

1 **3.6 AIR QUALITY**

2 Air pollutants are characterized as being "primary" or "secondary" pollutants. Primary
3 pollutants are those emitted directly into the atmosphere (e.g., carbon monoxide, sulfur dioxide,
4 lead particles, and hydrogen sulfide). Secondary pollutants are those formed through chemical
5 reactions in the atmosphere (e.g., ozone and sulfate particles); these chemical reactions involve
6 primary pollutants, pollutants present in the atmosphere, and other secondary pollutants.

7 **3.6.1 Climate and Meteorology**

8 The San Francisco Bay Area experiences a Mediterranean-type climate, characterized by mild
9 temperature conditions. Weather conditions are monitored at major airports and various
10 locations in the Bay Area (WeatherDisc Associates 1990a, 1990b, 1990c, 1990d). Daily
11 temperature variations are typically 44 to 58 degrees Fahrenheit (°F) during the winter and 54 to
12 66 °F during the summer. Annual precipitation averages about 20 inches (51 centimeters [cm])
13 at sea level locations, with most precipitation falling from October through April. Poor
14 visibility, primarily due to heavy fog, is most likely during late fall and winter.

15 **3.6.2 Applicable Regulations, Plans, and Policies**

16 The federal Clean Air Act (42 U.S.C. §§ 7401-7671q, as amended in 1977 by Pub. L. 95-95, 91
17 Stat. 685-796 and Pub. L. 95-190, 91 Stat. 1399-1404) requires the adoption of national ambient
18 air quality standards (NAAQS) to protect the public health, safety, and welfare from known or
19 anticipated effects of air pollution. The NAAQS have been updated occasionally. Current
20 standards are set for sulfur dioxide (SO₂), carbon monoxide, nitrogen dioxide (NO₂), ozone
21 (O₃), particulate matter equal to or less than 10 microns in size (PM₁₀), fine particulate matter
22 equal to or less than 2.5 microns in size (PM_{2.5}), and lead. These federal standards are shown in
23 Table 3.6-1.

24 The Clean Air Act Amendments of 1990 (Pub. L. 101-549, 104 Stat. 2399 codified as amended at
25 42 U.S.C. §§ 7401-7671q) require the US Environmental Protection Agency (EPA) to promulgate
26 rules to ensure that federal actions conform to the appropriate state implementation plan (SIP).
27 These rules, known together as the General Conformity Rule (40 C.F.R. §§ 51.850-51.860 and 40
28 C.F.R. Part 93), require any federal agency responsible for an action to determine if its action
29 conforms with pertinent guidelines and regulations. Certain actions are exempt from
30 conformity determination, including those actions associated with transfers of land or facilities
31 where the federal agency does not retain continuing authority to control emissions associated
32 with the properties. Federal actions also may be exempt if the projected emissions rates would
33 be less than specified emission rate thresholds, known as de minimis limits.

34 The Clean Air Act defines a group of pollutants called Hazardous Air Pollutants (HAPs) or air
35 toxics. Exposure to these pollutants is a concern, as they can cause or contribute to cancer, birth
36 defects, genetic damage, and other adverse health effects. The source and effects are generally
37 local rather than regional. Evaluation is based on case studies, not standards for concentrations.
38 Examples of air toxics include benzene and asbestos. Title III of the Clean Air Act provides a
39 program for the control of 189 HAPs. The first stage of the program involves the

**Table 3.6-1
Federal Ambient Air Quality Standards**

Pollutant	Symbol	Averaging Time	Standard, as	Standard,	Violation Criteria
			parts per million (ppm) by volume	as micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)	
		National		National	
Ozone	O ₃	1 Hour	0.12	235	If exceeded on more than 3 days in 3 years
		8 Hours	0.08	157	
Carbon Monoxide	CO	8 Hours	9.0	10,000	If exceeded by the mean of annual 4th highest daily values for a 3-year period
		1 Hour	35	40,000	
Inhalable Particulate Matter	PM ₁₀	Annual Geometric Mean ¹	---	---	If exceeded more than 1 day per year
		Annual Arithmetic Mean ²	---	50	
Fine Particulate Matter	PM _{2.5}	Annual Arithmetic Mean	---	150	If exceeded as a 3-year single station average over 3 years
		24 Hours	---	15	
Nitrogen Dioxide	NO ₂	Annual Arithmetic Mean	---	65	If exceeded as a 3-year spatial average of data from designated stations over 3 years
		1 Hour	0.053	100	
Sulfur Dioxide	SO ₂	Annual Arithmetic Mean	---	80	If exceeded
		24 Hours	0.14	365	
Lead Particles	Pb	3 Hours	0.5	1,300	If exceeded more than 1 day per year
		1 Hour	---	---	
Sulfate Particles	SO ₄	Calendar Quarter	---	1.5	If exceeded more than 1 day per year
		30 Days	---	---	
Hydrogen Sulfide	H ₂ S	24 Hours	---	---	---
		1 Hour	---	---	
Vinyl Chloride	C ₂ H ₃ Cl	24 Hours	---	---	---
		1 Hour	---	---	

Note: All standards except the national PM₁₀ and PM_{2.5} standards are based on measurements corrected to 25 degrees Celsius and 1 atmosphere pressure.

The national PM₁₀ and PM_{2.5} standards are based on direct flow volume data without correction to standard temperature and pressure.

Decimal places shown for standards reflect the rounding precision used for evaluating compliance.

Except for the 3-hour sulfur dioxide standard, the national standards shown are the primary (health effects) standards.

The national 3-hour sulfur dioxide standard is a secondary (welfare effects) standard.

EPA adopted new ozone and particulate matter standards on July 18, 1997; the new standards became effective on September 16, 1997.

The national 1-hour ozone standard will be rescinded for an area when EPA determines that the standard has been achieved in that area.

Previous national PM₁₀ standards (which had different violation criteria than the September 1997 standards) will remain in effect for existing PM₁₀ nonattainment areas until EPA takes actions required by Section 172(e) of the Clean Air Act or approves emission control programs for the relevant PM₁₀ state implementation plan.

Violation criteria for all standards except the national annual standard for PM_{2.5} are applied to data from individual monitoring sites.

Violation criteria for the national annual standard for PM_{2.5} are applied to a spatial average of data from one or more community-oriented monitoring sites representative of exposures at neighborhood or larger spatial scales, 40 C.F.R. Part 58.

The "10" in PM₁₀ and the "2.5" in PM_{2.5} are not particle size limits; these numbers identify the particle size class (aerodynamic equivalent diameters in microns) collected with 50 percent mass efficiency by certified sampling equipment. The maximum particle size collected by PM₁₀ samplers is about 50 microns aerodynamic equivalent diameter; the maximum particle size collected by PM_{2.5} samplers is about 6 microns aerodynamic equivalent diameter, 40 C.F.R. Part 53.

¹The annual geometric mean is defined as the "nth" root of the product of "n" observations.

²The annual arithmetic mean is defined as the sum of "n" observations divided by the number of observations.

Source: National Ambient Air Quality Standards (ARB Fact Sheet 39), 40 C.F.R. Parts 50, 51, and 58.

1 promulgation of National Emissions Standards for HAPs (NESHAPs) to reduce HAP emissions
2 from new and existing sources. Major sources will be required to implement Maximum
3 Available Control Technology. Area sources will be required to implement general achievable
4 control technology. This will be followed by a second phase in which residual risks will be
5 evaluated, and further controls will be considered.

6 The California Clean Air Act of 1988, as amended in 1992 (CCAA), outlines a program to attain
7 the California ambient air quality standards (CAAQS) for O₃, NO₂, SO₂, and CO by the earliest
8 practical date. Since the CAAQS are more stringent than the NAAQS, emissions reductions
9 beyond what would be required to show attainment of the NAAQS are needed.

10 The Bay Area Air Quality Management District (BAAQMD) is the regional authority that
11 enforces the state and federal Clean Air Act requirements by promulgating rules for the
12 purpose of regulating stationary emission sources. BAAQMD is also responsible for the
13 preparation of the planning documents that guide the efforts necessary to achieve the national
14 and state ambient air quality standards. The current planning document is the *Bay Area 2001*
15 *Ozone Attainment Plan*, which functions as that part of the SIP applicable to the BAAQMD
16 (BAAQMD et al 2001). This plan also contains measures to show progress towards attainment
17 of the state O₃ standard.

18 3.6.3 Regional and Local Air Quality

19 *Bay Area*

20 With respect to federal ambient air quality standards, specific geographic areas are classified by
21 the EPA as either nonattainment, attainment, or unclassified for each pollutant. For most air
22 pollutants, initial federal status designations are made as either nonattainment or unclassified.
23 In the federal usage, the unclassified designation includes attainment areas that comply with
24 federal standards and areas for which monitoring data are lacking. Unclassified areas are
25 treated as attainment areas for most regulatory purposes. Federal attainment designations
26 generally are used only for areas that change from a nonattainment status to an attainment
27 status.

28 In June 1998, the San Francisco Bay Area was reclassified from an attainment/maintenance area
29 to an unclassified nonattainment area for the federal one-hour ozone standard. The urbanized
30 portions of the San Francisco Bay Area are categorized presently as attainment areas for the
31 federal carbon monoxide standards. The Bay Area is currently designated as unclassified for
32 the federal PM₁₀ standard (BAAQMD 1998).

33 Ozone, CO, and PM₁₀ are the major pollutants of concern in the Bay Area and are monitored at
34 a number of locations. The monitoring station at Arkansas Street in San Francisco (between US
35 101 and I-280, south of Sixteenth Street) is the major monitoring location for the city. Carbon
36 monoxide levels in San Francisco also are monitored at the BAAQMD office on Ellis Street.
37 Table 3.6-2 summarizes recent (1990-1999) monitoring data for O₃, CO, and PM₁₀.

3.6 Air Quality

**Table 3.6-2
Summary of Recent Air Quality Monitoring Data for San Francisco Monitoring Stations**

Monitoring Station	Air Quality Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
OZONE											
San Francisco - Arkansas St.	Peak 1-hour value (ppm)	0.06	0.05	0.08	0.08	0.06	0.09	0.07	0.07	0.05	0.08
	Days above federal standard	0	0	0	0	0	0	0	0	0	0
CARBON MONOXIDE											
San Francisco - Arkansas St.	Peak 1-hour value (ppm)	8.0	9.0	8.0	7.0	6.0	5.0	5.0	5.0	N/A	N/A
	Peak 8-hour value (ppm)	5.6	6.5	6.4	5.1	4.5	4.4	3.9	3.5	4.0	3.7
	Days above federal standard	0	0	0	0	0	0	0	0	0	0
San Francisco - Ellis St.	Peak 1-hour value (ppm)	12.0	14.0	10.0	10.0	8.0	9.0	9.0	8.0	N/A	N/A
	Peak 8-hour value (ppm)	6.9	8.4	7.4	6.9	5.4	5.5	5.6	5.8	5.7	3.8
	Days above federal standard	0	0	0	0	0	0	0	0	0	0
INHALABLE PARTICULATE MATTER, PM₁₀											
San Francisco - Arkansas St.	Peak 24-hour value ($\mu\text{g}/\text{m}^3$)	165	109	81	69	93	50	71	81	52	78
	Annual geometric mean ($\mu\text{g}/\text{m}^3$)	27.8	29.7	27.6	25.1	24.7	22.1	21.4	22.5	20.1	N/A
	Annual arithmetic mean ($\mu\text{g}/\text{m}^3$)	34.0	34.9	31.6	28.8	28.0	24.9	24.3	25.0	N/A	N/A
	Number of 24-hour samples	61	60	61	61	61	61	61	61	61	61
	% of samples above federal standard	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
<p>Notes: ppm = parts per million by volume. $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter. N/A = Data not available. Federal 1-hour ozone standard is 0.12 ppm. Federal 1-hour carbon monoxide standard is 35 ppm. Federal 8-hour carbon monoxide standard is 9 ppm. Federal PM₁₀ standards: 50 $\mu\text{g}/\text{m}^3$, annual arithmetic mean; 150 $\mu\text{g}/\text{m}^3$, 24-hour average. PM₁₀ samples are collected approximately once every six days. Other pollutants are monitored continuously (except for instrument calibration and maintenance periods). Source: CARB 1990-1997; CARB 2000.</p>											

- 1 The federal 1-hour O₃ standard is 0.12 ppm. The federal 1-hour CO standard is 35 ppm, while
- 2 the federal 8-hour standard is 9.0 ppm. Federal standards for O₃ and CO were not violated in
- 3 San Francisco from 1990 to 1999. Several violations of the federal ozone standard occurred in
- 4 other parts of the Bay Area during 1995, 1996, and 1998 (in Contra Costa, Alameda, and Santa
- 5 Clara counties) (CARB 1995, 1996; BAAQMD 1997; BAAQMD et al. 1999).

1 The federal 24-hour average PM₁₀ standard is 150 µg/m³. The federal PM₁₀ standard has not
2 been exceeded in the project region since 1990.

3 *NSTI*

4 Air emission sources at NSTI included stationary sources, where emissions from a source are
5 generated at a fixed point, and mobile sources, where emissions from a source may be
6 generated at multiple locations.

7 *Stationary Sources*

8 Stationary emission sources at NSTI included boilers, fuel storage tanks, gasoline dispensing
9 islands, individual fuel dispensing facilities, a gasoline truck loading rack, an incinerator, a
10 paint spray booth, a sandblasting machine, miscellaneous welding and sheet metal equipment,
11 an electric heating oven, a fire fighter training facility, and a wastewater treatment system.

12 Approximately 82 percent of the stationary sources at NSTI operated under air quality permits
13 issued by the BAAQMD. Exempt sources are those not requiring permits because the sources
14 are indicated explicitly in relevant BAAQMD rules as exempt from permit requirements. The
15 permit exemption can be based on equipment capacity, material usage, or emissions below
16 certain thresholds. At closure of NSTI, Navy had 32 permitted stationary sources and 7 exempt
17 sources (DON 1997). As shown in Table 3.6-3, some permitted and exempt sources have been
18 retained by Navy to meet DoD needs, some have been shut down, and some, based on Navy's
19 preliminary allocation plan, may be transferred to the LRA.

Table 3.6-3. Stationary Emission Source Status at NSTI

<i>Sources and Disposition Status</i>	<i>Number of Sources</i>
Number of stationary sources	
With BAAQMD permits	32
Exempt from permit requirements	7
Total	39
Permitted sources banked by Navy to meet DoD needs	1
Permits or exempt sources that may be transferred to the LRA	13
Permitted sources shut down or transferred to other agencies	25
<i>Source: DON 1997.</i>	

20 The BAAQMD has an emissions banking program to credit facilities that close or reduce
21 emissions from permitted sources. The emissions reduced may be deposited into the banking
22 program as offsets to meet future permit requirements at DoD facilities. NSTI had one banking
23 certificate as of February 1997.

24 *Mobile Sources*

25 Mobile sources at NSTI included private and government vehicles, heavy trucks, lawn
26 maintenance equipment, ships, and aircraft. The mobile source emission inventory for NSTI
27 documented 1992 emission levels from on-road vehicles and off-road mobile sources, such as
28 marine vessels and ground support equipment. These emissions are shown in Table 3.6-4.

Table 3.6-4. NSTI Mobile Source Emissions Summary

Activity Type or Vehicle Class	Tons per Year				
	ROG	CO	NO _x	PM ₁₀	SO _x
Privately Owned Vehicles	6.5	54.8	4.9	1.9	0.1
Government-owned Vehicles	0.9	7.6	1.6	0.2	0.0
Commercial Vehicles and Visitors	9.1	65.8	12.5	3.7	0.3
Off-road Equipment	1.7	6.6	0.5	0.0	0.0
Ship Operations	17.0 ¹	20.5	88.5	3.0 ²	12.8
Totals	35.3	155.3	107.9	8.9	13.2
¹ Emissions provided as hydrocarbons ² Assumes all particulate emissions are equal to PM ₁₀ ROG= reactive organic gases CO= carbon monoxide NO _x = nitrogen oxides PM ₁₀ = inhalable particulate matter SO _x = sulfur oxides Source: DON 1996a.					

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