

4.9 AIR QUALITY

4.9.1 EXISTING CONDITIONS

METEOROLOGY AND CLIMATE

The southern portion of Solano County, including the project site, is part of the San Francisco Bay Area Air Basin (SFBAAB). Climatic conditions are strongly influenced by local topography and proximity to the Pacific Ocean and nearby bays. The Carquinez Strait is a major gap in the Coast Ranges that channels surface air flows between the SFBAAB and the Central Valley.

The Fairfield area's climate, as with all California coastal environs, is dominated by the strength and position of the semi-permanent high-pressure center over the Pacific Ocean near Hawaii. This center creates warm summers, mild winters, and infrequent rainfall. It drives the daytime sea breeze and maintains comfortable humidity and ample sunshine. These same atmospheric processes, however, combine periodically to restrict the ability of the atmosphere to disperse air pollution, particularly in heavily developed areas where air pollution reaches levels in excess of established clean air standards.

The nearest official precipitation station is the Fairfield Fire Station (Station No. 4-2934), about 4 miles northeast of the site. Temperatures in Fairfield average 60° F annually, ranging from about 40°F on winter mornings to the mid-80s on summer afternoons. Daily and seasonal oscillations of temperature are small because of the moderating marine influence. The extreme temperatures recorded at the station are 112° F and 18° F. Temperature at the site is similar to the Fairfield-Suisun City area.

The station records report a normal annual rainfall of 21 inches. The estimated 1,000-year, 24-hour precipitation is 7.64 inches; the maximum recorded 24-hour rainfall is 4.35 inches. Rainfall is confined primarily to the rainy season, from early November to mid-April. Much of the area's rainfall derives from the fringes of mid-latitude storms, however, and a shift in the annual storm track of a few hundred miles can mean the difference between a very wet year and near-drought conditions.

Evaporation data, interpolated from surrounding climatological stations, range between 60 and 85 inches annually.

Winds in the project area are markedly bimodal. During the day, especially in summer, winds are from the southwest through west at 10-15 mph as air is funneled through the Carquinez Strait and accelerates across the project area in a Venturi-like effect. Winds increase during the daytime and reach peak speeds in the early evening hours. At night, especially in winter, the land becomes cooler than the water, and an offshore flow of 2-4 mph develops from the Central Valley toward the ocean. After sunrise and after sunset, there is usually a period of light and disorganized flow as one flow regime dissipates and the replacing regime has not yet become fully established. The net effect of the prevailing wind distribution is rapid ventilation in the daytime with clean marine air and corresponding good air quality. The air stagnation at

night during winter creates a strong potential for elevated air pollution levels. However, air draining from the Central Valley toward San Francisco is relatively unpolluted; therefore, nocturnal air quality is usually good in the project area.

The nearest reporting station with wind data is at Travis AFB, approximately 2 miles northeast of the site. Wind data indicate that prevailing winds from February through November are from the southwest and west-southwest, at a mean wind speed of 14 miles per hour (mph), and the December through January prevailing winds are from the north at a mean wind speed of 11.3 mph. Due to topographic differences between the landfill and the reporting station, localized wind conditions may vary at the site.

In addition to the winds that govern the horizontal rate and trajectory of any air pollutants, the Bay Area experiences two characteristic temperature inversions that control the vertical depth through which pollutants can be mixed. The daytime onshore flow of marine air is capped by a massive dome of warm air that acts as a giant lid over the region. As clean marine air moves inland, pollutants are continually added from below without any dilution from above. As this layer slows down in inland valleys of the air basin and undergoes photochemical transformations under abundant sunlight, unhealthy levels of smog (mainly ozone) develop. A second inversion forms at night as cool air pools in low elevations while the air aloft remains warm. Shallow radiation inversions are formed (especially in winter) that trap pollutants near intensive traffic sources, such as freeways and shopping centers, and form localized areas in violation of clean air standards. These areas are called “hot spots.”

Although inversions are found during all seasons of the year, the summertime regional capping inversion and the localized winter radiation inversions are, by far, the most dominant. The seasonal split in inversion intensity thus contributes significantly to the difference in air quality and climate occurring in the Bay Area during summer compared to winter. Because Fairfield is located in an area where turbulence associated with moderate summer winds dilutes air pollution levels, and where the winter offshore trajectory is from lightly developed agricultural areas, baseline air quality at the project site rarely exceeds clean air standards either during summer or winter.

AIR POLLUTANTS OF PRIMARY CONCERN

Federal and state air quality standards have been established for six air pollutants, for the primary purpose of protecting human health and environment. Consequently, these pollutants are typically referred to as “criteria air pollutants” and include: ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), suspended particulate matter (PM_{2.5} and PM₁₀), and lead (Pb). In addition to the criteria air pollutants, toxic air contaminants (TACs) are also regulated at the federal and state levels. The air pollutants of primary concern, in regards to the proposed landfill expansion project, as well as applicable regulatory requirements and ambient air quality standards associated with these pollutants, are discussed separately as follows:

Criteria Air Pollutants

As previously mentioned, the U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) for six criteria air pollutants. California has also established its own ambient air quality standards (CAAQS), which are at least as stringent as, but generally more stringent than, the NAAQS. California and National ambient air quality standards have been established for O₃, NO₂, CO, SO₂, particulate matter, lead, hydrogen sulfide (California only), and vinyl chloride (California only). Furthermore, oxides of nitrogen (NO_x) and reactive organic gases (ROG) are regulated as criteria pollutants because they are O₃ precursors. The California and National ambient air quality standards for criteria pollutants are summarized in Table 4.9-1. A description of the common sources and related health and environmental effects typically associated with these pollutants are discussed in more detail below.

Ozone. O₃ is a colorless, odorless gas that is present in the troposphere in concentrations of a few tenths of a part per million (ppm) or less. O₃ is not usually emitted directly by pollutant-generating sources. It is created by atmospheric reactions between organic compounds (such as solvents and unburned fuels) and oxides of nitrogen (a product of combustion processes) in the presence of sunlight. Because O₃ is created over time by reactions between NO_x and ROG emitted by hundreds of sources in a geographical area, it tends to be higher downwind of the primary source areas. Peak O₃ concentrations typically occur during the summer months, when long days allow the chemical reactions to take place over a longer period of time. Adverse health effects due to photochemical oxidants range from mild irritation of the eyes, nose and throat to possible impairment of lung function. Other effects include aggravation of respiratory and cardiac diseases, and pulmonary dysfunction. O₃, the primary constituent of photochemical smog, is a severe irritant to all mucous membranes, and its main health effects are on the respiratory system.

Nitrogen Dioxide. NO₂ is a natural trace constituent of the troposphere. The major anthropogenic sources of NO₂ are combustion devices, such as boilers, gas turbines, and stationary and mobile reciprocating internal combustion engines. Combustion devices primarily emit nitric oxide (NO), which reacts in the atmosphere to form NO₂. The combined emissions of NO and NO₂ are referred to as NO_x, which are reported as equivalent NO₂. Because NO₂ reacts with ROG to form O₃ and is also generated by the reactions that form photochemical smog, the concentrations of NO₂ in a particular geographical area may not be representative of the local NO_x emission sources.

Inhalation is the most common route of exposure to NO₂. The principal site of toxicity is the lower respiratory tract due to its relatively low solubility in water. The severity of the health effects depend mainly on the concentration inhaled and less on the duration of exposure. An individual may experience a variety of acute symptoms, including cough, difficulty breathing, vomiting, headache, and eye irritation during or shortly after exposure. After an interval of a few hours (usually 4 to 12 hours), an exposed individual may experience chemical pneumonitis or pulmonary edema with rapid breathing, difficulty breathing, cough, hemoptysis, cyanosis,

chest pain, and rapid heartbeat. Severe, symptomatic NO₂ intoxication after acute exposure has on occasion been linked with prolonged respiratory impairment with symptoms of chronic bronchitis, and with decreased lung function.

**Table 4.9-1
Ambient Air Quality Standards**

California ¹		National ²	
Air Pollutant	Concentration	Primary (>)	Secondary (>)
ozone (O ₃)	0.09 ppm, 1-hr avg	0.12 ppm, 1-hr avg 0.08 ppm, 8-hr avg ³	0.12 ppm, 1-hr avg 0.08 ppm, 8-hr avg ³
carbon monoxide (CO)	9 ppm, 8-hr avg 20 ppm, 1-hr avg	9 ppm, 8-hr avg 35 ppm, 1-hr avg	9 ppm, 8-hr avg 35 ppm, 1-hr avg
nitrogen dioxide (NO ₂)	0.25 ppm, 1-hr avg	100 µg/m ³ annual	100 µg/m ³ annual
sulfur dioxide (SO ₂)	0.04 ppm, 24-hr avg 0.25 ppm, 1-hr avg	0.03 ppm, annual avg 0.14 ppm, 24-hr avg	0.5 ppm, 3-hr avg
suspended particulate matter (PM ₁₀)	30 µg/m ³ annual geometric mean 50 µg/m ³ , 24-hr avg	50 µg/m ³ annual arithmetic mean 150 µg/m ³ , 24-hr avg	50 µg/m ³ annual arithmetic mean 150 µg/m ³ , 24-hr avg
suspended particulate matter (PM _{2.5})	–	15 µg/m ³ annual arithmetic mean 65 µg/m ³ , 24-hr avg	15 µg/m ³ annual arithmetic mean 65 µg/m ³ , 24-hr avg
lead (Pb)	1.5 µg/m ³ , 30-day avg	1.5 µg/m ³ calendar quarter	1.5 µg/m ³ calendar quarter
sulfates	25 µg/m ³ , 24-hr avg	–	–
hydrogen sulfide	0.03 ppm, 1-hr avg	–	–
vinyl chloride	0.01 ppm, 24-hr avg	–	–
visibility reducing particles	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.	–	–

¹ California standards for ozone, carbon monoxide, sulfur dioxide (1-hour), suspended particulate matter-PM₁₀ visibility reducing particles, are values that are not to be exceeded. The sulfur dioxide (24-hour), sulfates, lead, hydrogen sulfide, and vinyl chloride standards are not to be equaled or exceeded.

² National standards, other than ozone and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

³ Based on newly established 8-hour EPA standard. The 0.12 ppm 1-hour standard will not be revoked in a given area until that area has achieved 3 consecutive years of air quality data meeting the 1-hour standard.

ppm = parts per million by volume
µg/m³ = micrograms per cubic meter
Source: California Air Resources Board 2001

Carbon Monoxide. Carbon monoxide is a product of incomplete combustion, principally from automobiles and other mobile sources of pollution. Industrial sources typically contribute less than 10% to ambient carbon monoxide levels. Peak carbon monoxide levels are localized near areas of high motor vehicle traffic, and occur typically during winter months when calm conditions are common.

Carbon monoxide enters the bloodstream through the lungs by combining with hemoglobin, the substance that normally carries oxygen to the cells. CO combines with hemoglobin much more readily than oxygen does, with the result that the amount of oxygen getting to cells is drastically reduced. The symptoms of CO exposure at higher levels include dizziness, headaches, slowed reactions, and fatigue. CO exposure is especially harmful to people with heart or lung disease, or anemia.

Sulfur Dioxide. SO₂ is produced by the combustion of any fuel containing sulfur. Sulfur dioxide is also emitted by chemical plants that treat or refine sulfur or sulfur-laden chemicals.

The major health effects of SO₂ are on the upper respiratory tract. Only a small portion of inhaled SO₂ penetrates the lower respiratory tract because it is water soluble. SO₂ is a respiratory irritant with bronchoconstriction occurring with inhalation at 5 ppm or more. On contact with the moist mucous membranes, sulfur dioxide produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is the more important determinant of respiratory effects. High concentrations of sulfur dioxide may cause edema of the lungs or glottis and can produce respiratory paralysis.

Particulate Matter. Respirable particulate matter (PM) is referred to as airborne particulate of 10 microns, or less, in size. Sources of airborne particulate matter include directly-emitted particulate (e.g., fugitive dust and smoke), finely-divided aerosols (chiefly organic compounds), and byproducts of secondary reactions of emitted sulfates and nitrates in the atmosphere.

The health effects of respirable PM depend on the nature of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons, and other toxic substances adsorbed onto fine particulates or with fine dust particles of silica or asbestos. Generally, health effects associated with respirable PM may result from both short-term and long-term exposures to elevated levels of PM. These effects may include increased mortality, reduced lung function, aggravation of asthma and bronchitis symptoms, and respiratory disease.

Toxic Air Contaminants

TACs include those air pollutants that are believed to result in an increase in mortality or serious illness, or which may pose a present or potential hazard to human health. Health effects commonly associated with TACs include cancer, birth defects, neurological damage, damage to the body's natural defense system, and diseases which lead to death. TACs can be separated into carcinogens and noncarcinogens based on the nature of the physiological degradation associated with exposure to the pollutant. For regulatory purposes, carcinogens

are assumed to have no safe threshold below which health impacts will not occur. Noncarcinogenic TACs differ in that there is generally assumed a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

There are hundreds of different types of TACs, with varying degrees of toxicity. Sources of TACs are most commonly associated with industrial processes, such as petroleum refining or chrome plating operations, commercial operations, such as gasoline stations and dry cleaning establishments, and motor vehicle exhaust. Landfill gas can include a wide range of TACs including, among others, benzene, carbon tetrachloride, perchloroethylene, vinyl chloride, methylene chloride, methyl chloroform, trichloroethylene, mercaptans, and sulfides. In addition, mobile source emissions associated with landfill operations can result in additional emissions of acetaldehyde, benzene, 1,3-butadiene, formaldehyde, and diesel exhaust particulate.

Odorous Emissions

As bacterial decomposition proceeds, odoriferous compounds can escape from the landfill surface through cracks in the surface cover. Other possible sources of odors are the actual wastes. Some household and consumer products contain substances with distinctive odors. The major contribution to odors comes from two groups of compounds: the first group is dominated by esters and organosulfurs, and the second group consists of alkyl benzenes and limonene. Together with hydrocarbons, the second group is probably responsible for the background smell associated with a landfill (EPA 1991).

The sensory perception of odorants has four major dimensions: detectability, intensity, character, and hedonic tone. Odor detectability consists of a detection threshold and a recognition threshold. The detection threshold is the lowest concentration of an odorant that will elicit a sensory response in 50% of the population. There is an awareness of the presence of an added substance, but not necessarily an odor sensation. The detection thresholds are determined using human subjects and sophisticated dilution equipment. Detection thresholds are published for more than 900 chemicals (Cha 1991). The recognition threshold is the minimum concentration that is recognized as having a characteristic odor quality by a segment of the population. Odor intensity refers to the perceived strength of the odor sensation, and odorant character is what the substance smells like (e.g., fishy, rancid, hay, sewer, turpentine, ammonia, etc.). Hedonic tone is a category judgment of the relative pleasantness or unpleasantness of the odor, and is influenced by factors such as subjective experience and frequency of occurrence (Cha 1991). For example, roses have been demonstrated to possess an odor with pleasant hedonic tone. Garbage has been demonstrated to possess an odor with an unpleasant hedonic tone (Poustchi 1991).

Odor Control Programs

In October 2002, the adjacent neighbors (Guidotti and Tonneson) complained about a strong odor at their properties. When landfill staff contacted the neighbors to determine the wind

direction, type of odor, and its duration, they concluded that landfill operations caused the objectionable odor. Although daily surveys were conducted at the landfill to identify the source of the odor, its intensity continued to diminish.

When the complaint was received, wastewater treatment plant sludge was being delivered to the site from a large sludge lagoon cleanout program. Several days after the sludge deliveries began, the neighbors registered the odor concerns. Nuisance odors also were noted at that time by many onsite personnel. Staff ceased using the sludge as an ADC material and instead buried the sludge as it was received. As the lagoon cleanout proceeded, the character of the sludge changed to a drier material that did not generate odors. The sludge cleanout project lasted for about 6 weeks. The project applicant sent a memorandum to the LEA on December 2, 2002, advising the County of the findings of the odor occurrence investigation.

Based on this event, the project applicant instituted additional odor monitoring activities. An environmental technician has been directed to tour the downwind side of the landfill several times each day to check for odor occurrence. If onsite odors are identified, the landfill operator is required to immediately cover the material or change operations so that the odors are controlled. As a preventative measure, prior to new sources of sludge being received, the landfill operator currently requires landfill staff to determine the possibility for nuisance odor conditions to be created. This determination includes an evaluation of the moisture content of future sludge deliveries, since dryer sludge usually results in reduction of odors.

The adjacent neighbors have also recently complained to the County about odors generated from the site's composting operations.

REGULATORY PROVISIONS

Criteria Air Pollutants

Air quality within the Bay Area is regulated by several jurisdictions including the EPA, California Air Resources Board, and the Bay Area Air Quality Management District. Each of these jurisdictions develops rules, regulations, policies, and/or goals to attain the goals or directives imposed upon them through legislation. Although U.S. EPA regulations may not be superseded, both state and local regulations may be more stringent. Following is a summary of federal, state, and local regulatory provisions that pertain to the control of criteria air pollutant emissions and how they relate to the proposed project.

Federal

At the federal level, the EPA has been charged with implementing national air quality programs. The EPA's air quality mandates are drawn primarily from the Federal Clean Air Act, which was signed into law in 1970. Congress substantially amended the Federal Clean Air Act in 1977 and again in 1990. The Federal Clean Air Act required the EPA to establish NAAQS, and also set deadlines for their attainment. Two types of NAAQS have been

established: primary standards, which protect public health, and secondary standards, which protect public welfare from non-health-related adverse effects, such as visibility restrictions.

In June 1997, the EPA adopted new O₃ and PM₁₀ federal standards. The EPA changed the 1 hour O₃ federal standard of 0.12 ppm to an 8 hour standard of 0.08 ppm. The EPA also adopted an additional standard for suspended particulate matter from PM₁₀ to less than PM_{2.5}. Although these new standards have been adopted, air quality monitoring data are not available for the new measurements. Therefore, the evaluation of air quality impacts in this section refers only to the pre June 1997 standards.

Pursuant to the 1990 federal Clean Air Act Amendments, the EPA has classified air basins (or portions thereof) as either “attainment” or “non attainment” for each criteria air pollutant, based on whether or not the NAAQS have been achieved.

The Clean Air Act requires each state to prepare an air quality control plan referred to as the State Implementation Plan. The 1990 Clean Air Act Amendments additionally required states containing areas that violate NAAQS to revise their State Implementation Plans to incorporate additional control measures to reduce air pollution. The EPA has responsibility to review all State Implementation Plans to determine if they conform to the mandates of the Clean Air Act Amendments and will achieve air quality goals when implemented.

New landfills, as defined by the EPA, are regulated under Section 111(b) of the federal Clean Air Act; existing landfills are controlled under the guidelines of Section 111(d). Collectively, these regulations are known as New Source Performance Standards (NSPS) for municipal solid waste (MSW) as set forth under 40 Code of Federal Regulations (CFR) Part 60, Subpart WWW. NSPS and its associated Emission Guidelines for MSW landfills (40 CFR 60, Subpart Cc and 40 CFR 62, Subpart GGG) can have a substantial effect on landfill operations. Because of this regulation, owners and operators of MSW landfills are required, some for the first time, to evaluate and possibly control landfill air emissions.

The intent of the NSPS rule and the Emission Guidelines is to reduce emissions of landfill gas. The pollutants of concern contained within landfill gas are non-methane organic compounds (NMOC) and methane. Compliance requirements are based on the design capacity of the landfill and its NMOC emission rate. If a landfill exceeds a threshold of 50 megagrams per year of NMOC emissions, then the operator must install landfill gas collection and control systems to extract and destructively combust landfill gas (i.e., in a flare, boiler, or engine generator). Operations, monitoring, record keeping, and reporting for the collection/control system must be implemented in accordance with stated requirements.

The NSPS rule applies to all new MSW landfills. A new landfill is defined as a MSW landfill that started construction, or began initial waste acceptance on or after May 30, 1991. A landfill modification (e.g., expansion) that occurred after May 30, 1991 would also subject the landfill to the NSPS rule. MSW landfills that meet the above criteria and have a design capacity greater than 2.5 million megagrams (or 2.5 million cubic meters) of waste must evaluate NMOC emissions to determine their requirements under the NSPS rule.

The Emission Guidelines apply to all existing landfills (as opposed to the NSPS, which applies to new landfills) that have a site capacity of at least 2.5 million megagrams of waste and which either received waste on or before November 8, 1987, or for which construction began prior to May 30, 1991. The requirements of Emission Guidelines are similar to those of NSPS, except that the state in which the landfill is located plays a role in establishing the actual regulations through the State Implementation Plan process.

Under the federal 1990 Clean Air Act Amendments, major stationary sources are required to obtain Title V operating permits. Title V is a federally-enforceable state operating permit program set forth under 40 CFR Part 70. Major sources of criteria air pollutants are required to apply for and obtain Title V operating permits. The Title V programs are developed at the state or local level, as outlined in 40 CFR Part 70. All landfills subject to NSPS or Emission Guidelines are also subject to Title V, regardless of emissions or major source status. A Title V permit is an umbrella permit, which consolidates all federal, state, and local air quality regulations and requirements into one permit. Although the Title V permit is required in addition to any Authority to Construct permits or Permits to Operate required by any local agency, these additional permits are incorporated into the Title V permit and, thus, the Title V permit becomes the overall guiding document for air quality compliance at a site.

State

The California Air Resources Board is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act of 1988. The California Clean Air Act requires that all air districts in the state endeavor to achieve and maintain CAAQS for O₃, CO, SO₂, and NO₂ by the earliest practical date. The California Clean Air Act specifies that districts focus particular attention on reducing the emissions from transportation and area-wide emission sources, and the act provides districts with new authority to regulate indirect sources. Each district plan is to achieve a 5% annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each nonattainment pollutant or its precursors. Any additional development within the region obviously would impede the reduction goals of the California Clean Air Act.

Other California Air Resources Board duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control districts and air quality management districts, establishing CAAQS (which in many cases are more stringent than the NAAQS), and setting emissions standards for new motor vehicles. The emission standards established for motor vehicles differ depending on various factors including the model year, and the type of vehicle, fuel and engine used.

California has implemented air emissions regulations for landfills under the state's air pollution control authority. The state has established control criteria, collection and control system requirements, testing and reporting requirements, and exemption criteria for MSW landfills. Control criteria include levels of tested air contaminants, average maximum concentrations of total organics over a certain area, and maximum concentration of organic compounds as methane at any location along the landfill surface.

Local

The Bay Area Air Quality Management District (BAAQMD), is the local agency responsible for achieving and maintaining the NAAQS and CAAQS. The BAAQMD has the authority to adopt and enforce regulations dealing with new source review, emissions of hazardous air pollutants, and controls for specific types of sources. This authority includes implementation and enforcement of the NSPS, Emission Guidelines, and Title V programs for landfills.

Toxic Air Contaminants

TACs are regulated through implementation of federal and state laws. Federal law uses the term “Hazardous Air Pollutants” to refer to the same types of compounds referred to as TACs under state law. Both terms encompass essentially the same compounds. For purposes of this report, TACs will be used when referring to these pollutants. It is important to note that TACs are not considered criteria pollutants in that the federal and California Clean Air Acts do not address them specifically through the setting of National or State Ambient Air Quality Standards. However, enforcement of NAAQS and CAAQS for the control of criteria pollutants, such as O₃ and PM, can result in reducing airborne emissions of TACs. The following is a summary of the major current federal and state regulations and programs for controlling TAC emissions:

Federal

Title III of the Clean Air Act requires EPA to promulgate National Emissions Standards for Hazardous Air Pollutants for certain categories of sources which emit one or more air pollutants identified as hazardous. Emission standards may be different between “major sources” and “area sources” of TACs. (Major sources are defined as stationary sources with potential to emit over 10 tons per year of any TAC or over 25 tons per year of any combination of TACs; all other sources are considered area sources.) The emission standards are to be promulgated in two phases. In the first phase (1992 - 2000), the EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring Maximum Achievable Control Technology. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001 through 2008), EPA is required to promulgate health risk-based emissions standards where such standards are deemed necessary to address risks remaining after implementation of the technology-based National Emissions Standards for Hazardous Air Pollutant standards.

The Maximum Achievable Control Technology for municipal solid waste landfills (40 CFR, Part 63, Subpart AAAA) was recently promulgated in January, 2003. The landfill Maximum Achievable Control Technology incorporates by reference existing NMOC control requirements set forth in the federal Emissions Guidelines (40 CFR, Part 60, Subpart Cc); as well as, additional record-keeping and the development of operational plans and report. The new rule applies to any landfill, which is defined as a major Hazardous Air Pollutant source or area source (based on NMOC emission and design capacity thresholds) that has accepted waste

since November 8, 1987. Sources that do not exceed the threshold limitations are required to demonstrate and report this fact to the EPA. The existing landfill, as well as the proposed expansion, is subject to this rule.

State and Local Programs

The California legislature has adopted several state bills to control toxic air contaminants. Implementation of state adopted legislation pertaining to the control of TACs are the responsibility of the California Air Resources Board and local air pollution control districts. The most significant legislation applicable to the proposed project is summarized below:

The Tanner Toxics Act (AB 1807): The Tanner Toxics Act established the California toxic air contaminant control program (AB 1807, H&SC Section 39666, et seq.) to identify and control toxic air contaminants. Under the Tanner Act, the California Air Resources Board is required to identify a substance as a TAC based on the review of the scientific data and the recommendations by both the Office of Environmental and Health Hazard Assessment and the Scientific Review Panel. After designation, the California Air Resources Board investigates appropriate measures to limit emissions of the TACs. These measures may include emission limitations, control technologies, operation and maintenance requirements, closed system engineering, cost, or substitution of compounds. The California Air Resources Board then prepares a report on the appropriate degree of regulation and adopts Air Toxics Control Measures. These control measures are the minimum regulations that must be imposed by each of the local air districts in the form of regulations. Districts must adopt rules that are at least as stringent as the state's.

Air Toxics “Hot Spots” Information and Assessment Act: The Air Toxics “Hot Spots” Information and Assessment Act (AB2588) is a state law enacted in 1987. The Act addresses public concerns that emissions from individual facilities might cause local concentration of air toxics “Hot Spots” at a level where individuals may be exposed to an excess risk of adverse health effects. The program requires facilities to notify all exposed persons if it is determined that there is a significant health risk. The law requires certain facilities to submit information regarding emissions of more than 550 toxic air contaminants to their local air pollution control districts. In accordance with these requirements, landfills must perform gas and ambient air testing for ten compounds (vinyl chloride, benzene, ethylene dibromide, ethylene dichloride, methylene chloride, perchloroethylene, carbon tetrachloride, methyl chloroform, trichloroethylene, and chloroform) and report the results to the local air districts. The primary objective of these tests, the so-called air quality solid waste assessment tests, is to provide a screening basis to characterize landfill air releases and subsurface gas migration at landfills. AB 2588 was amended in 1993 by SB 1731, Facility Toxic Air Contaminant Risk Reduction Audit and Plan. In accordance with SB 1731, local air districts are required to establish a program to reduce risks from existing facilities that are deemed to pose a significant health risk.

Waters Bill (AB 3205): AB 3205 (H&S Code Section, 42301.6 through 42301.9) addresses sources of hazardous air pollutants near schools. It requires new or modified sources of hazardous air emissions located within 1000 feet from the outer boundary of a school to give

public notice to the parents or guardians of children enrolled in any school located within one-quarter mile of the source and to each address within a 1,000-foot radius.

AMBIENT AIR QUALITY

Regional air quality management planning in the Bay Area is conducted as a cooperative effort among three regional agencies: the BAAQMD, the Association of Bay Area Governments (ABAG), and the Metropolitan Transportation Commission. O₃ and PM₁₀ are regional air pollutants of concern throughout the Bay Area. State air quality standards for O₃ and PM₁₀ are periodically exceeded in most portions of the Bay Area, including Solano County. CO is a pollutant of concern in some urban portions of the Bay Area. The BAAQMD publishes annual reports of monitoring conducted for air pollutants at various stations throughout the Bay Area. Information concerning Bay Area attainment status for ambient air quality standards that is found on the BAAQMD's web site (<http://www.baaqmd.gov/planning/resmod/baas.htm>) was updated in January 2002 as summarized below:

- ▶ **O₃.** The Bay Area is designated as nonattainment for both the state and federal 1-hour ozone standards. The Bay Area is designated as unclassified for the federal 8-hour ozone standard; a 1999 federal court ruling blocked the implementation of the 8-hour ozone standard. Its status is unclear as of January 2002.
- ▶ **PM₁₀.** The Bay Area is designated as nonattainment for California standards and as unclassified for the federal 24-hour standard.
- ▶ **CO.** The Bay Area attained the state CO standard in 1993. In April 1998, the Bay Area was redesignated to attainment for the federal 8-hour CO standard.

The BAAQMD conducts ambient air quality measurements at its Fairfield air monitoring station. However, O₃ is the only air quality parameter monitored at the Fairfield station. The nearest air quality data resource where the entire spectrum of criteria pollutants (those with NAAQS) is monitored is located in Vallejo, about 15 miles southwest of Fairfield. Table 4.9-2 contains data for key pollutants from 1996 to 2000 at the Vallejo monitoring station.

The project site is located in a rural area with few sources of air pollution other than operations at the landfill site. Surrounding lands are primarily open space and grazing land, with a few scattered rural residences (mostly north and northeast of the landfill). Because the project site is located away from dense concentrations of traffic-related air emissions (e.g., freeways or congested arterial roadways), baseline air quality at the project site is most likely better than that measured in Vallejo.

**Table 4.9-2
Summary of Air Quality at the Vallejo Monitoring Station (1996–2000)**

Pollutant	2000	1999	1998	1997	1996
Ozone					
Maximum 1-hour concentration (pphm) ¹	8	11	12	10	11
Federal days ²	0	0	0	0	0
State days ³	0	4	3	1	5
3-year average ⁴	0.0	0.0	0.0	0.3	0.3
Maximum 8-hour concentration (pphm) ^{1,5}	6	9	—	—	—
Federal days ²	0	1	—	—	—
3-year average ⁴	6.1	6.2	—	—	—
Carbon Monoxide					
Maximum 1-hour concentration (ppm) ¹	6.5	6.6	—	—	—
Maximum 8-hour concentration (ppm) ¹	5.1	5.5	5.3	4.9	4.9
Federal/state days ³	0	0	0	0	0
Nitrogen Dioxid⁵					
Maximum 1-hour concentration (pphm) ¹	6	8	6	7	7
Annual average (pphm) ⁶	1.3	1.4	—	—	—
Federal/state days ³	0	0	0	0	0
Sulfur Dioxide					
Maximum 24-hour (ppb) ¹	5	7	6	5	7
Annual average (ppb) ⁶	1.5	1.4	—	—	—
Federal/state days ³	0	0	0	0	0
PM₁₀					
Annual geometric mean (µg/m ³) ⁷	13.0	16.4	15.0	15.6	15.2
Annual average (µg/m ³) ⁷	15.0	19.5	—	—	—
Maximum 24-hour (µg/m ³) ¹	53	84	—	—	—
Federal days ²	0	0	0	0	0
State days ³	1	3	1	3	0
Notes: µg/m ³ = Micrograms per cubic meter. -- = Not available. ppb = Parts per billion. pphm = Parts per hundred million. ppm = Parts per million. ¹ The highest average contaminant concentration over a 1-hour, 8-hour, or 24-hour period. ² The number of days during the year for which the monitoring station recorded contaminant concentration levels in excess of the federal standard. ³ The number of days during the year for which the monitoring station recorded contaminant concentration levels in excess of the state standard. ⁴ The average number of days per year in excess of the federal ozone standard, based on the most recent 3-year period. An average higher than 1.0 indicates that the region is considered out of attainment by the EPA. ⁵ EPA promulgated the 8-hour standard in mid-1997. ⁶ The yearly average (arithmetic mean) of the readings taken at a given monitoring station. ⁷ The annual geometric mean concentration level (used for PM ₁₀). Source: http://www.baaqmd.gov/pic/apsums.htm .					

4.9.2 PROJECT IMPACTS

THRESHOLDS OF SIGNIFICANCE

For purposes of this EIR, air quality impacts would be considered significant if the project would:

- ▶ violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- ▶ result in cumulatively considerable net increases of any criteria air pollutant for which the County is nonattainment under applicable NAAQS or CAAQS; or
- ▶ create objectionable odors affecting a substantial number of people

The Bay Area Air Quality Management District further defines thresholds of significance as follows:

- ▶ *Construction Impacts.* Project impacts would be considered significant if feasible BAAQMD construction control mitigation measures listed in the BAAQMD CEQA Guidelines are not incorporated.
- ▶ *Regional Impacts.* Project emissions would be considered significant at a regional level if the resulting emissions of ROG, NO_x, or PM₁₀ exceed 15 tons per year or 80 pounds per day.
- ▶ *Localized CO Impacts on Roadways.* Project CO concentrations would be considered significant if a project contributes to CO concentrations exceeding the State Ambient Air Quality Standard of 9.0 parts per million averaged over 8 hours or 20 parts per million for 1 hour.
- ▶ *Toxic Air Contaminants:* Project emissions would be considered significant if sensitive receptors are exposed to substantial pollutant concentrations or elevated levels of toxic air contaminants that would result in a risk of greater than 10 cancers in a million.

Impact
4.9-1

Air Quality Impacts Associated with Expanded Landfill Operations. *The landfill expansion anticipated with project implementation would extend the landfill's operating life and would continue to generate fugitive dust, equipment exhaust, landfill gas, composting emissions, landfill-generated trip emissions, and other mobile source emissions. Project-generated emissions would contribute to existing non-attainment conditions. Therefore, this impact would be considered **significant**.*

In general, emissions from landfills are primarily associated with direct releases of landfill gas, as well as emissions associated with the onsite and offsite combustion sources. Onsite combustion sources of emissions typically include the use of enclosed (ground) flares for disposal of unwanted flammable gases and vapors, as well as the use of heavy duty vehicles for the onsite handling of waste and soils. Other sources of air emissions typically associated with

the operation of landfills include mobile source emissions associated with the delivery of waste to the landfill, emissions generated from the construction of ancillary facilities at the landfill, and employee vehicles. The primary sources of emissions typically associated with landfills are discussed separately, as follows:

Landfill Gas (Fugitive Emissions)

Landfill gas generation is a result of the decomposition of landfill waste. Initially, carbon dioxide (CO₂) is the primary gas produced, the result of waste decomposing under aerobic (i.e., with oxygen) conditions. As oxygen is depleted, anaerobic decomposition (i.e., without oxygen) begins to occur, resulting in emissions of primarily methane (CH₄) and CO₂, and other trace gases, including nitrogen, oxygen, and non-methane organic compounds. Emissions of non-methane organic compounds (NMOC) often contain volatile organic compounds, as well as various organic hazardous pollutants, greenhouse gases, and compounds associated with stratospheric O₃ depletion. Landfill gas generation rates, as well as the percentage of each constituent gas generated, can vary greatly from landfill to landfill, and over time and location within the landfill.

The increased landfill capacity would, over time, result in an increase in the amount of landfill gas generated at the project site. In compliance with 40 CFR Part 60, which establishes standards and guidelines for the monitoring and control of landfill gas emissions, an existing landfill gas collection and control system is in place at the landfill that extracts landfill gas to control surface emissions and subsurface migration of landfill gas. Over the life expectancy of the landfill, the landfill gas collection and control system would be modified and expanded, in accordance with 40 CFR Part 60, to accommodate projected increases in gas flow rates. Approximately 80 percent of the landfill gas emission are assumed to be captured by the landfill gas collection and control system. Tables 4.9-3 and 4.9-4 identify the remaining fugitive emissions of ROG generated from landfill gas on a daily basis. Based on these emission calculations, the fugitive landfill gas emissions of ROG would not substantially increase. However, they would contribute to the total ROG emissions generated with project implementation at the site, which exceed the BAAQMD significance threshold. Therefore, this impact would be considered significant.

Landfill Gas (Power Plant Facility Emissions)

The generation of landfill gas results in secondary emissions associated with burning the gas in an onsite flare, as currently occurs, or burning the gas in a landfill gas power generation facility, which is proposed as part of the project's landfill gas collection and control system. The combustion emissions associated with these gas disposal methods include nitrogen oxides, carbon dioxide, carbon monoxide, and unburned NMOCs. Emissions of sulfur dioxide may result from the burning of sulfur compounds present in the gas, such as hydrogen sulfide, and mercaptans. Additional emissions of concern, including toxic air contaminants, may also occur associated with the combustion of the trace components found within the landfill gas. Toxic air contaminants are discussed in more detail below. The emissions associated with the landfill gas

**Table 4.9-3
Summary of Existing Daily Emissions**

Source of Emissions	PM-10 lbs/day	NOx lbs/day	ROG lbs/day
Landfill Equipment Exhaust	20.0	213	72.0
Transportation Emissions			
Haul Trucks	4.3	170.2	6.0
Autos/Light Trucks	8	183.3	11.7
Fugitive Emissions			
Landfill Gas	0	0	2.35
MSW/Material Handling	140	0	0
Travel-Unpaved Roads	36.9	0	0
Emissions from Energy Recovery <i>(Assumes 90% Control)</i>	11	15	30
Emissions from Composting	0	0	25
TOTAL	221	581	147

Source: Air Permitting Specialists, 2003

**Table 4.9-4
Summary of Existing Plus Project Daily Emissions**

Source of Emissions	PM-10 lbs/day	NOx lbs/day	ROG lbs/day
Landfill Equipment Exhaust	20.0	213	72.0
Transportation Emissions			
Haul Trucks	4.3	170.2	6.0
Autos/Light Trucks	8	183.3	11.7
Fugitive Emissions			
Landfill Gas	0	0	7.08
MSW/Material Handling	140	0	0
Travel-Unpaved Roads	36.9	0	0
Emissions from Energy Recovery <i>(Assumes 90% Control)</i>	10	63	6
Emissions from Composting	0	0	178
TOTAL	219.2	629.5	280.8

Source: Air Permitting Specialists, 2003

power generation facility would not differ substantially from those currently generated by the landfill gas flare and would not contribute to the exceedance of the applicable BAAQMD significance thresholds (Tables 4.9-3 and 4.9-4). Therefore, this impact would be considered less than significant.

Landfill Activities

Landfill activities are a source of fugitive dust and mobile source emissions that can have a substantial impact on local air quality. Fugitive dust generated during landfill operations is primarily associated with excavation and grading activities, waste tipping and compaction activities, vehicle travel on unpaved roads, and wind erosion of exposed graded surfaces and soil storage piles. Also, the construction of facilities, including construction of waste cells, leachate evaporation ponds, stormwater detention basins, siltation basins, and other landfill facilities generate emissions from employee and truck haul trips to and from the landfill, exhaust emissions from grading equipment, and fugitive dust emissions.

Fugitive dust emissions (PM_{10}) associated with material handling and construction activities at the site are a function of such parameters as soil-silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled onsite and offsite. ROG and NO_x emissions are generated primarily by the operation of gasoline- and diesel-powered motor vehicles used in landfill operations.

These emissions are currently generated at the site by ongoing landfill operations. Table 4.9-3 identifies the current daily emissions generated by ongoing landfill operations and Table 4.9-4 identifies the projected daily emissions associated with the proposed project. Because the permitted daily tonnage of waste accepted at the site would not substantially increase, emissions generated from landfill equipment operated at the site, from material handling activities, and from vehicle trips would not substantially differ. However, the proposed increase in composting operations at the site would result in ROG emissions in excess of the BAAQMD significance thresholds. Also, the proposed project would extend the active life of the landfill by approximately 35 years. By extending the active life of the landfill, the generation of landfill emissions from the site would also be extended. Because the proposed project would increase the total emissions generated at the site over the project's life time, this impact would be considered significant.

Mitigation Measure 4.9-1: Air Quality Impacts Associated With Expanded Landfill Operations

The following mitigation measures shall be implemented to minimize impacts associated with expanded landfill operations:

- ▶ All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized for dust emissions using water, chemical stabilizer/suppressant, or vegetative cover.

- ▶ All onsite unpaved roads and offsite unpaved roads shall be effectively stabilized for dust emissions using water or chemical stabilizer/suppressant.
- ▶ All land clearing, grubbing, scraping, excavation, land leveling, grading, and cut and fill activities shall be effectively controlled for fugitive dust emissions by utilizing application of water or by pre-soaking.
- ▶ When materials are transported off site, all material shall be covered or effectively wetted to limit visible dust emissions, or at least 6 inches of freeboard space from the top of the container shall be maintained.
- ▶ All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets.
- ▶ Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized for fugitive dust emissions by utilizing sufficient water or chemical stabilizer.
- ▶ The excavator shall use either water or petroleum-based palliatives (approved for use by the BAAQMD) as a dust control measure.
- ▶ Suspend excavation and grading activity associated with site construction operations when winds exceed 20 mph.
- ▶ Limit area subject to excavation, grading, and other construction activity at any one time.
- ▶ When shredding or chipping of wood or concrete crushing is practiced at the site, the shredding and crushing units shall be equipped with water sprays to provide control of dust. The amount of water used shall be regulated and minimized to avoid runoff, ponding, or leaching of the wood materials.
- ▶ Compost piles shall be water as necessary to maintain the necessary moisture content for composting to occur during the dry weather season and to minimize dust generation. If insufficient water is available on the site and the landfill operator does not wish to haul water to the site for composting operations, the operations shall be reduced or cease as appropriate until such time that adequate water is available.
- ▶ New sources of waste shall be evaluated for potential dust emissions. The specific waste handling protocols shall identify the type of dust control method that will be used. Examples include moistening the waste at the point of generation or placing the material in plastic bags. The case-specific protocols shall be reviewed with the LEA, RWQCB, and BAAQMD before finalizing. If the evaluation of the waste handling protocol indicates the potential for release of fugitive dust or volatile substances, the BAAQMD shall be contacted. If emission controls are anticipated for a new waste that is of substantial quantity and to be frequently delivered over a long time, an application

for amendment of the site Air Permit shall be made, if deemed necessary by the BAAQMD.

- ▶ Comply with the requirements of the revised BAAQMD permit for the proposed composting operations, landfill gas power plant facility and the landfill gas collection and control system at the site. In addition, the project applicant shall comply with the requirements of a full Composting Facility Permit for the site including managing composting operations to minimize the generation of ROG emissions. This shall include monitoring the water content, pile temperature, and turning frequency in order to ensure that composting operations are effectively managed.

Level of Significance after Mitigation

With implementation of the identified mitigation measure, potential air quality impacts associated with the proposed project would be considered less than significant.

Impact
4.9-2

Toxic Air Contaminants. *Three residences are located within approximately 2,000 feet of the proposed Phase I and II expansion areas. These residences would not be exposed to concentrations of toxic air contaminants from onsite sources in excess of applicable standards. This impact is considered **less than significant**.*

As previously discussed, landfill gas is known to contain various concentrations of toxic volatile organic compounds and other chemicals. Also, the primary landfill gas control device, the proposed power plant, which would generate toxic air contaminants, would be located in the northern portion of the site within approximately 1,800 feet of the eastern residence. The majority of these chemicals are typically collected with the landfill gas and routed to an onsite control device (the proposed power plant) for destruction in compliance with existing air quality and landfill regulations. These controls are typically sufficient to maintain human health risks below the levels of significance. A health risk assessment was conducted to ensure that localized concentrations at nearby receptors remain within acceptable levels. Table 4.9-5 summarizes the emission rates for toxic air pollutants associated with fugitive releases of landfill gas, emissions from power generation and diesel particulate from landfill equipment. These emissions were used as input to the California Air Resources Board's HRA96 risk model. In addition to the emission rates of toxic air pollutants, this model also requires the concentration of a generic air pollutant being released at 1 gram per second. The model then uses this information to predict maximum cancer risk at a given location.

The results of the risk analysis indicate that maximum cancer risk due to lifetime exposure (70 years) to toxic air emissions would be 5.05 cancers in a million for the nearest residence to the site. This risk level is below the 10 cancers in a million threshold of significance. Therefore, the proposed project would not result in a significant health risk to the public.

**Table 4.9-5
Summary of Emission Rates of Toxic Air Pollutants**

Compound	From LFG (gram/sec)	From GT (90% Control)	From LF Equip (gram/sec)	Total (gram/sec)
1,1,1 Trichloroethane	2.44E-03	Negl.	0	2.44E-03
Acrylonitrile	9.11E-05	Negl.	0	9.11E-05
Benzene	2.75E-05	4.93E-05	0	7.68E-05
Carbon Tetrachloride	5.76E-08	2.82E-05	0	2.82E-05
Chloroform	4.32E-07	4.22E-05	0	4.27E-05
Ethylbenzene	6.64E-05	Negl.	0	6.64E-05
Ethylene Dibromide	1.44E-08	Negl.	0	1.44E-08
Perchloroethylene	5.37E-05	Negl.	0	5.37E-05
Vinyl Chloride	1.06E-04	3.76E-06	0	1.09E-04
Toluene	5.66E-04	2.58E-04	0	8.24E-04
Xylenes	1.74E-04	7.28E-05	0	2.47E-04
Diesel Particulate			0.012	1.19E-02

Notes:

Gas Turbine Percent Control: 90%

Conversion Factor (lbs/yr to gram/sec) = (1 x 454)/(8760 x 3600): 1.44E-05

Source: Air Permitting Specialists 2003

Mitigation Measure 4.9-2: Toxic Air Contaminants

No mitigation measures will be necessary.

Level of Significance after Mitigation

Potential air quality impacts associated with toxic air contaminants would be considered less than significant.

Impact
4.9-3

Local Air Quality Impact Of Project Traffic. *Given the negligible increase in project-generated traffic, CO concentrations at local intersections would not be anticipated to exceed applicable state or federal ambient air quality standards. As a result, this impact would be considered less than significant.*

The primary mobile source pollutant of concern is carbon monoxide (CO). Localized concentrations of CO are a direct function of the number of vehicles generated by a project, vehicle idling time, and traffic flow conditions. CO concentrations close to congested roadways or intersections may reach unhealthy levels, affecting local sensitive receptors (e.g. residents, school children, hospital patients, and the elderly). However, under normal meteorological conditions, carbon monoxide transport is extremely limited and disperses rapidly with distance from the source.

The proposed project is projected to increase the peak permitted vehicle traffic by 16 vehicles, or 32 one-way trips. This increase in vehicle trips would have a negligible effect on CO concentrations at local intersections used to access the site. Also, sensitive receptors are not located within direct proximity of the landfill entrance road and background CO concentrations along this roadway are relatively low due to the limited traffic that accesses the facility (i.e., a maximum of 500 vehicles per day). Therefore, this impact would be considered less than significant.

Mitigation Measure 4.9-3: Local Air Quality Impact Of Project Traffic

No mitigation measures would be necessary.

Level of Significance after Mitigation

Potential localized air quality impacts associated with project-generated traffic would be considered less than significant.

Impact
4.9-4

Odors Generated From Landfill Operations. *Odors generated from the existing landfill operations have been a source of complaints from the adjacent residences. Odors associated with landfill operations would continue to be generated from the project site. In addition, new sources of odors would be introduced at the site. Therefore, this impact would be considered significant.*

Odor intensities typically are diluted with distance as odoriferous substances mix with air and, as a result, receptors further downwind would be less subject to odor impacts than those closer to the landfill. Maximum odor impacts are expected to occur during the nighttime surface inversions that tend to concentrate and then disperse odors. Limited residential development is located in the vicinity of the project site. As previously discussed, three single-family residences are located within approximately 2,000 feet of the proposed landfill expansion that have been affected by landfill-generated odors in the past and could be in the future.

Neither the EPA nor California Air Resources Board has established ambient air quality criteria for odors. The proposed project would result in emissions of landfill gas resulting from the decomposition of municipal waste over a longer period based on the expanded site life. Odors would be generated at the landfill working face due to the tipping and processing of putrescible waste (wastes that rot, such as food). With the proposed expansion, the landfill's working face would move closer to the existing residences as the northeastern cells of the Phase II area are developed.

Odors generated at the working face are primarily controlled by periodically covering the active face of the landfill with soil. Good cover material generally helps disperse odors over a wide area without any concentrated points of maximum emissions. Soil contains microbes that feed on some of the complex odorants in the landfill gas. The landfill gas control system also helps minimize odors by collecting and destroying landfill gas. However, with the conversion to a 24-hour operation, the application of cover over the working face would occur on a weekly

rather than daily schedule, thus limiting the effectiveness of cover material in controlling odors from the working face.

New odor sources at the site would include the ADC demonstration project, the process of combining high-moisture content and powdery materials and storing the material for use as ADC, and the expanded composting operations. Because the use of alternative materials in ADC would be conducted as a demonstration project, the potential odor generation from these materials would be part of the evaluation criteria. The demonstration project would include an evaluation of the effectiveness of various odor management methods. The use of ADC in the demonstration project would require regular evaluations of site logistics, weather conditions, performance of the cover, and odor and dust occurrence. The Local Enforcement Agency would be responsible for monitoring the ADC demonstration project and determining if odor generation is a nuisance for adjacent residences. Biosolids and other pollution control residues would be required to be evaluated for odor nuisance potential before being stored or used as ADC. In order to minimize odor nuisances, ADC materials that have some objectionable odor if stored in wet conditions (i.e., soggy reject compost) would be required to be mixed with soil, covered with a soil layer, or tarped during storage. Increased odor generation at the site associated with the implementation of the ADC demonstration project may occur. However, one of the main purposes of the demonstration project is to determine whether alternative materials used as ADC would cause any nuisance. Therefore, if the alternative materials used in the ADC demonstration project generate nuisance odors, the use of the odor-generating material would not be considered an effective ADC and it would not be considered for wider use at the site.

Combining high-moisture content and powdery materials in order to create ADC could generate nuisance odors, depending upon the odor generating characteristics of the high-moisture content materials. These materials would typically include liquids, muds and sludges that could generate significant odors. These high-moisture content materials would be mixed with dry powdery materials on the dormant intermediate or final capped areas of the landfill over an area of approximately 2 acres. Usually the material would be used as ADC as soon as it is received and the blending process is completed. However, in some instances, such as when dried sludge ponds are cleaned during the summer, several thousand cubic yards of material are delivered over a one to two week period. In this situation, the stockpiled material would be used over several months. Due to the odor generating potential of high-moisture content wastes and the potential for the combined materials to be stored on the site over several months, the odor impacts associated with this project component would be considered significant.

Adding biosolids to the composting operation and using other methods of handling sludge could increase odors if the compost windrow piles became too wet and stagnant (anaerobic conditions will create offensive odors), the seasonal sludge-drying ponds are not properly managed, or land application of biosolids is excessive. These components of the Phase II Project require revising the existing green material composting permit to a full composting facility permit and revising the Report of Disposal Site Information. The landfill operator

would be required to monitor the water content, pile temperature, and turning frequency in order to ensure that composting operations are effectively managed. However, due to the existing complaints received from the adjacent residences, it is anticipated that increasing the composting operations at the site and allowing other methods for handling sludge would result in increased nuisance odors by these residences. Based on the odor nuisance that could result for the adjacent residences, this impact would be considered significant.

Mitigation Measure 4.9-4: Odors Generated From Landfill Operations

In order to minimize odor generation at the adjacent residences, all composting operations at the site shall be relocated from the northern site boundaries to the center or southern portions of the site. Sludge processing and storage operations, and the mixing and storage of high-moisture content materials combined with dry powdery materials, shall also only occur in the center or southern portions of the site.

In addition, the project applicant shall modify the Odor Impact Minimization Plan submitted to the Local Enforcement Agency in April 2003 to include odor control measures for the 24-hour operation of the working face, the land application of biosolids and the use of seasonal sludge-drying ponds. Odor control measures for the working face could include increasing the frequency of cover application, as necessary to control objectionable odors. Odor control measures for the sludge handling processes would include the use of either a vapor phase counteractant system during sludge processing operations or the use of topical applicants as an odor neutralizer at the close of sludge spreading or borrowing operations. The vapor phase counteractant system would consist of an automated pumping system that delivers a mixture of concentrated odor counteractant to a high pressure distribution hose that is equipped with misting nozzles. The system produces a fog downwind of the odor area that mixes with the odor and masks or counteracts its nuisance effects. A topical applicant would consist of a potassium solution applied to wet sludge as a topical odor neutralizer.

If sludge odor problems persist, receipt of incoming sludge shall be discontinued and the existing, onsite source of the odor shall be landfilled and covered with soil.

Level of Significance after Mitigation

With implementation of the identified mitigation measure, potential odor impacts associated with the proposed project would be considered less than significant.

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