirements, you may alter the project design/operation in such a way that all requirements of the exemption are met or obtain a construction permit.

YES	NO	NA	DESCRIPTION
x	—	—	Have you included a description of how this exemption claim meets the general rule for the use of standard exemptions (§116.211 checklist is available)?
x	—	—	Have you reviewed all other exemptions to determine that none authorize the proposed construction or change had all requirements been met?
—	—	x	If this claim is to qualify the use of other chemicals at a facility authorized by another exemption, are all the requirements of that specific exemption met? Have you included a description of how that exemption's requirements are met?
x	—	—	Is each emission source located at least 100 feet from any recreational area, residence, or other structure not occupied or used solely by the owner or operator of the facilities or the owner of the property upon which the facilities are located? Attach a scaled map.
x	—	—	Do all the chemicals that will be part of new or changed emissions at the facility appear in Table 118A or in the 1985-86 version of the list of Threshold Limit Values (TLV) published by the American Conference of Governmental Industrial Hygienists? List the compounds and their L value from Table 118A or their TLV.
x	—	—	Are the calculated new or increased emissions, including fugitives, for each chemical less than or equal to 5 tons per year? Attach calculations.
x	—	—	Are the calculated new or increased emissions, including fugitives, for each chemical less than or equal to "E" pounds per hour as determined using the formula in STDX 118(c) or 6 pounds per hour, whichever is lower? Attach both the "E" and emissions calculations for each compound.
x	—	—	Have you attached to the PI-7 a complete description of the project?
x	—	—	Are all the facilities, in which the compounds listed in STDX 118(e) are handled, located at least 300 feet from the nearest property line and 600 feet from the nearest

off-property receptor? Your attached scaled map should show the effected facilities, the nearest fence lines, and receptors.

__	__	x	Are the total on-property quantities of each compound listed in STDX 118(e) always less than or equal to 500 pounds? This requirement does not apply to permit authorizations.
__	__	x	Are all compounds listed in STDX 118(e) handled only in unheated containers operated in compliance with U.S. Department of Transportation Regulations (49 CFR 171 through 178)?
__	__	x	Are procedures and equipment in place to ensure that containers containing chemicals listed in STDX 118(e) never vent to, or are never opened directly to, the atmosphere? Attach descriptions as necessary.
__	__	x	For physical changes or modifications to existing facilities, does all air pollution abatement equipment remain unchanged (i.e. no change or addition is allowed)? (This requirement does not mean that new facilities may not have control equipment.)
x	__	__	Will all visible emissions, except uncombined water, have opacity less than or equal to 5 percent in any five-minute period?

COPY OF TNRCC MAY 10, 1996 LETTER

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

May 10, 1996

Lieutenant Colonel Dean C. Schmelling
Post Commander
DEPARTMENT OF THE ARMY, CAMP STANLEY
25800 Ralph Fair Road
Boerne, Texas 78006

Re: Standard Exemption
Registration No. 32405
Soil Vapor Extraction System
Boerne, Bexar County
Account ID No. BG-0841-S

Dear Lieutenant Colonel Schmelling:

This is in response to your request to register the operation of a soil vapor extraction system under Standard Exemption at your facility in Bexar County. We have evaluated the information you have submitted in support of your request, and we find that a number of insufficiencies prevent us from determining whether you have met all the requirements of the standard exemption claimed in your registration request and/or of 30 TAC §116.211 (Regulation VI). Therefore, we cannot confirm your claim of this exemption at this time.

Insufficiencies are summarized below:

Please provide a to-scale site map that shows the emissions points and the distance to the nearest off-site receptor.

Please furnish the date of operation of the system. We note that the pilot test was conducted without prior registration. For future reference, we consider any emissions into the atmosphere from remediation projects, even pilot tests, as subject to provision (f) of Standard Exemption 68. Also for future reference, please note that, in no case, may emissions of trichloroethene and dichloroethene exceed six pounds per hour.

If you have any soil analyses, please discuss these as they may relate to the pilot test results.

Re: Standard Exemption
Registration No. 32405

Please submit any new information or modification proposals as a new standard exemption registration request. To expedite the process at that time, please include a copy of this letter. We remind you that Sections 382.0518(a) and 382.057 of the Texas Clean Air Act, Texas Health and Safety Code, Chapter 382, provide that you must obtain a construction permit or fully comply with a standard exemption before you begin work on the construction of a new facility or modify an existing facility that may emit air contaminants.

We appreciate your cooperation in this matter. If you have any questions concerning this exemption, please contact Mr. Terry Murphy of our Office of Air Quality, New Source Review Division at (512) 239-1587.

Sincerely,

Tammy Villarreal
Manager, Chemical Section
New Source Review Division
Texas Natural Resource Conservation Commission

TV/TM/al

cc: Mr. James Menke, Air Program Manager, San Antonio

Record No. 42868

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**GENERAL PERMIT INFORMATION
PERMIT: 32406 ENGR: BULLARD, KAREN M./ GROUP: COAT ID:BG0841S
ISSUED TO: DEPARTMENT OF THE ARMY, CAMP STANLEY
UNIT NAME: BLDG 27 PAINT BOOTH
OPERATING SCHEDULE: 24.0 HRS/DAY 7 DAYS/WK 52 WKS/YR
LAT: 29-40-35 LONG: 098-37-52 REGION: 13 COUNTY: BEXAR
NEAR CITY: BOERNE LOC: 25800 RALPH FAIR RD

**PERMIT/SITE CONTACT INFORMATION:
PERSON: LT. DEAN C. SCHMELLING ADDR1: 25800 RALPH FAIR ROAD
TITLE: POST COMMANDER ADDR2: BOERNE
CITY: BOERNE STATE: TX ZIP: 78006 PHONE: (210)221-7461

** CONSTRUCTION **		** OPERATING **		** CONTINUANCE **	
TYPE APPL(C,S,X):	(X)	OPERATION START :		NOTICE MAILED :	
APPL RECD :	04-17-96	OPER APPL RECD :		APPL RECD :	
DEFIC LTR SNT :		OPER APPL CMPLT :		DEFIC LTR SNT :	
SUPP INFO REQ :		DISP(I,D): ( )		SUPP INFO REQ :	
SUPP INFO RECD :		OPR TYPE(R,S) : ( )		SUPP INFO RECD :	
APPL CMPLT :		**********		APPL CMPLT :	
COMP LTR SNT :		* *		COMP LTR SNT :	
PUB NTC SNT :		* I= ISSUED D=DENIED *		PUB NTC SNT :	
PUB NTC PUB :		* E=EXPIRED *		PUB NTC PUB :	
PUB HEAR (R,H) :	( )	* C=CNST S=SPECIAL *		PUB HEAR(R,H) :	( )
CNST TYPE(C,X,S):	(X)	* X=EXEMPT R=OPER *		DISP(I,D,E):( ) :	
DISP (I) :	05-02-96	**********			
CNST START DATE :					

**EMISSIONS CHANGED :

**REMARKS:

**OTHER PERMIT DATES:
APP/PERMIT VOIDED: REASON:
APP ON HOLD UNTIL: REASON:
CONST STOPPED UNTIL:

VOID/HOLD CODES: PD-PLT DISMANTLED
CR-COMPANY REQUEST TI-TIME EXPIRED
DD-DATA DELAY TD-TECH DIFFICULTY
RE-REISSUED NR-NO RESPONSE

**PERMIT TYPES/STANDARDS:
NEW MAJ SOURCE:> 100 TPY: SIC: 9999
MAJOR MODIFICATION: PORTABLE: RELATED PERMITS: SUFFIX REASON
NON-ATTAIN REVIEW: NSPS: TACB: CHG LOC:
INSIGNIFICANT EMISSIONS: NESHAP: PSD-TX: CHG OWN:
FUEL CONVERSION: TOXIC MATERIALS: STD EX NO.:

**AIR CONTAMINANT INFORMATION:

NAME	CODE	MAX ALLOWABLE RATE LBS/HR	TONS/YR	ACTUAL TONS/YR

**ABATEMENT EQUIPMENT:

file

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

May 2, 1996

Colonel Dean C. Schmelling
Post Commander
DEPARTMENT OF THE ARMY,
CAMP STANLEY
25800 Ralph Fair Road
Boerne, Texas 78006

Re: Standard Exemption Registration
Nos. 32406, and 32407
Buildings 27, and 200 Paint Booths
Boerne, Bexar County
Account ID No. BG-0841-S

Dear Colonel Schmelling:

This is in response to your standard exemption registrations, Forms PI-7, concerning the proposed operation of spray paint booths in Boerne, Bexar County. We understand that you will operate these booths in conjunction with other storage activities at the same site.

After evaluation of the information which you have furnished, we have determined that your proposed operations are exempt from permitting procedures under Standard Exemption No. 75 if constructed and operated as described in your registration requests. This standard exemption was authorized by the Executive Director of the Texas Natural Resource Conservation Commission (TNRCC) pursuant to 30 TAC Section 116.211 (Regulation VI). A copy of the standard exemption in effect at the time of this registration is enclosed. You must operate in accordance with all requirements of the enclosed standard exemption.

You are reminded that regardless of whether a permit is required, these facilities must be in compliance with all rules and regulations of the TNRCC and of the U.S. Environmental Protection Agency at all times.

Re: Permit Nos. 32406, and 32407

Your cooperation in this matter is appreciated. If you have any questions concerning this standard exemption, please contact Ms. Karen M. Bullard in the Office of Air Quality, New Source Review Division at (512) 239-6142.

Sincerely,

James E. Crocker, P.E.
Manager, Coatings and Combustion Section
New Source Review Division
Texas Natural Resource Conservation Commission

JC/KB/sl

Enclosure

cc: Mr. James Menke, Air Program Manager, San Antonio

Record Nos. 42869 and 42870

STANDARD EXEMPTION REVIEW SHEET

Standard Exemption No. 75 Review

Received by TNRCC: 4/17/96 by Engineer: 44/22/96 Initials: KBULLARD
Claimant: DEPARTMENT OF THE ARMY, CAMP STANLEY
Account ID No.: BG-0841-S Project No.: 32407 Record No.: 42870
Region: 13 County: Bexar City: Boerne
Project Overview: BLDG. 200 PAINT BOOTH

Is registration required?			Yes [x]	No []
Form Submitted:	None []	PI-7 [x]	PI-8 []	PI-7(124) []
Is a site review required?			Yes []	No [x]
If Yes: Received response from __ on __.				
Approved:		N/A [x]	Yes []	No []
Is an NOV involved?		Unknown []	Yes []	No [x]
If Yes: Does this claim resolve the NOV?		N/A [x]	Yes []	No []
If NOV is not resolved: Explain.				
Is this exemption claim for a facility or operation at a site with previously permitted facilities?			Yes [x]	No []
If Yes: Do any Special Conditions address use of standard exemptions at this site?		N/A []	Yes []	No [x]
Does this exemption modify a permitted facility?			Yes [x]	No []
If Yes: Do Special Conditions preclude modification by standard exemption?		N/A []	Yes []	No [x]
If Yes: Does this standard exemption need to be incorporated into the next permit amendment or renewal?		N/A []	Yes []	No [x]

Has sufficient information been provided to determine if:

1. **§116.211 (25 TPY VOC, etc.) or more stringent emission requirements of the exemption are being satisfied?** Yes [x] No []
2. **the facility or operation satisfies the conditions of the exemption?** Yes [x] No []

Engineer's Determination:

[]	X10	Insufficient information to determine if §116.211 and/or exemption requirements are satisfied.
[]	X10B/X10C	§116.211 and/or exemption requirements are not satisfied.
[x]	X1/X2	§116.211 and/or exemption requirements are satisfied (non-autobody).
[]	X14	Register; no checklist.
[]	X15/X16/X17	§116.211 and/or exemption requirements are satisfied (autobody).
[]	Other	

Contact with claimant: Date: __ Purpose: __
Date: __ Purpose: __

Comments: Camp Stanley is registering two paint booths at the same site where they recently received permit 29466 for degreasing operations. Since they have gone through public notice at this site and they meet the requirements of Std. Ex. 75, the 116 checklist is not needed.

Engineer: Karen M. Bullard **Date:** 5/2/96

Std. Ex. Coordinator: Craig Pritzlaff **Date:** 5/2/96

March 21, 1995

TEXAS NATI , RESOURCE CONSERVATION COMMI
REGISTRATION FORM FOR STANDARD EXEMPTIONS
FORM PI-7

I. Company Name Department of the Army, Camp Stanley
(Corporation, Company, Government Agency, Firm, etc.)
Mailing Address 25800 Ralph Fair Rd., Boerne, TX 78006
Individual Authorized to Act for Applicant: Name LTC Dean C. Schmelling Title Post Commander
Address 25800 Ralph Fair Rd., Boerne, TX 78006 Telephone (210) 221-7461

II. LOCATION OF EXEMPT FACILITY (Latitude and Longitude must be to the nearest second):
Name of Plant or Site Department of the Army, Camp Stanley
Street Address 25800 Ralph Fair Rd., Boerne, TX 78006
Nearest City Boerne County Bexar Latitude 29° 40' 35" Longitude 98° 37' 52"
SITE REQUIREMENTS: A. Submit a plot plan to scale of the property showing the location of plant boundaries, plant equipment, and surrounding area.
B. Furnish an area map with a scale showing the facility location relative to highways and towns.

III. TYPE OF FACILITY:
A. Applicable Standard Exemption Number(s) from TNRCC List Exemption Number 75
B. Name of Facility and Company's Facility Number
C. TNRCC Account Identification Number BG 0341S
D. Previous Special Exemption or Permit Number
E. Operating Schedule: Hours/day 24 Days/week 7 Weeks/year 52
F. Proposed Start of Construction (Date) Operation (Date)
G. Permanent [X] Portable [ ]
H. Length of time at this site, if portable

93406

IV. PROCESS INFORMATION
Description of Process: Prepare and attach a written description of the exempt process and applicable checklists (when available). The description must be in sufficient detail to indicate that the facility will conform to the specified exemption.

V. EMISSIONS DATA Furnish a description of the basis for emission rates including fugitives. (Calculations, emission factors, measurement, NSPS, etc.)

Emission Point Number	Name of Source	Name of Air Contaminant	Emission Rate of Each Air Contaminant			
			lb/hr		tons/yr	
			Gaseous	Particulate	Gaseous	Particulate
EPN 7	Bldg. 27 Paint Booth	VOC	5.38		2.80	
EPN 7	Bldg. 27 Paint Booth	Particulates		0.11		0.012

VI. A copy of the application is being sent to the Regional Office of the TNRCC\: [X]Yes [ ]No

VII. I, LTC Dean C. Schmelling Post Commander
(Name) (Title)

state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption. The facility will operate in compliance with all Regulations of the Texas Natural Resource Conservation Commission and with Federal Environmental Protection Agency Regulations governing air pollution.

DATE 4/11/96 SIGNATURE

Rev. 9/21/93

APR 18

INTRODUCTION

Camp Stanley Storage Activity (CSSA), Boerne, Texas is a subinstallation of the US Army Red River Depot (RRAD), located in Texarkana, Texas. The primary mission of CSSA is receipt, storage, and issuance of supplies, as well as quality assurance testing and maintenance of military weapons and ammunition. CSSA is located in northwestern Bexar County, approximately 19 miles northwest of downtown San Antonio (see area map). Bexar County is an attainment county. The Texas Natural Resource Conservation Commission (TNRCC has issued an Air Quality Permit for the operation of a cold solvent cleaning facility to CSSA (permit no. 29466, account ID no. BG-0841-S). This report includes standard exemption registrations for spray paint booth operations (standard exemption 75) and soil remediation activities (standard exemptions 68 and 118) at CSSA. A plot plan of the entire installation showing all boundaries is provided in this report. All stationary emission sources are indicated on this plot plan, including exempt sources as well as permitted sources. Table IIA-1, following the map sleeves, presents the UTM coordinates and heights of buildings located in the vicinity of the permitted sources. For each building, the UTM coordinates shown represent the locations of the four corners of the building.

The exempt sources represented by this registration meet all requirement of 30 TAC 116.211 and their respective exemption requirements.

This standard exemption registration submittal includes sections 1 and 2 for spray paint booths located in building 200 and building 27, respectively. Also, the SWMU B-3 soil vapor extraction system (SVE) registration (Section 3). Each section includes all necessary data for determining the applicability of the standard exemption requirements.

BUILDING 27
EXEMPTION REGISTRATION

Section 2

Table of Contents

PI-7 Form

Process Description

Process Flow Diagrams

Emission Calculations

Supplemental Emissions Data for Building 27 Paint Booth

BUILDING 27 PAINT BOOTH

FORM PI-7

BUILDING 27 PAINT BOOTH

PROCESS DESCRIPTION

32406

EPN 7 and FUG 2 - Building 27 Paint Booth

The paint booth at Building 27 is used primarily for coating flat-surface office equipment such as desks, bookshelves, tables, and cabinets. Items are coated in the main painting area of the booth utilizing an atomized air spray gun, aerosol application, brush application, or roller application depending on the requirements of a particular operation. VOC emissions from all coating operations and PM emissions from spay gun and aerosol coating overspray are vented through a particulate filter bank, which has a 99 percent particulate removal efficiency. A horizontal exhaust fan maintains air flow across the filter bank. Coated products are allowed to dry for at least five minutes inside the booth with the fan in operation before being removed from the booth. Brushes, rollers, and the spray gun used for coating are cleaned with various thinners inside the painting area of the booth with the fan in operation. Most emissions are released through EPN 7; however, some fugitive emissions arise from continued drying after coated items have been removed from the booth.

The paint booth at Building 27 meets the requirements of standard exemption 75. An overview of standard exemption 75 requirements and how the paint boot at building 27 complies with each applicable requirements as follows:

Building 27 Paint Booth
Standard Exemption 75 Requirements

75(a)	CSSA has met the limits of this exemption without the use of VOC or exempt solvent (non-VOC) control equipment.
75(b)	CSSA building 27 paint booth includes only VOCs or non-VOCs and not metal spraying or metalizing (the deposition or spraying of molten metal onto a surface to form a coating).
75(c)	CSSA building 27 paint booth complies with all VOC emission limitations (see emission calculations, and supplemental emissions data).
75(e)	CSSA will maintained, in sufficient detail, records to demonstrate compliance with this standard exemption.
75(f)	CSSA employs good housekeeping procedures to minimize fugitive emissions.
75(g)	CSSA will not exceed 5% opacity from any emission point as determined by the United States Environmental Protection Agency Method 9 averaged over a 6 minute period except for those periods described in 30 TAC 111.111 (a) (1) (E) (Regulation I).
75(h)	CSSA is located in Bexar County, an attainment county.

75(i) A form PI-7 for the paint booth in building 27 is included in this registration submittal.

75(j) CSSA operations conducted in building 27 spray booth has a ventilating velocity of 113 ft/min., particulate matter control efficiency of 99%, a face velocity greater than 150 ft/min., and vertical elevated stacks through which the spray booth emissions are exhausted at least 1.5 times the building height above grade.

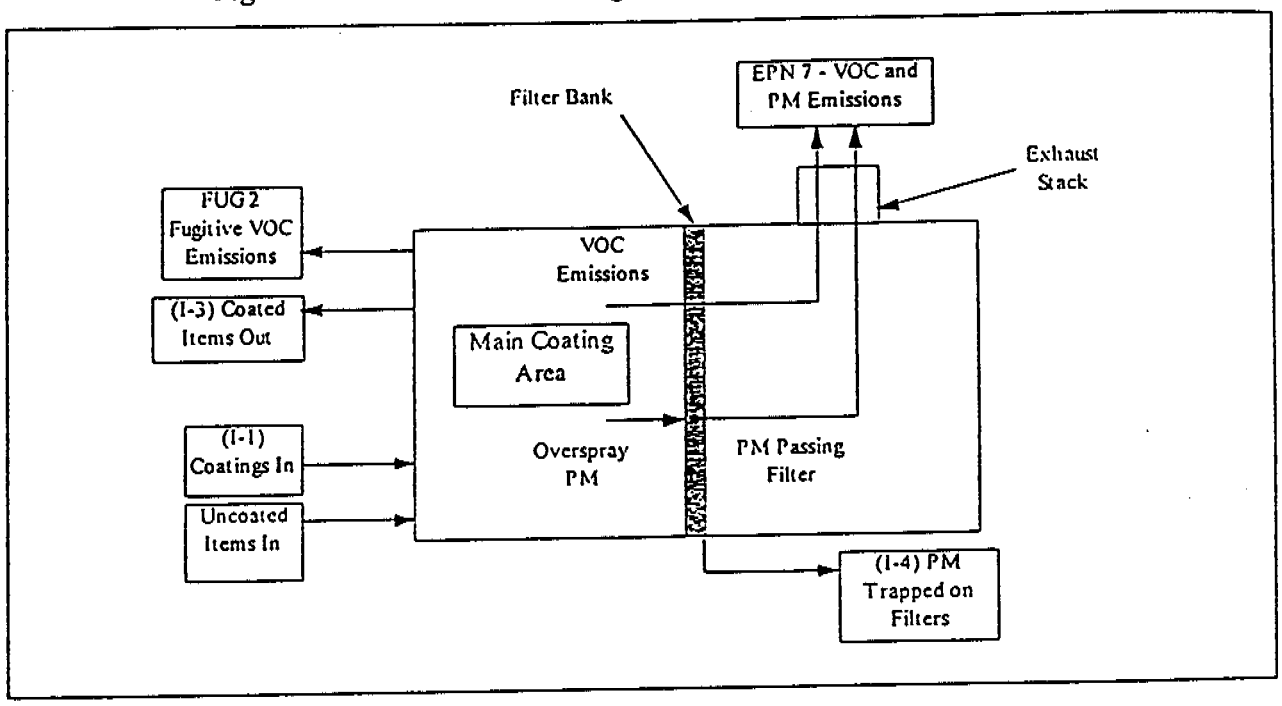
75(k&l) Outdoor or non-enclosed painting operations occurring at CSSA will comply with all requirements identified by Standard Exemption 75(k) and 75(l).

BUILDING 27 PAINT BOOTH

PROCESS FLOW DIAGRAMS

PROCESS FLOW DIAGRAMS

Figure IV.1. Process Flow Diagram for Paint Booth - Building 27



BUILDING 27 PAINT BOOTH

EMISSION CALCULATIONS

00406

EMISSION CALCULATIONS

Paint Booth - Building 27 (EPN 7 and FUG 2)

The paint booth at Building 27 is used for coating of typical office equipment, including desks, tables, bookshelves and cabinets. Emissions from this booth are calculated following the calculation guidance provided in the TNRCC Technical Guidance Package for Coatings Sources: Spray Painting and Dip Coating Operations. The equations presented in the Technical Package have not been reprinted in this application, but sample calculations and spreadsheets are presented to demonstrate each calculation procedure.

Product Usage Rates and MSDSs. The names and maximum usage rates for the respective products used in the booth are presented in Table V.-b4 in Attachment V.-b

The booth does employ the use of an automatic, air-atomized spray gun, and all coatings applied with the spray gun are considered to be applied at the maximum rate of transfer of the spray gun (2 gal/hour). All annual usage rates, as well as hourly usage rates for aerosol and brush- and roller-applied coatings, are predicted maximums based on historical hourly and annual usage rates for applicable coating at the booth. Historical usage rates were determined by the normal operator of the booth and are considered to be conservative.

Emissions Assumptions. A summary of maximum hourly emissions for each product used in the booth is presented in Table V.-b2 in Attachment V.-b. A summary of annual emissions for each product is presented in Table V.-b3 in Attachment V.-b. The worksheets shown in Table V.-b4 of Attachment V.-b detail the calculation of both bulk and speciated emissions for each material used in the booth. Each material is presented in a separate worksheet.

Maximum hourly emissions and maximum annual emissions are calculated from the maximum hourly usage rate and maximum annual usage rate, respectively, for each coating. Procedures follow the guidelines established in the aforementioned TNRCC technical guidance package. The following assumptions and general procedures are used during the calculation emissions:

(1) The solids content of each material is taken as the difference between the material density and the maximum VOC content of the material as listed on the product MSDS.

(2) For all brush- and roller-applied materials, the percent overspray was assumed to be zero (0), implying a 100 percent transfer efficiency.

(3) For coatings applied with the spray gun, the percent overspray is estimated at 55 percent using Table 232 from *Modern Pollution Control Technology, Volume 1.* This accounts for air atomized spraying on mostly flat surfaces with a some spraying of table leg type surfaces.

(4) For aerosol-applied materials, the percent overspray is estimated at 55 percent using Table 232 from *Modern Pollution Control Technology, Volume 1.* Aerosol spraying was assumed to represent the air atomization method of spraying.

(5) The filter efficiency of the filters in the booth is 99 percent.

(6) Booth flashoff for each coating is estimated using Figure 655 from *Modern Pollution Control Technology, Volume 1.* Each item coated is assumed to dry inside the booth for a minimum of 5 minutes before being removed. The enamels used in the booth were determined to have a booth flashoff of 40 percent using evaporation curve 5 in Figure 655 for alkyds. Lacquers used in the booth were determined to have a booth flashoff of 91 percent using evaporation curve 1 for lacquers. The latex used in the booth is conservatively assumed to have the same booth flashoff as the enamels. Where applicable, the amounts of thinners used to thin enamels and lacquers are assumed to have the same booth flashoff as the coating in which they are mixed.

(7) All PM emissions presented are assumed to be stack emissions and not fugitive emissions.

(8) The thinner amounts used strictly for cleanup are assumed to have booth flashoffs of 100 percent since all cleanup is conducted inside the booth with the fan on.

(9) The overall maximum hourly amount of emissions presented in Table VI.C-b2 reflect the largest single hourly emissions release from a discrete application (either coating or thinner cleanup)

(10) The total annual emissions presented in Table VI.C-b3 reflect the sum of annual emissions from all applications (both coating and thinner cleanup).

Sample Calculations. The following section presents sample calculations of emissions from the paint booth in Building 27. Calculations are performed using the assumptions previously stated. The coating chosen is Enamel 3 - White Alkyd Enamel and Paint Thinner. The worksheet for this coating in Table V.C-b4 presents the chemical data for this coating. The procedure for calculating emissions for the thinner portion of the enamel is identical to the procedure for the coating portion

Total Hourly VOC Emissions:

Total hourly VOC (lb/hr) = Max. Allowable Hourly Usage Rate (gal/hr) * Max. VOC content (lb/gal)

Total hourly VOC = 1.11 gal/hr * 3.03 lb/gal = 3.36 lb/hr

Hourly Fugitive VOC Emissions:

Hourly Fugitive VOC (lb/hr) = Total hourly VOC (lb/hr) * Transfer Efficiency * Fugitive Flashoff

Hourly Fugitive VOC = 3.36 lb/hr * 0.45 * 0.60 = 0.907 lb/hr

Hourly Booth VOC Emissions:

Hourly Booth VOC (lb/hr) = Total VOC (lb/hr) - Fugitive VOC (lb/hr)

Hourly Booth VOC = 3.36 lb/hr - 0.907 lb/hr = 2.45 lb/hr

Hourly PM Emissions:

Hourly PM (lb/hr) = Max. Allowable Usage Rate (gal/hr) * Solids Cont. (lb/gal) * (1 - Trans. Effic.) * (1 - Filter Efficiency)

Hourly PM = 1.11 gal/hr * 7.8 lb/gal * (1 - .45) * (1 - 0.99) = 0.048 lb/hr

SUPPLEMENTAL EMISSIONS DATA
FOR BUILDING 27 PAINT BOOTH

TABLE 18
BUILDING 27 SPRAY BOOTH

Point Number (from Flow Diagram) EPN 7 (Figure IV.1 Building 27 Paint Booth)	Annual Hours of Operation of this Booth 1,920 hours

EXHAUST GAS STREAM CHARACTERISTICS

Flow Rate (acfm)		Exhaust Stack			Building Height (ft)	Abatement Device Particulate Loading (lb/hr)	
Design Maximum	Average Expected	Temperature °F	Height (ft)	Diameter (ft)		Inlet	Outlet
	1,086	Ambient	30	3.5	20	99% eff. filters	

TYPE OF COATING AND MAXIMUM RATE OF USE

Type	Max. Rate of Use (lb/hr)	Max. Rate of Use (Tons/yr)	Volatile Portion (%weight)
Lacquer	See note (a)	See note (a)	See note (b)
Varnish			
Enamel	See note (a)	See note (a)	See note (b)
Metal Primer			
Metal Spray			
Resin			
Sealer			
Shellac			
Stain			
Zinc Chromate			
Epoxy			
Polyurethane			
Other	Latex - See note (a)	See note (a)	See note (b)

SOLVENT COMPOSITION AND RATE OF USE (INCLUDE THAT SUPPLIED WITH COATING)

Chemical Composition of Volatiles & wt.(%)	Max. Rate of Use (lb/hr)	Max Rate of Use (ton/yr)
See note (b)	See note (a)	See note (a)

TYPE AND COST OF ABATEMENT DEVICE

☐ Spray Chamber (water use gal/hr) _____ ☐ Water Curtain (water use gal/hr)

☒ Dry Filter Pads (No.) 18 (6) (Size) 20"x20"x1" (20"x25"x1") ☐ Other (Explain) _____

Capital Installed Cost $ N/A- Federal Facility Annual Operating Cost $N/A - Federal Facility

METHOD OF SPRAYING	DESCRIPTION OF ITEMS TO BE COATED (SHAPE AND SIZE)
☒ Air Atomization (HVLP) ☐ Airless Electrostatic ☐ Disc ☐ Airless ☐ Air-Atomized ☒ Other Aerosol/Brush/Roller	Items coated are primarily office furniture such as desks, tables, cabinets, bookshelves, etc. Items coated are the size and shape of typical office furniture. Coating is mostly flat-surface coating with some table/chair leg type coating.

(a) Hourly and annual usage rates for materials in this booth are shown in table V.-b1 in attachment V.-b. Densities and other specific information are presented in the worksheets of Table V.-b4.

(b) Volatile contents of each material are presented in the worksheets of Table V.-b4 in Attachment V.-b.

Table V.-b1. Summary of Hourly And Annual Emission Rates from Building 27 Paint Booth

	Total Hourly VOC Emissions	Hourly Fugitive VOC Emissions	Hourly Booth VOC Emissions	Hourly PM Emissions
Maximum Hourly Emissions (lb/hr):	5.38	3.08	5.16	0.108
Total Annual Emissions (ton/yr):	2.80	0.56	2.24	0.012

Table V.-b2. Summary of Hourly Emission Rates from Building 27 Paint Booth

Coating Number	Coating Name	Application Type	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
ENAMELS						
Enamel 1	Black Alkyd Enamel with Thinner 1	Spray Gun	5.14	1.39	3.75	0.033
		Brush/Roller	5.14	3.08	2.05	0.000
Enamel 2	Black Alkyd Enamel with Thinner 2	Spray Gun	5.12	1.38	3.74	0.033
		Brush/Roller	5.12	3.07	2.05	0.000
Enamel 3	White Alkyd Enamel with Thinner 1	Spray Gun	4.30	1.16	3.14	0.048
		Brush/Roller	4.30	2.58	1.72	0.000
Enamel 4	White Alkyd Enamel with Thinner 2	Spray Gun	4.29	1.16	3.13	0.048
		Brush/Roller	4.29	2.57	1.71	0.000
Enamel 5	Orange Alkyd Enamel with Thinner 1	Spray Gun	4.29	1.16	3.13	0.032
		Brush/Roller	4.29	2.58	1.72	0.000
Enamel 6	Orange Alkyd Enamel with Thinner 2	Spray Gun	4.28	1.15	3.12	0.032
		Brush/Roller	4.28	2.57	1.71	0.000
Enamel 7	Blue Alkyd Enamel with Thinner 1	Spray Gun	4.21	1.14	3.08	0.038
		Brush/Roller	4.21	2.53	1.69	0.000
Enamel 8	Blue Alkyd Enamel with Thinner 2	Spray Gun	4.20	1.13	3.07	0.038
		Brush/Roller	4.20	2.52	1.68	0.000
Enamel 9	Yellow Alkyd Enamel with Thinner 1	Spray Gun	4.37	1.18	3.19	0.034
		Brush/Roller	4.37	2.62	1.75	0.000
Enamel 10	Yellow Alkyd Enamel with Thinner 2	Spray Gun	4.35	1.18	3.18	0.034
		Brush/Roller	4.35	2.61	1.74	0.000
Enamel 11	Gray Alkyd Enamel with Thinner 1	Spray Gun	4.28	1.16	3.13	0.038
		Brush/Roller	4.28	2.57	1.71	0.000
Enamel 12	Gray Alkyd Enamel with Thinner 2	Spray Gun	4.27	1.15	3.11	0.038
		Brush/Roller	4.27	2.56	1.71	0.000
LATEX						
Latex 1	Tinting White Latex	Spray Gun	2.52	0.68	1.84	0.108
		Brush Roller	3.78	2.27	1.51	0.000
LACQUERS						
Lacquer 1	Lusterless Lacquer with Thinner 3	Spray Gun	5.29	0.21	5.07	0.019
		Brush/Roller	5.29	0.48	4.82	0.000
Lacquer 2	Black Aerosol Lacquer	Aerosol Can	5.23	0.21	5.02	0.011
Lacquer 3	Orange Aerosol Lacquer	Aerosol Can	5.28	0.21	5.07	0.014
Lacquer 4	Fluor. Orange Aerosol Lacquer	Aerosol Can	5.38	0.22	5.16	0.014
Lacquer 5	Yellow Aerosol Lacquer	Aerosol Can	5.36	0.22	5.14	0.014
Lacquer 6	Green Aerosol Lacquer	Aerosol Can	5.25	0.21	5.04	0.013
Lacquer 7	Olive Green Aerosol Lacquer	Aerosol Can	5.32	0.22	5.10	0.014
Lacquer 8	Blue Aerosol Lacquer	Aerosol Can	5.33	0.22	5.11	0.014
THINNERS						
Thinner 1	Paint Thinner	Cleanup Only	5.04	0.00	5.04	0.000
Thinner 2	Enamel Thinner	Cleanup Only	4.95	0.00	4.95	0.000
Thinner 3	Dope and Lacquer Thinner	Cleanup Only	5.15	0.00	5.15	0.000
		Maximum Hourly Emissions (lb/hr)*:	5.38	3.08	5.16	0.11

* Maximum hourly emissions reflect the maximum amount of emissions from any single coating or cleaning application.

Table V.-b3. Summary of Annual Emission Rates from Building 27 Paint Booth*

Coating Number	Coating Name	Application Type	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
ENAMELS						
Enamel 1	Black Alkyd Enamel with Thinner 1	Spray Gun	0.17	0.05	0.13	0.001
		Brush/Roller	0.07	0.04	0.03	0.000
Enamel 2	Black Alkyd Enamel with Thinner 2	Spray Gun	0.17	0.05	0.13	0.001
		Brush/Roller	0.07	0.04	0.03	0.000
Enamel 3	White Alkyd Enamel with Thinner 1	Spray Gun	0.15	0.04	0.11	0.002
		Brush/Roller	0.06	0.03	0.02	0.000
Enamel 4	White Alkyd Enamel with Thinner 2	Spray Gun	0.14	0.04	0.11	0.002
		Brush/Roller	0.06	0.03	0.02	0.000
Enamel 5	Orange Alkyd Enamel with Thinner 1	Spray Gun	0.14	0.04	0.11	0.001
		Brush/Roller	0.06	0.03	0.02	0.000
Enamel 6	Orange Alkyd Enamel with Thinner 2	Spray Gun	0.14	0.04	0.11	0.001
		Brush/Roller	0.06	0.03	0.02	0.000
Enamel 7	Blue Alkyd Enamel with Thinner 1	Spray Gun	0.14	0.04	0.10	0.001
		Brush/Roller	0.06	0.03	0.02	0.000
Enamel 8	Blue Alkyd Enamel with Thinner 2	Spray Gun	0.14	0.04	0.10	0.001
		Brush/Roller	0.06	0.03	0.02	0.000
Enamel 9	Yellow Alkyd Enamel with Thinner 1	Spray Gun	0.15	0.04	0.11	0.001
		Brush/Roller	0.06	0.04	0.02	0.000
Enamel 10	Yellow Alkyd Enamel with Thinner 2	Spray Gun	0.15	0.04	0.11	0.001
		Brush/Roller	0.06	0.04	0.02	0.000
Enamel 11	Gray Alkyd Enamel with Thinner 1	Spray Gun	0.14	0.04	0.11	0.001
		Brush/Roller	0.06	0.03	0.02	0.000
Enamel 12	Gray Alkyd Enamel with Thinner 2	Spray Gun	0.14	0.04	0.10	0.001
		Brush/Roller	0.06	0.03	0.02	0.000
LATEX						
Latex 1	Tinting White Latex	Spray Gun	0.08	0.02	0.06	0.003
		Brush Roller	0.08	0.05	0.03	0.000
LACQUERS						
Lacquer 1	Lusterless Lacquer with Thinner 3	Spray Gun	0.19	0.01	0.19	0.001
		Brush/Roller	0.08	0.01	0.07	0.000
Lacquer 2	Black Aerosol Lacquer	Aerosol Can	0.05	0.00	0.05	0.000
Lacquer 3	Orange Aerosol Lacquer	Aerosol Can	0.05	0.00	0.05	0.000
Lacquer 4	Fluor. Orange Aerosol Lacquer	Aerosol Can	0.05	0.00	0.05	0.000
Lacquer 5	Yellow Aerosol Lacquer	Aerosol Can	0.05	0.00	0.05	0.000
Lacquer 6	Green Aerosol Lacquer	Aerosol Can	0.05	0.00	0.05	0.000
Lacquer 7	Olive Green Aerosol Lacquer	Aerosol Can	0.05	0.00	0.05	0.000
Lacquer 8	Blue Aerosol Lacquer	Aerosol Can	0.05	0.00	0.05	0.000
THINNERS						
Thinner 1	Paint Thinner	Cleanup	0.21	0.00	0.21	0.000
Thinner 2	Enamel Thinner	Cleanup	0.46	0.00	0.46	0.000
Thinner 3	Dope and Lacquer Thinner	Cleanup	0.10	0.00	0.10	0.000
		Total Annual Emissions (ton/yr):	2.80	0.56	2.24	0.012

* Note that for enamels, each type of enamel can be used with either Thinner 1 or Thinner 2. Therefore, annual emissions consider the enamel/thinner combination (for each enamel) which results in the highest emissions. For example, Enamel 3 (White Alkyd Enamel with Thinner 1) has higher total emissions than Enamel 4 (White Alkyd Enamel with Thinner 2). Therefore, Enamel 3 is conservatively considered in the total annual emissions.

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 1 - Black Alkyd Enamel with Thinner 1 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Black Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-297-0591	None
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.110	0.806
Density (lb/gal):	9.25	6.72
Max. VOC Content (lb/gal):	3.78	6.72
Solids Content (lb/gal):	5.47	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.27	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.06	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	4.20	1.13	3.06	0.033
Thinner:	0.94	0.25	0.69	0.000
Total:	5.14	1.39	3.75	0.033

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.14	0.04	0.10	0.001
Thinner:	0.03	0.01	0.02	0.000
Total:	0.17	0.05	0.13	0.001

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 1 - Black Alkyd Enamel with Thinner 1 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Black Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-297-0591	None
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.110	0.806
Density (lb/gal):	9.25	6.72
Max. VOC Content (lb/gal):	3.78	6.72
Solids Content (lb/gal):	5.47	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.27	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	4.20	2.52	1.68	0.000
Thinner:	0.94	0.56	0.38	0.000
Total:	5.14	3.08	2.05	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.06	0.03	0.02	0.000
Thinner:	0.01	0.01	0.01	0.000
Total:	0.07	0.04	0.03	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 2 - Black Alkyd Enamel with Thinner 2 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Black Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-297-0591	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.110	0.792
Density (lb/gal):	9.25	6.60
Max. VOC Content (lb/gal):	3.78	6.60
Solids Content (lb/gal):	5.47	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.27	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.06	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	4.20	1.13	3.06	0.033
Thinner:	0.92	0.25	0.67	0.000
Total:	5.12	1.38	3.74	0.033

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.14	0.04	0.10	0.001
Thinner:	0.03	0.01	0.02	0.000
Total:	0.17	0.05	0.13	0.001

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 2 - Black Alkyd Enamel with Thinner 2 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Black Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-297-0591	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.110	0.792
Density (lb/gal):	9.25	6.60
Max. VOC Content (lb/gal):	3.78	6.60
Solids Content (lb/gal):	5.47	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.27	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	4.20	2.52	1.68	0.000
Thinner:	0.92	0.55	0.37	0.000
Total:	5.12	3.07	2.05	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.06	0.03	0.02	0.000
Thinner:	0.01	0.01	0.00	0.000
Total:	0.07	0.04	0.03	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 3 - White Alkyd Enamel with Thinner 1 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	White Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-664-4761	None
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.300	0.806
Density (lb/gal):	10.83	6.72
Max. VOC Content (lb/gal):	3.03	6.72
Solids Content (lb/gal):	7.80	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	12.03	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.07	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.36	0.91	2.46	0.048
Thinner:	0.94	0.25	0.69	0.000
Total:	4.30	1.16	3.14	0.048

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.11	0.03	0.08	0.002
Thinner:	0.03	0.01	0.02	0.000
Total:	0.15	0.04	0.11	0.002

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 3 - White Alkyd Enamel with Thinner 1 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	White Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-664-4761	None
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.300	0.806
Density (lb/gal):	10.83	6.72
Max. VOC Content (lb/gal):	3.03	6.72
Solids Content (lb/gal):	7.80	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	12.03	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.36	2.02	1.35	0.000
Thinner:	0.94	0.56	0.38	0.000
Total:	4.30	2.58	1.72	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.05	0.03	0.02	0.000
Thinner:	0.01	0.01	0.01	0.000
Total:	0.06	0.03	0.02	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 4 - White Alkyd Enamel with Thinner 2 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	White Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-664-4761	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.76	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.300	0.792
Density (lb/gal):	10.83	6.60
Max. VOC Content (lb/gal):	3.03	6.60
Solids Content (lb/gal):	7.80	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	12.03	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.07	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.36	0.91	2.46	0.048
Thinner:	0.92	0.25	0.67	0.000
Total:	4.29	1.16	3.13	0.048

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.11	0.03	0.08	0.002
Thinner:	0.03	0.01	0.02	0.000
Total:	0.14	0.04	0.11	0.002

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 4 - White Alkyd Enamel with Thinner 2 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	White Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-664-4761	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.300	0.792
Density (lb/gal):	10.83	6.60
Max. VOC Content (lb/gal):	3.03	6.60
Solids Content (lb/gal):	7.80	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	12.03	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.36	2.02	1.35	0.000
Thinner:	0.92	0.55	0.37	0.000
Total:	4.29	2.57	1.71	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.05	0.03	0.02	0.000
Thinner:	0.01	0.01	0.00	0.000
Total:	0.06	0.03	0.02	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 5 - Orange Alkyd Enamel with Thinner 1 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Orange Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-527-3201	None
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.000	0.806
Density (lb/gal):	8.33	6.72
Max. VOC Content (lb/gal):	3.02	6.72
Solids Content (lb/gal):	5.31	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	9.25	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.05	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.35	0.91	2.45	0.032
Thinner:	0.94	0.25	0.69	0.000
Total:	4.29	1.16	3.13	0.032

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.11	0.03	0.08	0.001
Thinner:	0.03	0.01	0.02	0.000
Total:	0.14	0.04	0.11	0.001

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 5 - Orange Alkyd Enamel with Thinner 1 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Orange Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-527-3201	None
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.000	0.806
Density (lb/gal):	8.33	6.72
Max. VOC Content (lb/gal):	3.02	6.72
Solids Content (lb/gal):	5.31	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	9.25	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.35	2.01	1.34	0.000
Thinner:	0.94	0.56	0.38	0.000
Total:	4.29	2.58	1.72	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.05	0.03	0.02	0.000
Thinner:	0.01	0.01	0.01	0.000
Total:	0.06	0.03	0.02	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 6 - Orange Alkyd Enamel with Thinner 2 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Orange Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-527-3201	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.000	0.792
Density (lb/gal):	8.33	6.60
Max. VOC Content (lb/gal):	3.02	6.60
Solids Content (lb/gal):	5.31	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	9.25	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.05	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.35	0.91	2.45	0.032
Thinner:	0.92	0.25	0.67	0.000
Total:	4.28	1.15	3.12	0.032

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.11	0.03	0.08	0.001
Thinner:	0.03	0.01	0.02	0.000
Total:	0.14	0.04	0.11	0.001

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 6 - Orange Alkyd Enamel with Thinner 2 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Orange Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-527-3201	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.000	0.792
Density (lb/gal):	8.33	6.60
Max. VOC Content (lb/gal):	3.02	6.60
Solids Content (lb/gal):	5.31	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	9.25	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.35	2.01	1.34	0.000
Thinner:	0.92	0.55	0.37	0.000
Total:	4.28	2.57	1.71	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.05	0.03	0.02	0.000
Thinner:	0.01	0.01	0.00	0.000
Total:	0.06	0.03	0.02	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 7 - Blue Alkyd Enamel with Thinner 1 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Blue Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-598-5929	None
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.100	0.806
Density (lb/gal):	9.17	6.72
Max. VOC Content (lb/gal):	2.95	6.72
Solids Content (lb/gal):	6.22	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.18	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.06	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.27	0.88	2.39	0.038
Thinner:	0.94	0.25	0.69	0.000
Total:	4.21	1.14	3.08	0.038

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.11	0.03	0.08	0.001
Thinner:	0.03	0.01	0.02	0.000
Total:	0.14	0.04	0.10	0.001

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 7 - Blue Alkyd Enamel with Thinner 1 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Blue Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-598-5929	None
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.100	0.806
Density (lb/gal):	9.17	6.72
Max. VOC Content (lb/gal):	2.95	6.72
Solids Content (lb/gal):	6.22	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.18	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.27	1.96	1.31	0.000
Thinner:	0.94	0.56	0.38	0.000
Total:	4.21	2.53	1.69	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.04	0.03	0.02	0.000
Thinner:	0.01	0.01	0.01	0.000
Total:	0.06	0.03	0.02	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 8 - Blue Alkyd Enamel with Thinner 2 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Blue Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-598-5929	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.100	0.792
Density (lb/gal):	9.17	6.60
Max. VOC Content (lb/gal):	2.95	6.60
Solids Content (lb/gal):	6.22	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.18	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.06	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.27	0.88	2.39	0.038
Thinner:	0.92	0.25	0.67	0.000
Total:	4.20	1.13	3.07	0.038

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.11	0.03	0.08	0.001
Thinner:	0.03	0.01	0.02	0.000
Total:	0.14	0.04	0.10	0.001

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 8 - Blue Alkyd Enamel with Thinner 2 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Blue Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-598-5929	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.100	0.792
Density (lb/gal):	9.17	6.60
Max. VOC Content (lb/gal):	2.95	6.60
Solids Content (lb/gal):	6.22	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.18	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.27	1.96	1.31	0.000
Thinner:	0.92	0.55	0.37	0.000
Total:	4.20	2.52	1.68	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.04	0.03	0.02	0.000
Thinner:	0.01	0.01	0.00	0.000
Total:	0.06	0.03	0.02	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 9 - Yellow Alkyd Enamel with Thinner 1 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Yellow Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-527-2045	None
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.046	0.806
Density (lb/gal):	8.72	6.72
Max. VOC Content (lb/gal):	3.09	6.72
Solids Content (lb/gal):	5.63	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	9.68	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.05	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.43	0.93	2.50	0.034
Thinner:	0.94	0.25	0.69	0.000
Total:	4.37	1.18	3.19	0.034

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.12	0.03	0.08	0.001
Thinner:	0.03	0.01	0.02	0.000
Total:	0.15	0.04	0.11	0.001

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 9 - Yellow Alkyd Enamel with Thinner 1 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Yellow Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-527-2045	None
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.046	0.806
Density (lb/gal):	8.72	6.72
Max. VOC Content (lb/gal):	3.09	6.72
Solids Content (lb/gal):	5.63	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	9.68	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.43	2.06	1.37	0.000
Thinner:	0.94	0.56	0.38	0.000
Total:	4.37	2.62	1.75	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.05	0.03	0.02	0.000
Thinner:	0.01	0.01	0.01	0.000
Total:	0.06	0.04	0.02	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 10 - Yellow Alkyd Enamel with Thinner 2 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Yellow Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-527-2045	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.046	0.792
Density (lb/gal):	8.72	6.60
Max. VOC Content (lb/gal):	3.09	6.60
Solids Content (lb/gal):	5.63	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	9.68	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.05	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.43	0.93	2.50	0.034
Thinner:	0.92	0.25	0.67	0.000
Total:	4.35	1.18	3.18	0.034

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.12	0.03	0.08	0.001
Thinner:	0.03	0.01	0.02	0.000
Total:	0.15	0.04	0.11	0.001

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Enamel 10 - Yellow Alkyd Enamel with Thinner 2 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Yellow Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-527-2045	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.046	0.792
Density (lb/gal):	8.72	6.60
Max. VOC Content (lb/gal):	3.09	6.60
Solids Content (lb/gal):	5.63	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	9.68	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.43	2.06	1.37	0.000
Thinner:	0.92	0.55	0.37	0.000
Total:	4.35	2.61	1.74	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.05	0.03	0.02	0.000
Thinner:	0.01	0.01	0.00	0.000
Total:	0.06	0.04	0.02	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 11 - Gray Alkyd Enamel with Thinner 1 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Gray Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-266-7731	None
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.100	0.806
Density (lb/gal):	9.17	6.72
Max. VOC Content (lb/gal):	3.01	6.72
Solids Content (lb/gal):	6.16	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.18	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.06	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.34	0.90	2.44	0.038
Thinner:	0.94	0.25	0.69	0.000
Total:	4.28	1.16	3.13	0.038

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.11	0.03	0.08	0.001
Thinner:	0.03	0.01	0.02	0.000
Total:	0.14	0.04	0.11	0.001

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 11 - Gray Alkyd Enamel with Thinner 1 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Gray Alkyd Enamel	Paint Thinner (Thinner 1)
National Stock Number:	8010-00-286-7731	None
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.100	0.806
Density (lb/gal):	9.17	6.72
Max. VOC Content (lb/gal):	3.01	6.72
Solids Content (lb/gal):	6.16	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.16	0.94
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.34	2.00	1.34	0.000
Thinner:	0.94	0.56	0.38	0.000
Total:	4.28	2.57	1.71	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.05	0.03	0.02	0.000
Thinner:	0.01	0.01	0.01	0.000
Total:	0.06	0.03	0.02	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 12 - Gray Alkyd Enamel with Thinner 2 - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	84.38
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Gray Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-286-7731	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	75.00	9.38
Specific Gravity:	1.100	0.792
Density (lb/gal):	9.17	6.60
Max. VOC Content (lb/gal):	3.01	6.60
Solids Content (lb/gal):	6.16	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.18	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.06	0.01

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.34	0.90	2.44	0.038
Thinner:	0.92	0.25	0.67	0.000
Total:	4.27	1.15	3.11	0.038

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.11	0.03	0.08	0.001
Thinner:	0.03	0.01	0.02	0.000
Total:	0.14	0.04	0.10	0.001

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Enamel 12 - Gray Alkyd Enamel with Thinner 2 - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	1.25
Total Max. Hourly Application Rate (gal/hr):	1.13
Total Max. Annual Application Rate (gal/yr):	33.75
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Gray Alkyd Enamel	Enamel Thinner (Thinner 2)
National Stock Number:	8010-00-286-7731	8010-00-558-7027
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	1.11	0.14
Annual Use Rate (gal/yr):	30.00	3.75
Specific Gravity:	1.100	0.792
Density (lb/gal):	9.17	6.60
Max. VOC Content (lb/gal):	3.01	6.60
Solids Content (lb/gal):	6.16	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	10.18	0.92
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.34	2.00	1.34	0.000
Thinner:	0.92	0.55	0.37	0.000
Total:	4.27	2.56	1.71	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.05	0.03	0.02	0.000
Thinner:	0.01	0.01	0.00	0.000
Total:	0.06	0.03	0.02	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Lacquer 1 - Lustreless Lacquer with Thinner 3 - Spray Gun Application

Application Type:	Spray Gun
Max. Allowable Application Rate (gal/hr)	1.00
Max. Hourly Application Rate (gal/hr):	2.00
Maximum Annual Application Rate (gal/yr):	73.13
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Lustreless Lacquer	Lacquer Thinner
National Stock Number:	8010-00-111-8353	8010-00-160-5788
Max. Hourly Usage Rate (gal/hr):	1.78	0.22
Max. Allowable Usage Rate (gal/hr)	0.89	0.11
Annual Use Rate (gal/yr):	65.00	8.13
Specific Gravity:	1.080	0.824
Density (lb/gal):	9.00	6.87
Max. VOC Content (lb/gal):	5.10	6.87
Solids Content (lb/gal):	3.90	0.00
Percent Overspray (%):	55.00	55.00
Transfer Efficiency (%):	45.00	45.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	91.00	91.00
Fugitive Flashoff (%):	9.00	9.00
Generic Short Term VOC Rate (wt% lb/hr):	8.00	0.76
Generic Short Term PM Rate (wt% lb/hr):	0.04	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	4.53	0.18	4.35	0.02
Thinner:	0.76	0.03	0.72	0.00
Total:	5.29	0.21	5.07	0.019

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.17	0.01	0.16	0.001
Thinner:	0.03	0.00	0.03	0.000
Total:	0.19	0.01	0.19	0.001

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Lacquer 1 - Lustreless Lacquer with Thinner 3 - Brush/Roller Application

Application Type:	Brush/Roller
Max. Allowable Application Rate (gal/hr)	1.00
Max. Hourly Application Rate (gal/hr):	1.13
Maximum Annual Application Rate (gal/yr):	29.25
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Lustreless Lacquer	Lacquer Thinner
National Stock Number:	8010-00-111-8353	8010-00-160-5788
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr)	0.89	0.11
Annual Use Rate (gal/yr):	26.00	3.25
Specific Gravity:	1.080	0.824
Density (lb/gal):	9.00	6.87
Max. VOC Content (lb/gal):	5.10	6.87
Solids Content (lb/gal):	3.90	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	91.00	91.00
Fugitive Flashoff (%):	9.00	9.00
Generic Short Term VOC Rate (wt% lb/hr):	8.01	0.76
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	4.54	0.41	4.13	0.00
Thinner:	0.76	0.07	0.69	0.00
Total:	5.29	0.48	4.82	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.07	0.01	0.06	0.000
Thinner:	0.01	0.00	0.01	0.000
Total:	0.08	0.01	0.07	0.000

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PERM[illegible]

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Lacquer 2 - Black Gloss Aerosol Lacquer - Aerosol Application

Name:	Black Gloss Aerosol Lacquer
National Stock Number:	8010-00-290-6984
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr):	0.40
Max. Allowable Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	18.75
Specific Gravity:	0.867
Density (lb/gal):	7.23
Max. VOC Content (lb/gal):	5.23
Solids Content (lb/gal):	2.00
Percent Overspray (%):	55.00
Transfer Efficiency (%):	45.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	7.23
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.23	0.21	5.02	0.011
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ANNUAL EMISSIONS:	**Total Annual VOC Emissions (ton/yr)**	**Annual Fugitive VOC Emissions (ton/yr)**	**Annual Booth VOC Emissions (ton/yr)**	**Annual PM Emissions (ton/yr)**
Coating:	0.05	0.00	0.05	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Lacquer 3 - Orange Aerosol Lacquer - Aerosol Application

Name:	Orange Aerosol Lacquer
National Stock Number:	8010-00-721-9479
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr)	0.40
Max. Allowable Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	18.75
Specific Gravity:	0.933
Density (lb/gal):	7.78
Max. VOC Content (lb/gal):	5.28
Solids Content (lb/gal):	2.50
Percent Overspray (%):	55.00
Transfer Efficiency (%):	45.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	7.78
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.28	0.21	5.07	0.014

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.05	0.00	0.05	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Lacquer 4 - Fluorescent Orange Aerosol Lacquer - Aerosol Application

Name:	Fluorescent Orange Aerosol Lacquer
National Stock Number:	8010-00-958-8148
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr):	0.40
Max. Allowable Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	18.75
Specific Gravity:	0.961
Density (lb/gal):	8.01
Max. VOC Content (lb/gal):	5.38
Solids Content (lb/gal):	2.63
Percent Overspray (%):	55.00
Transfer Efficiency (%):	45.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	8.01
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.38	0.22	5.16	0.014
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ANNUAL EMISSIONS:	**Total Annual VOC Emissions (ton/yr)**	**Annual Fugitive VOC Emissions (ton/yr)**	**Annual Booth VOC Emissions (ton/yr)**	**Annual PM Emissions (ton/yr)**
Coating:	0.05	0.00	0.05	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Lacquer 5 - Yellow Aerosol Lacquer - Aerosol Application

Name:	Yellow Aerosol Lacquer
National Stock Number:	8010-00-721-9744
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr):	0.40
Max. Allowable Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	18.75
Specific Gravity:	0.956
Density (lb/gal):	7.97
Max. VOC Content (lb/gal):	5.36
Solids Content (lb/gal):	2.61
Percent Overspray (%):	55.00
Transfer Efficiency (%):	45.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	7.97
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.36	0.22	5.14	0.014
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ANNUAL EMISSIONS:	**Total Annual VOC Emissions (ton/yr)**	**Annual Fugitive VOC Emissions (ton/yr)**	**Annual Booth VOC Emissions (ton/yr)**	**Annual PM Emissions (ton/yr)**
Coating:	0.05	0.00	0.05	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Lacquer 6 - Green Aerosol Lacquer - Aerosol Application

Name:	Green Aerosol Lacquer
National Stock Number:	8010-00-141-2951
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr):	0.40
Max. Allowable Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	18.75
Specific Gravity:	0.924
Density (lb/gal):	7.70
Max. VOC Content (lb/gal):	5.25
Solids Content (lb/gal):	2.45
Percent Overspray (%):	55.00
Transfer Efficiency (%):	45.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	7.70
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.25	0.21	5.04	0.013
[redacted]				
ANNUAL EMISSIONS:	**Total Annual VOC Emissions (ton/yr)**	**Annual Fugitive VOC Emissions (ton/yr)**	**Annual Booth VOC Emissions (ton/yr)**	**Annual PM Emissions (ton/yr)**
Coating:	0.05	0.00	0.05	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Lacquer 7 - Olive Green Aerosol Lacquer - Aerosol Application

Name:	Olive Green Aerosol Lacquer
National Stock Number:	8010-00-584-3149
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr):	0.40
Max. Allowable Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	18.75
Specific Gravity:	0.943
Density (lb/gal):	7.86
Max. VOC Content (lb/gal):	5.32
Solids Content (lb/gal):	2.54
Percent Overspray (%):	55.00
Transfer Efficiency (%):	45.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	7.86
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.32	0.22	5.10	0.014
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.05	0.00	0.05	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Lacquer 8 - Blue Aerosol Lacquer - Aerosol Application

Name:	Blue Aerosol Lacquer
National Stock Number:	8010-00-721-9746
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr):	0.40
Max. Allowable Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	18.75
Specific Gravity:	0.945
Density (lb/gal):	7.88
Max. VOC Content (lb/gal):	5.33
Solids Content (lb/gal):	2.55
Percent Overspray (%):	55.00
Transfer Efficiency (%):	45.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	7.88
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.33	0.22	5.11	0.014
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ANNUAL EMISSIONS:	**Total Annual VOC Emissions (ton/yr)**	**Annual Fugitive VOC Emissions (ton/yr)**	**Annual Booth VOC Emissions (ton/yr)**	**Annual PM Emissions (ton/yr)**
Coating:	0.05	0.00	0.05	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Latex 1 - Flat Tinting White Latex - Spray Gun Application

Application Type:	Spray Gun
Total Max. Allowable Application Rate (gal/hr)	2.00
Total Max. Hourly Application Rate (gal/hr):	2.00
Total Max. Annual Application Rate (gal/yr):	120.00
Mix Ratio (Thinner:Coating):	Not thinned

Name:	Flat Tinting White Latex
National Stock Number:	8010-00-F00-7172
Max. Hourly Usage Rate (gal/hr):	2.00
Max. Allowable Usage Rate (gal/hr)	2.00
Annual Use Rate (gal/yr):	120.00
Specific Gravity:	1.327
Density (lb/gal):	11.06
Max. VOC Content (lb/gal):	1.26
Solids Content (lb/gal):	9.80
Percent Overspray (%):	55.00
Transfer Efficiency (%):	45.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	40.00
Fugitive Flashoff (%):	60.00
Generic Short Term VOC Rate (wt% lb/hr):	22.12
Generic Short Term PM Rate (wt% lb/hr):	0.12

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	2.52	0.68	1.84	0.108

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.08	0.02	0.06	0.003

Table V.-b4. Emissions From Building 27 Paint Booth Materials

Latex 1 - Flat Tinting White Latex - Brush/Roller Application

Application Type:	Brush/Roller
Total Max. Allowable Application Rate (gal/hr)	3.00
Total Max. Hourly Application Rate (gal/hr):	3.00
Total Max. Annual Application Rate (gal/yr):	130.00
Mix Ratio (Thinner:Coating):	Not thinned

Name:	Flat Tinting White Latex
National Stock Number:	8010-00-F00-7172
Max. Hourly Usage Rate (gal/hr):	3.00
Max. Allowable Usage Rate (gal/hr)	3.00
Annual Use Rate (gal/yr):	130.00
Specific Gravity:	1.327
Density (lb/gal):	11.06
Max. VOC Content (lb/gal):	1.26
Solids Content (lb/gal):	9.80
Percent Overspray (%):	0.00
Transfer Efficiency (%):	100.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	40.00
Fugitive Flashoff (%):	60.00
Generic Short Term VOC Rate (wt% lb/hr):	33.18
Generic Short Term PM Rate (wt% lb/hr):	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	3.78	2.27	1.51	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.08	0.05	0.03	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Thinner 1 - Paint Thinner - Cleanup Only

Name:	Paint Thinner	
National Stock Number:	None (Manufacturer is Startex)	
Application Type:	Cleanup of Brushes/Rollers/Spray Gun*	
Max. Hourly Usage Rate (gal/hr):	2.65	
Max. Allowable Usage Rate (gal/hr)	0.75	
Annual Use Rate (gal/yr):	62.00	
Specific Gravity:	0.806	
Density (lb/gal):	6.72	
Max. VOC Content (lb/gal):	6.72	
Solids Content (lb/gal):	0.00	
Percent Overspray (%):	0.00	
Transfer Efficiency (%):	100.00	
Filter Efficiency (%):	99.00	
Booth Flashoff (%):	100.00	All cleaning is done within booth
Fugitive Flashoff (%):	0.00	
Generic Short Term VOC Rate (wt% lb/hr):	5.04	
Generic Short Term PM Rate (wt% lb/hr):	0.00	

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Thinner:	5.04	0.00	5.04	0.00

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Thinner:	0.21	0.00	0.21	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Thinner 2 - Enamel Thinner - Cleanup Only

Name:	Sythetic Resin Enamel Thinner	
National Stock Number:	8010-00-160-5788	
Application Type:	Cleanup of Brushes/ Rollers/Spray Gun*	
Max. Hourly Usage Rate (gal/hr):	1.65	
Max. Allowable Usage Rate (gal/hr)	0.75	
Annual Use Rate (gal/yr):	139.00	
Specific Gravity:	0.792	
Density (lb/gal):	6.60	
Max. VOC Content (lb/gal):	6.60	
Solids Content (lb/gal):	0.00	
Percent Overspray (%):	0.00	
Transfer Efficiency (%):	100.00	
Filter Efficiency (%):	99.00	
Booth Flashoff (%):	100.00	All cleaning is done within booth
Fugitive Flashoff (%):	0.00	
Generic Short Term VOC Rate (wt% lb/hr):	4.95	
Generic Short Term PM Rate (wt% lb/hr):	0.00	

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Thinner:	4.95	0.00	4.95	0.00

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Thinner:	0.46	0.00	0.46	0.000

Table V.-b4. Emissions From Building 27 Paint Booth Materials
Thinner 3 - Dope and Lacquer Thinner - Cleanup Only

Name:	Dope and Lacquer Thinner	
National Stock Number:	8010-00-160-5788	
Application Type:	Cleanup of brushes/rollers/spray gun*	
Max. Hourly Usage Rate (gal/hr):	1.65	
Max. Allowable Usage Rate (gal/hr)	0.75	
Annual Use Rate (gal/yr):	29.00	
Specific Gravity:	0.824	
Density (lb/gal):	6.87	
Max. VOC Content (lb/gal):	6.87	
Solids Content (lb/gal):	0.00	
Percent Overspray (%):	0.00	
Transfer Efficiency (%):	100.00	
Filter Efficiency (%):	99.00	
Booth Flashoff (%):	100.00	All cleaning is done within booth
Fugitive Flashoff (%):	0.00	
Generic Short Term VOC Rate (wt% lb/hr):	5.15	
Generic Short Term PM Rate (wt% lb/hr):	0.00	

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Thinner:	5.15	0.00	5.15	0.00
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Thinner:	0.10	0.00	0.10	0.000

***GENERAL PERMIT INFORMATION
PERMIT: 32407 ENGR: BULLARD, KAREN M./ GROUP: COAT ID:BG0841
ISSUED TO: DEPARTMENT OF THE ARMY, CAMP STANLEY
UNIT NAME: BLDG. 200 PAINT BOOTH
OPERATING SCHEDULE: 24.0 HRS/DAY 7 DAYS/WK 52 WKS/YR
LAT: 29-40-35 LONG: 098-37-52 REGION: 13 COUNTY: BEXAR
NEAR CITY: BOERNE LOC: 25800 RALPH FAIR RD

***PERMIT/SITE CONTACT INFORMATION:
PERSON: LT. DEAN C. SCHMELLING ADDR1: 25800 RALPH FAIR ROAD
TITLE: POST COMMANDER ADDR2: BOERNE
CITY: BOERNE STATE: TX ZIP: 78006 PHONE: (210)221-7461

** CONSTRUCTION **		** OPERATING **		** CONTINUANCE **	
TYPE APPL(C,S,X):	(X)	OPERATION START :		NOTICE MAILED :	
APPL RECD :	04-17-96	OPER APPL RECD :		APPL RECD :	
DEFIC LTR SNT :		OPER APPL CMPLT :		DEFIC LTR SNT :	
SUPP INFO REQ :		DISP(I,D): ( )		SUPP INFO REQ :	
SUPP INFO RECD :		OPR TYPE(R,S) : ( )		SUPP INFO RECD :	
APPL CMPLT :		**********		APPL CMPLT :	
COMP LTR SNT :		* *		COMP LTR SNT :	
PUB NTC SNT :		* I= ISSUED D=DENIED *		PUB NTC SNT :	
PUB NTC PUB :		* E=EXPIRED *		PUB NTC PUB :	
PUB HEAR (R,H) :	( )	* C=CNST S=SPECIAL *		PUB HEAR(R,H) :	( )
CNST TYPE(C,X,S):	(X)	* X=EXEMPT R=OPER *		DISP(I,D,E):( ) :	
DISP (I) :	05-02-96	**********			
CNST START DATE :					

***EMISSIONS CHANGED :

***REMARKS:

***OTHER PERMIT DATES:
APP/PERMIT VOIDED: REASON:
APP ON HOLD UNTIL: REASON:
CONST STOPPED UNTIL:

VOID/HOLD CODES: PD-PLT DISMANTLED
CR-COMPANY REQUEST TI-TIME EXPIRED
DD-DATA DELAY TD-TECH DIFFICULTY
RE-REISSUED NR-NO RESPONSE

***PERMIT TYPES/STANDARDS:
NEW MAJ SOURCE:> 100 TPY: SIC: 9999
MAJOR MODIFICATION: PORTABLE: RELATED PERMITS: SUFFIX REASON
NON-ATTAIN REVIEW: NSPS: TACB: CHG LOC:
INSIGNIFICANT EMISSIONS: NESHAP: PSD-TX: CHG OWN:
FUEL CONVERSION: TOXIC MATERIALS: STD EX NO.:

***AIR CONTAMINANT INFORMATION:

NAME	CODE	MAX ALLOWABLE RATE LBS/HR	TONS/YR	ACTUAL TONS/YR

***ABATEMENT EQUIPMENT:

TEXAS NA[illegible] RESOURCE CONSERVATION COMM[illegible]N
REGISTRA[illegible]ON FORM FOR STANDARD EXEMPTIONS
FORM PI-7

I. Company Name Department of the Army, Camp Stanley
(Corporation, Company, Government Agency, Firm, etc.)
Mailing Address 25800 Ralph Fair Rd., Boerne, TX 78006
Individual Authorized to Act for Applicant: Name LTC Dean C. Schmelling Title Post Commander
Address 25800 Ralph Fair Rd., Boerne, TX 78006 Telephone (210) 221-7461

II. LOCATION OF EXEMPT FACILITY (Latitude and Longitude must be to the nearest second):
Name of Plant or Site Department of the Army, Camp Stanley
Street Address 25800 Ralph Fair Rd., Boerne, Tx 78006
Nearest City Boerne County Bexar Latitude 29° 40' 35" Longitude 98° 37' 52"
SITE REQUIREMENTS: A. Submit a plot plan to scale of the property showing the location of plant boundaries, plant equipment, and surrounding area.
B. Furnish an area map with a scale showing the facility location relative to highways and towns.

32407

III. TYPE OF FACILITY:
A. Applicable Standard Exemption Number(s) from TNRCC List 75.
B. Name of Facility and Company's Facility Number
C. TNRCC Account Identification Number BG 0341 S
D. Previous Special Exemption or Permit Number
E. Operating Schedule: Hours/day 24 Days/week 7 Weeks/year 52
F. Proposed Start of Construction (Date) Operation (Date)
G. Permanent [X] Portable [ ]
H. Length of time at this site, if portable

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IV. PROCESS INFORMATION
Description of Process: Prepare and attach a written description of the exempt process and applicable checklists (when available). The description must be in sufficient detail to indicate that the facility will conform to the specified exemption.

V. EMISSIONS DATA Furnish a description of the basis for emission rates including fugitives. (Calculations, emission factors, measurement, NSPS, etc.)

Emission Point Number	Name of Source	Name of Air Contaminant	Emission Rate of Each Air Contaminant			
			lb/hr		tons/yr	
			Gaseous	Particulate	Gaseous	Particulate
EPN 6	Bldg. 200 Paint Booth	VOC	5.40		0.190	
EPN 6	Bldg. 200 Paint Booth	Particulates		0.013		0.00015

VI. A copy of the application is being sent to the Regional Office of the TNRCC: [X] Yes [ ] No

VII. I, LTC Dean C. Schmelling Post Commander
(Name) (Title)

state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption. The facility will operate in compliance with all Regulations of the Texas Natural Resource Conservation Commission and with Federal Environmental Protection Agency Regulations governing air pollution.

DATE 4/11/96 SIGNATURE

Rev. 9/21/93

APR 18 1996

Texas Natural Resource Conservation Commission
Standard Exemption Registrations:
SWMU B-3 SVE Site, Building 27, Building 200

April 1996

90407

Prepared for

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

Prepared by

Parsons Engineering Science
8000 Center Park Drive, Suite 200
Austin, TX 78754

Project Number 721460.09

APR 1 7 1996

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STANDARD EXEMPTION APPLICABILITY CHECKLIST

30 TAC CHAPTER 116, SECTION 116.211
PERMIT EXEMPTIONS - APPLICABILITY CHECKLIST

This checklist is designed to help you confirm that you meet the general rule for using standard exemptions. Whether or not you use this checklist, your claim must be shown to meet all appropriate general requirements, as well as those in each standard exemption (STDX) you are claiming.

1. Description of overall activities at this location: see Introduction _____.

2. Are there any numbered air permits under the same account number? [x] YES [ ] NO
   If yes, do any permit conditions prohibit or restrict the use of standard exemptions (§116.211[a][6])? [ ] YES [x] NO
   (1) If yes, which permit numbers:_____
   (2) If yes, standard exemptions may not be used or their use must meet the restrictions of the permit. A new permit or permit amendment may be required.

3. Emissions check for this STDX claim (§116.211(a)(1)) (see Note 1)

   Calculated Tons Per Year

CO : 0	NO_x: 0	SO_x: 0
PM : 0.012	VOC: 8.42	Other:_____

   Note 1: List all emissions for this project (include point and equipment fugitive emissions from new or modified facilities as well as increases upstream and downstream that result from this project.)

   Are SO_x, PM, VOC, and other emissions shown above each less than 25 TPY?
   [x] YES [ ] NO

   Are the NO_x and CO emissions shown above each less than 250 TPY? [x] YES [ ] NO

   If the answer to either question is "NO," a standard exemption cannot be claimed.

4. Site exemption emissions check (§116.211[a][3]):
   Are total SO_x, PM, VOC and other emissions claimed under standard exemption at the site each less than 25 TPY? [x] YES [ ] NO

   Are total NO_x and CO emissions claimed under standard exemption at the site each less than 250 TPY? [x] YES [ ] NO

   If either question is answered "NO," determine if one facility at the property has had public notification and comment as required in Subchapter B or D of 30 TAC 116 or the applicable procedures of Chapter 116 in effect at the time of registration. If public notice has occurred, what permit or STDX required this action? _____

   If public notice has not occurred, a permit may be required for the proposed facility.

5. Nonattainment Check (§116.211[a][2]):
   Is the facility located in a nonattainment county/area (see listing below)? No
   If "NO," skip to paragraph 6.
   If "YES," which county/area?_____

   Show the actual increases (defined as new allowables minus old actuals - see Nonattainment New Source Review Manual) in emissions, without regard for any decreases, which result from this standard exemption claim for the following pollutants: NO_x:_____ VOC:_____ CO:_____ PM10:_____

Is the site an existing major source? (See §116.012) [ ] YES [ ] NO
Is the modification major? (See §116.012, Table I) [ ] YES [ ] NO

You may be required to provide documentation of nonattainment new source review applicability. If you have determined these requirements apply at your site for this exemption claim, enclose the necessary netting documentation (See Nonattainment New Source Review Manual).

6. Prevention of Significant Deterioration (PSD) Check (§116.211[b]):
An overall emissions rate of 100 (for a named source) or 250 tons per year or more on-site, or a significant modification for any single air contaminant for which a NAAQS has been issued may indicate a need for PSD review under 40 CFR 52. If you have determined that the netting requirements of 40 CFR 52 are triggered by this exemption claim, enclose the necessary documentation.

7. If any EPA New Source Performance Standards (NSPS) or National Emissions Standards for Hazardous Air Pollutants (NESHAPS) are applicable for the facility covered by the exemption(s) claimed (§116.211[a][5]), list them here: NA

8. §116.211(c) states "No person shall circumvent by artificial limitations the requirements of §116.110 of this title (covering permitting)." Circumvention by artificial limitations may include:

   (a) dividing a complete project into separate segments to circumvent §116.211(a)(1) limits;
   (b) claiming feed or production rates below the physical capacity of the project's equipment in order to begin constructing facilities before a permit or permit amendment is approved for full scale operations.

   Ensure that any exemption claim is free of circumvention by means of artificial limits such as these.

9. If all §116.211 requirements are met, we suggest use of the appropriate standard exemption worksheet(s) or checklist(s).

NONATTAINMENT AREAS

FOR OZONE (VOC OR NOx) Brazoria, Chambers, Collin, Dallas, Denton, El Paso, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Montgomery, Orange, Tarrant, and Waller Counties for VOC and NO_x as precursors to ozone; and, Victoria County for VOC only.

FOR LEAD: Section of Collin County

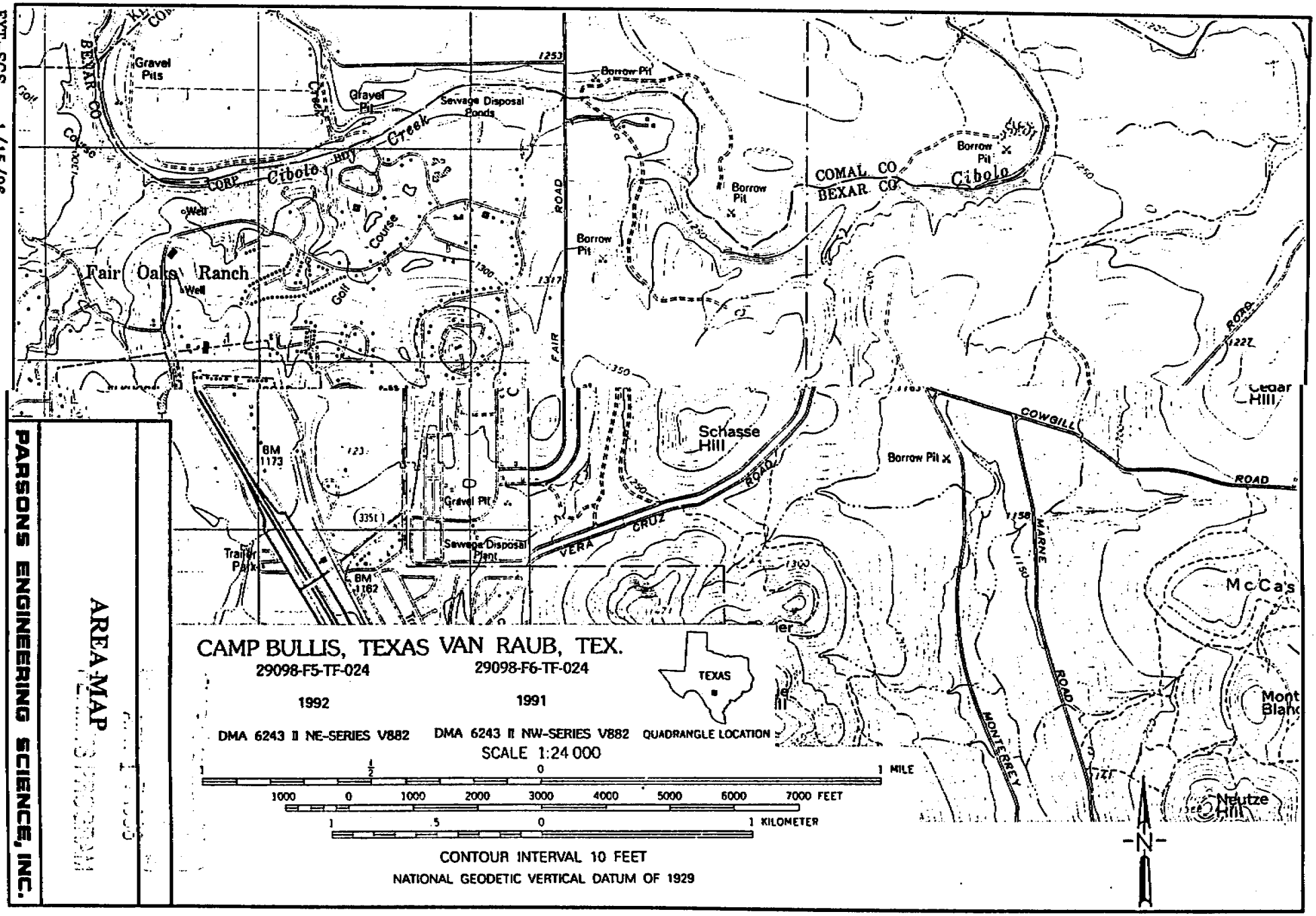
FOR PARTICULATE MATTER (PM 10): El Paso County

FOR CARBON MONOXIDE: Section of El Paso County

AREA MAP

XREF: BASE

EXT-SGS 1/15/96



AREA MAP

PARSONS ENGINEERING SCIENCE, INC.

PLOT PLAN

Table IIA-1. UTM Coordinates and Dimensions for Various Facility Buildings

Building Number	Building Corner	North UTM (M)	East UTM (M)	Building Height (ft)	Building Height (m)
4	NE	3284408.54133	536525.05881	12	3.66
4	NW	3284409.41551	536515.55016	12	3.66
4	SE	3284368.50057	536521.37765	12	3.66
4	SW	3284369.37474	536511.86899	12	3.66
5	NE	3284445.85803	536526.39481	12	3.66
5	NW	3284446.60421	536518.27839	12	3.66
5	SE	3284438.83971	536525.74957	12	3.66
5	SW	3284439.58589	536517.63319	12	3.66
27	NE	3284428.44484	536524.04790	20	6.10
27	NW	3284429.27202	536515.05060	20	6.10
27	SE	3284416.66090	536522.96452	20	6.10
27	SW	3284417.48808	536513.96722	20	6.10
79	NE	3283696.73811	535768.33420	12	3.66
79	NW	3283696.60753	535760.86697	12	3.66
79	SE	3283694.13526	535768.37973	12	3.66
79	SW	3283694.00468	535760.91249	12	3.66
89	NE	3283410.22942	535756.25190	12	3.66
89	NW	3283410.06138	535746.64236	12	3.66
89	SE	3283402.87292	535756.38056	12	3.66
89	SW	3283402.70487	535746.77102	12	3.66
90	NE	3283596.52581	535769.04730	17	5.18
90	NW	3283596.09974	535744.68569	17	5.18
90	SE	3283438.17804	535771.81666	17	5.18
90	SW	3283437.75198	535747.45505	17	5.18
91	NE	3283410.63610	535827.75404	17	5.18
91	NW	3283410.23861	535805.02571	17	5.18
91	SE	3283227.69298	535830.95375	17	5.18
91	SW	3283227.29547	535808.22521	17	5.18
92	NE	3283411.11940	535866.62460	17	5.18
92	NW	3283410.73303	535844.53128	17	5.18
92	SE	3283227.66682	535869.83303	17	5.18
92	SW	3283227.28041	535847.73971	17	5.18
93	NE	3283212.01672	535829.57683	17	5.18
93	NW	3283211.62119	535806.96128	17	5.18
93	SE	3283027.07190	535832.81132	17	5.18
93	SW	3283026.67637	535810.19576	17	5.18
94	NE	3283212.14621	535868.51841	17	5.18
94	NW	3283211.76326	535846.62124	17	5.18
94	SE	3283027.47639	535871.74812	17	5.18
94	SW	3283027.09344	535849.85094	17	5.18
96	NE	3283011.22992	535869.95682	17	5.18
96	NW	3283010.85198	535848.34529	17	5.18
96	SE	3282826.55580	535873.18656	17	5.18
96	SW	3282826.17786	535851.57502	17	5.18
98	NE	3283778.27125	535826.09001	12	3.66
98	NW	3293780.77057	535819.33262	12	3.66
98	SE	3283708.88890	535800.42770	12	3.66
98	SW	3283711.38825	535793.67034	12	3.66

Table IIA-1. UTM Coordinates and Dimensions for Various Facility Buildings

Building Number	Building Corner	North UTM (M)	East UTM (M)	Building Height (ft)	Building Height (m)
200	NE	3286586.82408	536668.42981	20	6.10
200	NW	3286586.34967	536641.31003	20	6.10
200	SE	3286575.78713	536668.61187	20	6.10
200	SW	3286575.31303	536641.50309	20	6.10
201	NE	3286563.59796	536662.31175	12	3.66
201	NW	3286563.33203	536647.10909	12	3.66
201	SE	3286555.18440	536662.45894	12	3.66
201	SW	3286554.91845	536647.25628	12	3.66
90-1	NE	3283582.64031	535788.21677	12	3.66
90-1	NW	3283582.38299	535773.50296	12	3.66
90-1	SE	3283568.28866	535788.46777	12	3.66
90-1	SW	3283568.03131	535773.75396	12	3.66
90-2	NE	3283556.64741	535788.77776	12	3.66
90-2	NW	3283556.39376	535774.27394	12	3.66
90-2	SE	3283542.00689	535789.03380	12	3.66
90-2	SW	3283541.75324	535774.52998	12	3.66

BUILDING 200
EXEMPTION REGISTRATION

Section 1

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Process Description

Process Flow Diagrams

Emission Calculations

Supplemental Emissions Data for Building 200 Paint Booth

BUILDING 200 PAINT BOOTH

FORM PI-7

BUILDING 200 PAINT BOOTH

PROCESS DESCRIPTION

EPN 6 and FUG1 - Builiding 200 Paint Booth

Both VOC and particulate emissions arise from the paint spray booth at Building 200. Painting operations at Building 200 (EPN 6) are limited to low volume applications to flat surfaces utilizing aerosol propelled paints and brush and roller coating. Aerosol painting and brush and roller painting techniques are utilized to minimize paint overspray and spillage. This spray booth does not utilize a pressurized spray gun. When coating or painting with aerosol, or brush- or roller-applied coatings, techniques are utilized to minimize paint overspray and spillage. The coatings used at the booth, while not exclusively low-VOC coatings, are those which meet military specifications for specific applications.

The following procedures are utilized to minimize fugitive emissions from spray booth operations at Building 200:

All spills are immediately cleaned up.

All equipment clean-up is performed in the booth with the booth and work area fans operating.

All waste coatings, solvents, and spent clean up solvents are stored in sealed containers until removed for disposal or recycling.

Solvent and paint laden rags will be maintained in closed containers until removed for disposal or recycling.

At building 200, painting operations are conducted in an enclosed spray booth in which the emissions of particulate matter are controlled by a dry filter system. The particulate removal systems have a removal efficiency of 99 percent, which surpasses the current TNRCC guidance for BACT of 95 percent removal efficiency.

The paint booth at Building 200 meets the requirements of standard excemption 75. An overview of standard excemption 75 requirements and how the paint booth at Building 200 complies with each applicable requirement is addressed by the following:

Building 200 Paint Booth
Standard Exemption 75 Requirements

75(a)	CSSA has met the limits of this exemption without the use of VOC or exempt solvent (non-VOC) control equipment.
75(b)	CSSA building 200 paint booth includes only VOCs or non-VOCs and not metal spraying or metalizing (the deposition or spraying of molten metal onto a surface to form a coating).
75(c)	CSSA building 200 paint booth complies with all VOC emission limitations (see emission calculations, and supplemental emissions data).

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75(e) CSSA will maintained, in sufficient detail, records to demonstrate compliance with this standard exemption.

75(f) CSSA employs good housekeeping procedures to minimize fugitive emissions.

75(g) CSSA will not exceed 5% opacity from any emission point as determined by the United States Environmental Protection Agency Method 9 averaged over a 6 minute period except for those periods described in 30 TAC 111.111 (a) (1) (E) (Regulation I).

75(h) CSSA is located in Bexar County, an attainment county.

75(i) A form PI-7 for the paint booth in building 200 is included in this registration submittal.

75(j) CSSA operations conducted in building 200 spray booth has a ventilating velocity of 113 ft/min., particulate matter control efficiency of 99%, a face velocity greater than 200 ft/min., and vertical elevated stacks through which the spray booth emissions are exhausted at least 1.5 times the building height above grade.

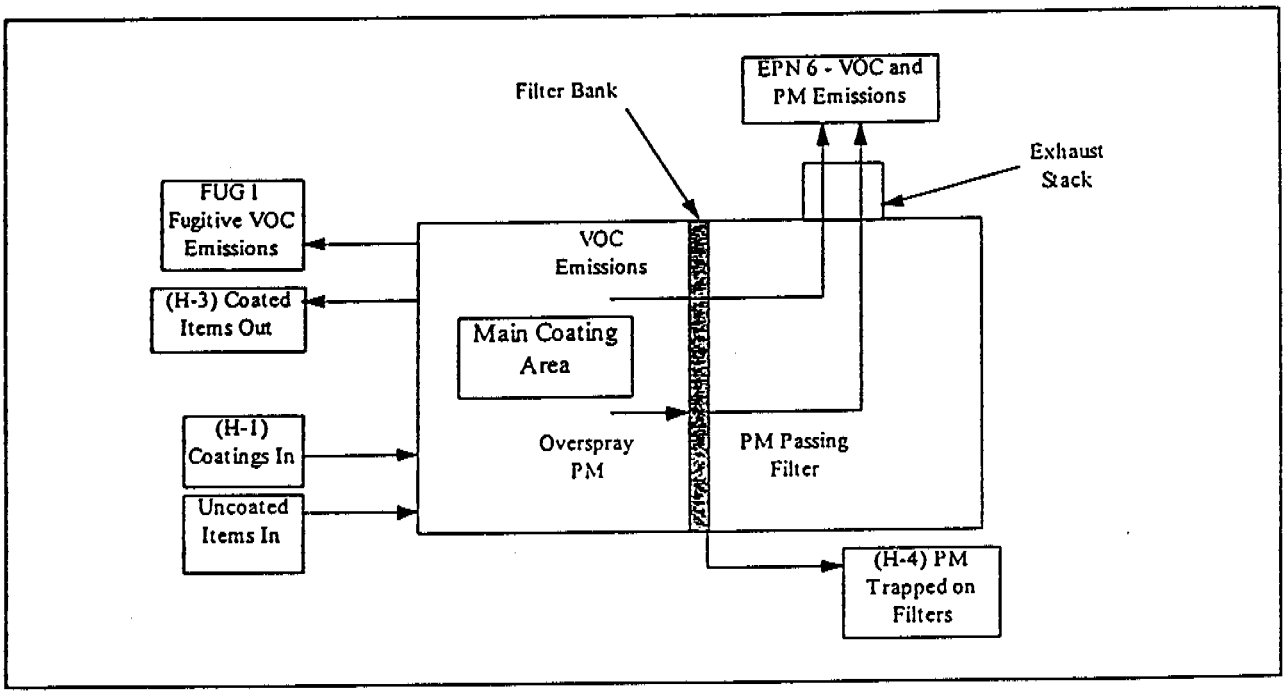
75(k&l) Outdoor or non-enclosed painting operations occurring at CSSA will comply with all requirements identified by Standard Exemption 75(k) and 75(l).

BUILDING 200 PAINT BOOTH

PROCESS FLOW DIAGRAMS

PROCESS FLOW DIAGRAMS

Figure IV.1. Process Flow Diagram for Paint Booth - Building 200



BUILDING 200 PAINT BOOTH

EMISSION CALCULATIONS

APRIL 1996

EMISSION CALCULATIONS

Paint Booth - Building 200 (EPN 6 and FUG 1)

The paint booth at Building 200 is used for flat-surface stenciling of crates, boxes, and other containers. Coatings are applied by aerosol, brush, or roller. Emissions from this booth are calculated following the calculation guidance provided in the TNRCC Technical Guidance Package for Coatings Sources: Spray Painting and Dip Coating Operations. The equations presented in the Technical Package have not been reprinted in this application, but sample calculations and spreadsheets are presented to demonstrate each calculation procedure.

Product Usage Rates and MSDSs. The names and maximum usage rates for the respective products used in the booth are presented in Table V.-a2.

Since this booth does not employ the use of an automatic spray gun, hourly rates can not be predicted from equipment design parameters (e.g., maximum gun flow rate). All usage rates are predicted maximums based on historical hourly and annual usage rates for each coating at the booth. Usage rates were determined by the normal operator of the booth and are considered to be conservative.

Emissions Assumptions. A summary of maximum hourly emissions for each product used in the booth is presented in Table V.-a2 in Attachment V.-a. A summary of annual emissions for each product is presented in Table V.-a3 in Attachment V-a. The worksheets shown in Table V.-a4 of Attachment V.-a detail the calculation of bulk emissions for each material used in the booth. Each material is presented in a separate worksheet.

Maximum hourly emissions and maximum annual emissions are calculated from the maximum hourly usage rate and maximum annual usage rate, respectively, for each coating. Procedures follow the guidelines established in the aforementioned TNRCC technical guidance package. The following assumptions and general procedures are used during the calculation emissions:

(1) The solids content of each material is taken as the difference between the material density and the maximum VOC content of the material as listed on the product MSDS.

(2) For all brush- and roller-applied materials, the percent overspray was assumed to be zero (0), implying a 100 percent transfer efficiency.

(3) For aerosol-applied materials, the percent overspray is estimated at 50 percent for the air atomization spraying method on flat surfaces using Table 232 from *Modern Pollution Control Technology, Volume 1.* Aerosol spraying was assumed to represent the air atomization method of spraying.

(4) The filter efficiency of the filters in the booth is 99 percent.

(5) Booth flashoff for each coating is estimated using Figure 655 from *Modern Pollution Control Technology, Volume 1.* Each item coated is assumed to dry

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inside the booth for a minimum of 5 minutes before being removed. The enamel used in the booth was determined to have a booth flashoff of 40 percent using evaporation curve 5 in Figure 655 for alkyds. Lacquers used in the booth were determined to have a booth flashoff of 91 percent using evaporation curve 1 for lacquers. Where applicable, the amounts of thinners used to thin enamels and lacquers are assumed to have the same booth flashoff as the coating in which they are mixed.

(6) All PM emissions presented are assumed to be stack emissions and not fugitive emissions.

(7) The thinner amounts used strictly for cleanup are assumed to have booth flashoffs of 100 percent since all cleanup is conducted inside the booth with the fan on.

(8) The overall maximum hourly amount of emissions presented in Table VI.C-a2 reflect the largest single hourly emissions release from a discrete application (either coating or thinner cleanup)

(9) The total annual emissions presented in Table VI.C-a3 reflect the sum of annual emissions from all applications (both coating and thinner cleanup)

Sample Calculations. The following section presents sample calculations of emissions from the paint booth in Building 200. Calculations are performed using the assumptions previously stated. The coating chosen is Lacquer 2 - Black Gloss Aerosol Lacquer. The worksheet for this coating in Table VI.C-a4 presents the chemical data for this coating.

Total Hourly VOC Emissions:

Total hourly VOC (lb/hr) = Max. Allowable Hourly Usage Rate (gal/hr) * Maximum VOC content (lb/gal)

Total hourly VOC = 1.0 gal/hr * 5.23 lb/gal = 5.23 lb/hr

Hourly Fugitive VOC Emissions:

Hourly Fugitive VOC (lb/hr) = Total hourly VOC (lb/hr) * Transfer Efficiency * Fugitive Flashoff

Hourly Fugitive VOC = 5.23 lb/hr * 0.50 * 0.09 = 0.235 lb/hr

Hourly Booth VOC Emissions:

Hourly Booth VOC (lb/hr) = Total VOC (lb/hr) - Fugitive VOC (lb/hr)

Hourly Booth VOC = 5.23 lb/hr - 0.09 lb/hr = 0.47 lb/hr

Hourly PM Emissions:

Hourly PM (lb/hr) = Max. Allowable Hourly Usage Rate (gal/hr) * Solids Cont. (lb/gal) * (1 - Trans. Effic.) * (1 - Filter Efficiency)

Hourly PM = 1.0 gal/hr * 2.00 lb/gal * (1 - .50) * (1 - 0.99) = 0.01 lb/hr

All annual emission rates are calculated in an identical manner to hourly emission rates substituting the annual material use rate for the hourly usage rate.

SUPPLEMENTAL EMISSIONS DATA
FOR BUILDING 200 PAINT BOOTH

TABLE 18
BUILDING 200 SPRAY BOOTH

Point Number (from Flow Diagram) EPN 6 (Figure IV.1 Bldg. 200 Paint Booth)	Annual Hours of Operation of this Booth 1,920 hours

EXHAUST GAS STREAM CHARACTERISTICS

Flow Rate (acfm)		Exhaust Stack			Building Height (ft)	Abatement Device Particulate Loading (lb/hr)	
Design Maximum	Average Expected	Temperature °F	Height (ft)	Diameter (ft)		Inlet	Outlet
	1,200	Ambient	30	3.5	20	99% eff. filters	

TYPE OF COATING AND MAXIMUM RATE OF USE

Type	Max. Rate of Use (lb/hr)	Max. Rate of Use (Tons/yr)	Volatile Portion (%weight)
Lacquer	See note (a)	See note (a)	See note (b)
Varnish			
Enamel	See note (a)	See note (a)	See note (b)
Metal Primer			
Metal Spray			
Resin			
Sealer			
Shellac			
Stain			
Zinc Chromate			
Epoxy			
Polyurethane			
Other			

SOLVENT COMPOSITION AND RATE OF USE (INCLUDE THAT SUPPLIED WITH COATING)

Chemical Composition of Volatiles & wt.(%)	Max. Rate of Use (lb/hr)	Max Rate of Use (ton/yr)
See note (b)	See note (a)	See note (a)

TYPE AND COST OF ABATEMENT DEVICE

☐ Spray Chamber (water use gal/hr) _____ ☐ Water Curtain (water use gal/hr)

☒ Dry Filter Pads (No.) 20 (Size) 21"x21"x1" ☐ Other (Explain) _____

Capital Installed Cost $ N/A - Federal Facility Annual Operating Cost $ N/A - Federal Facility

METHOD OF SPRAYING	DESCRIPTION OF ITEMS TO BE COATED (SHAPE AND SIZE)
☐ Air Atomization ☐ Airless Electrostatic ☐ Disc ☐ Airless ☐ Air-Atomized ☒ Other Aerosol/Brush/Roller	Coating is primarily stencilling of letters and symbols on boxes, crates, and other containers. Containers vary in size but are cubic in shape. Coating is almost exclusively flat-surface coating.

(a) Hourly and annual usage rates for materials in this booth are shown in table V.-a1 in Attachment V.-a. Densities and other specific information are presented in the worksheets of Table V.-a4.

(b) Volatile contents of each material are presented in the worksheets of Table V.-a4 in Attachment V.-a

Table V.-b1. Summary of Hourly And Annual Emission Rates from Building 200 Paint Booth

	Total Hourly VOC Emissions	Hourly Fugitive VOC Emissions	Hourly Booth VOC Emissions	Hourly PM Emissions
Maximum Hourly Emissions (lb/hr):	5.40	3.19	5.40	0.013
Total Annual Emissions (ton/yr):	0.19	0.02	0.17	0.000

Table V.-a2. Summary of Hourly Emissions from Building 200 Paint Booth

Number	Name	Application Type	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Enamels						
Enamel 1	Desert Sand Alkyd Enamel with Thinner 2	Brush/Roller	5.31	3.19	2.13	0.0000
Lacquers						
Lacquer 1	Lustreless Lacquer with Thinner 1	Brush/Roller	5.29	0.48	4.82	0.0000
Lacquer 2	Black Gloss Aerosol Lacquer	Aerosol Can	5.23	0.24	4.99	0.0100
Lacquer 3	Olive Green Aerosol Lacquer	Aerosol Can	5.32	0.24	5.08	0.0127
Lacquer 4	Red Aerosol Lacquer	Aerosol Can	5.28	0.24	5.04	0.0125
Lacquer 5	Blue Aerosol Lacquer	Aerosol Can	5.33	0.24	5.09	0.0127
Lacquer 6	Yellow Aerosol Lacquer	Aerosol Can	5.36	0.24	5.12	0.0130
Thinners						
Thinner 1	Dope and Lacquer Thinner	Cleanup	5.15	0.00	5.15	0.0000
Thinner 2	Paint Thinner, Turpentine	Cleanup	5.40	0.00	5.40	0.0000
		Maximum Hourly Emissions (lb/hr)*	5.40	3.19	5.40	0.0130

* Maximum hourly emissions reflect the largest single hourly emissions release from a discreet application (coating or cleanup).

Table V.-a3. Summary of Annual Emissions from Building 200 Paint Booth

NSN	Name	Application Type	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Enamels						
Enamel 1	Desert Sand Alkyd Enamel with Thinner 2	Brush/Roller	0.024	0.014	0.010	0.00000
Lacquers						
Lacquer 1	Lustreless Lacquer with Thinner 1	Brush/Roller	0.030	0.003	0.027	0.00000
Lacquer 2	Black Gloss Aerosol Lacquer	Aerosol Can	0.013	0.001	0.012	0.00002
Lacquer 3	Olive Green Aerosol Lacquer	Aerosol Can	0.013	0.001	0.013	0.00003
Lacquer 4	Red Aerosol Lacquer	Aerosol Can	0.013	0.001	0.013	0.00003
Lacquer 5	Blue Aerosol Lacquer	Aerosol Can	0.013	0.001	0.013	0.00003
Lacquer 6	Yellow Aerosol Lacquer	Aerosol Can	0.013	0.001	0.013	0.00003
Thinners						
Thinner 1	Dope and Lacquer Thinner	Cleanup	0.034	0.000	0.034	0.00000
Thinner 2	Paint Thinner, Turpentine	Cleanup	0.036	0.000	0.036	0.00000
		Total Annual Emissions (ton/yr)	0.190	0.020	0.170	0.00015

Table V.-a3. Summary of Annual Emissions from Building 200 Paint Booth
Enamel 1 - Desert Sand Alkyd Enamel with Thinner 2

Application Type:	Brush/Roller
Total Allowable Hourly Application Rate (lb/hr)	1.25
Total Max. Hourly Application Rate (lb/hr):	1.13
Total Max. Annual Application Rate (lb/hr):	11.25
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Desert Sand Alkyd Enamel	Paint Thinner
National Stock Number:	8010-00-111-8353	8010-00-246-6443
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr):	1.11	0.14
Annual Use Rate (gal/yr):	10.00	1.25
Specific Gravity:	1.200	0.864
Density (lb/gal):	10.00	7.20
Max. VOC Content (lb/gal):	3.88	7.20
Solids Content (lb/gal):	6.12	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	40.00	40.00
Fugitive Flashoff (%):	60.00	60.00
Generic Short Term VOC Rate (wt% lb/hr):	11.10	1.01
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	4.31	2.58	1.72	0.000
Thinner:	1.01	0.60	0.40	0.000
Total:	5.31	3.19	2.13	0.000

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.019	0.012	0.008	0.000
Thinner:	0.005	0.003	0.002	0.000
Total:	0.02	0.01	0.01	0.000

Table V.-a3. Summary of Annual Emissions from Building 200 Paint Booth

Lacquer 1 - Lustreless Lacquer with Thinner 1

Application Type:	Brush/Roller
Max. Allowable Hourly Application Rate (lb/hr)	1.00
Max. Hourly Application Rate (lb/hr):	1.13
Maximum Annual Application Rate (lb/yr):	11.25
Mix Ratio (Thinner:Coating):	1:8

	Coating	Thinner
Name:	Lustreless Lacquer	Lacquer Thinner
National Stock Number:	8010-00-527-3196	8010-00-160-5788
Max. Hourly Usage Rate (gal/hr):	1.00	0.13
Max. Allowable Usage Rate (gal/hr):	0.89	0.11
Annual Use Rate (gal/yr):	10.00	1.25
Specific Gravity:	1.080	0.824
Density (lb/gal):	9.00	6.87
Max. VOC Content (lb/gal):	5.10	6.87
Solids Content (lb/gal):	3.90	0.00
Percent Overspray (%):	0.00	0.00
Transfer Efficiency (%):	100.00	100.00
Filter Efficiency (%):	99.00	99.00
Booth Flashoff (%):	91.00	91.00
Fugitive Flashoff (%):	9.00	9.00
Generic Short Term VOC Rate (wt% lb/hr):	8.01	0.76
Generic Short Term PM Rate (wt% lb/hr):	0.00	0.00

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	4.54	0.41	4.13	0.00
Thinner:	0.76	0.07	0.69	0.00
Total:	5.29	0.48	4.82	0.00

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.03	0.00	0.02	0.000
Thinner:	0.00	0.00	0.00	0.000
Total:	0.03	0.00	0.03	0.000

Table V.-a3. Summary of Annual Emissions from Building 200 Paint Booth
Lacquer 2 - Black Gloss Aerosol Lacquer

Name:	Black Gloss Aerosol Lacquer
National Stock Number:	8010-00-290-6984
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr):	0.40
Max. Allowable Hourly Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	5.00
Specific Gravity:	0.867
Density (lb/gal):	7.23
Max. VOC Content (lb/gal):	5.23
Solids Content (lb/gal):	2.00
Percent Overspray (%):	50.00
Transfer Efficiency (%):	50.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	7.23
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.23	0.24	4.99	0.010
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ANNUAL EMISSIONS:	**Total Annual VOC Emissions (ton/yr)**	**Annual Fugitive VOC Emissions (ton/yr)**	**Annual Booth VOC Emissions (ton/yr)**	**Annual PM Emissions (ton/yr)**
Coating:	0.01	0.00	0.01	0.00002

Table V.-a3. Summary of Annual Emissions from Building 200 Paint Booth
Lacquer 3 - Olive Green Lacquer Aerosol

Name:	Olive Green Aerosol Lacquer
National Stock Number:	8010-00-584-3149
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr):	0.40
Max. Allowable Hourly Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	5.00
Specific Gravity:	0.943
Density (lb/gal):	7.86
Max. VOC Content (lb/gal):	5.32
Solids Content (lb/gal):	2.54
Percent Overspray (%):	50.00
Transfer Efficiency (%):	50.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	7.86
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.32	0.24	5.08	0.013

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.01	0.00	0.01	0.00003

Table V.-a3. Summary of Annual Emissions from Building 200 Paint Booth
Lacquer 4 - Red Aerosol Lacquer

Name:	Red Aerosol Lacquer
National Stock Number:	8010-00-721-9743
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr):	0.40
Max. Allowable Hourly Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	5.00
Specific Gravity:	0.933
Density (lb/gal):	7.78
Max. VOC Content (lb/gal):	5.28
Solids Content (lb/gal):	2.50
Percent Overspray (%):	50.00
Transfer Efficiency (%):	50.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	7.78
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.28	0.24	5.04	0.012
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ANNUAL EMISSIONS:	**Total Annual VOC Emissions (ton/yr)**	**Annual Fugitive VOC Emissions (ton/yr)**	**Annual Booth VOC Emissions (ton/yr)**	**Annual PM Emissions (ton/yr)**
Coating:	0.01	0.00	0.01	0.00003

Table V.-a3. Summary of Annual Emissions from Building 200 Paint Booth
Lacquer 5 - Blue Aerosol Lacquer

Name:	Blue Aerosol Lacquer
National Stock Number:	8010-00-721-9746
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr):	0.40
Max. Allowable Hourly Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	5.00
Specific Gravity:	0.945
Density (lb/gal):	7.88
Max. VOC Content (lb/gal):	5.33
Solids Content (lb/gal):	2.55
Percent Overspray (%):	50.00
Transfer Efficiency (%):	50.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	7.88
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.33	0.24	5.09	0.013

ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Coating:	0.01	0.00	0.01	0.00003

Table V.-a3. Summary of Annual Emissions from Building 200 Paint Booth

Lacquer 6 - Yellow Aerosol Lacquer

Name:	Yellow Aerosol Lacquer
National Stock Number:	8010-00-721-9744
Application Type:	Aerosol
Max. Hourly Usage Rate (gal/hr):	0.40
Max. Allowable Hourly Usage Rate (gal/hr)	1.00
Annual Use Rate (gal/yr):	5.00
Specific Gravity:	0.956
Density (lb/gal):	7.97
Max. VOC Content (lb/gal):	5.36
Solids Content (lb/gal):	2.61
Percent Overspray (%):	50.00
Transfer Efficiency (%):	50.00
Filter Efficiency (%):	99.00
Booth Flashoff (%):	91.00
Fugitive Flashoff (%):	9.00
Generic Short Term VOC Rate (wt% lb/hr):	7.97
Generic Short Term PM Rate (wt% lb/hr):	0.04

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Coating:	5.36	0.24	5.12	0.013
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ANNUAL EMISSIONS:	**Total Annual VOC Emissions (ton/yr)**	**Annual Fugitive VOC Emissions (ton/yr)**	**Annual Booth VOC Emissions (ton/yr)**	**Annual PM Emissions (ton/yr)**
Coating:	0.01	0.00	0.01	0.00003

Table V.-a3. Summary of Annual Emissions from Building 200 Paint Booth
Thinner 1 - Dope and Lacquer Thinner

Name:	Dope and Lacquer Thinner	
National Stock Number:	8010-00-160-5788	
Application Type:	Cleanup Only	
Max. Hourly Usage Rate (gal/hr):	0.50	
Max. Allowable Hourly Usage Rate (gal/hr)	0.75	
Annual Use Rate (gal/yr):	10.00	
Specific Gravity:	0.824	
Density (lb/gal):	6.87	
Max. VOC Content (lb/gal):	6.87	
Solids Content (lb/gal):	0.00	
Percent Overspray (%):	0.00	
Transfer Efficiency (%):	100.00	
Filter Efficiency (%):	99.00	
Booth Flashoff (%):	100.00	All cleaning assumed to be done within booth
Fugitive Flashoff (%):	0.00	
Generic Short Term VOC Rate (wt% lb/hr):	5.15	
Generic Short Term PM Rate (wt% lb/hr):	0.00	

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Thinner:	5.15	0.00	5.15	0.00
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ANNUAL EMISSIONS:	Total Annual VOC Emissions (ton/yr)	Annual Fugitive VOC Emissions (ton/yr)	Annual Booth VOC Emissions (ton/yr)	Annual PM Emissions (ton/yr)
Thinner:	0.03	0.00	0.03	0.000

Table V.-a3. Summary of Annual Emissions from Building 200 Paint Booth
Thinner 2 - Paint Thinner, Turpentine

Name:	Paint Thinner, Turpentine	
National Stock Number:	8010-00-246-6443	
Application Type:	Cleanup Only *	
Max. Hourly Usage Rate (gal/hr):	0.50	
Max. Allowable Hourly Usage Rate (gal/hr)	0.75	
Annual Use Rate (gal/yr):	10.00	
Specific Gravity:	0.864	
Density (lb/gal):	7.20	
Max. VOC Content (lb/gal):	7.20	
Solids Content (lb/gal):	0.00	
Percent Overspray (%):	0.00	
Transfer Efficiency (%):	100.00	
Filter Efficiency (%):	99.00	
Booth Flashoff (%):	100.00	All cleaning assumed to be done within booth
Fugitive Flashoff (%):	0.00	
Generic Short Term VOC Rate (wt% lb/hr):	5.40	
Generic Short Term PM Rate (wt% lb/hr):	0.00	

HOURLY EMISSIONS:	Total Hourly VOC Emissions (lb/hr)	Hourly Fugitive VOC Emissions (lb/hr)	Hourly Booth VOC Emissions (lb/hr)	Hourly PM Emissions (lb/hr)
Thinner:	5.40	0.00	5.40	0.00
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ANNUAL EMISSIONS:	**Total Annual VOC Emissions (ton/yr)**	**Annual Fugitive VOC Emissions (ton/yr)**	**Annual Booth VOC Emissions (ton/yr)**	**Annual PM Emissions (ton/yr)**
Thinner:	0.04	0.00	0.04	0.000