Appendix I

Glossary and List of Acronyms

GLOSSARY AND LIST OF ACRONYMS

Acid Insoluble Residue - Soil components not absorbed by the gastrointestinal tract that are used as a tracer for estimating soil ingestion .

Air Toxics "Hot Spots" Act Emission Inventory Reports - Documents that contain information regarding emission sources, emitted substances, emission rates and release parameters, prepared under the Emission Inventory Criteria and Guidelines (also referred to as "Inventory Reports").

Air Toxics "Hot Spots" Information and Assessment Act of 1987 (Health and Safety Code Section 44300-44394) - A state law which established the "Hot Spots" Program to develop a statewide inventory of site-specific air toxic emissions, to assess the risk to public health from exposure to these emissions, to notify the public of any significant health risks and to reduce emissions below the significant risk levels.

Algorithm - A set of rules for solving a problem in a finite number of steps.

Basal Metabolic Rate - The rate of oxygen intake and heat discharge in an organism in a basal (resting) state.

BG - Urban Block Groups. A geographical unit smaller than a census tract used for reporting census data.

Bioavailability - The degree and rate at which a substance is absorbed into a living system or is made available at the site of physiological activity.

Bioconcentrate - The process of increasing contaminant concentration in biota up the food chain as contaminants are ingested and concentrated in tissues of organisms higher up in the chain.

BPIP - Building Profile Input Program

Breathing Rate - The amount of air inhaled in a specified time period (e.g., per minute, per hour, per day, etc.); also called inhalation rate and ventilation rate.

Calms - A meteorological condition characterized by low wind speed values (generally wind speeds below 1.0 m/s). Wind speeds below the starting threshold of the anemometer or vane (whichever is greater) are normally considered calms.

CALMPRO - A U.S. EPA software program for processing calms.

Cancer Potency Factor - The theoretical upper bound probability of extra cancer cases occurring in an exposed population assuming a lifetime exposure to the chemical when the chemical dose is expressed in exposure units of milligrams/kilogram-day (mg/kg-d).

CAPCOA - California Air Pollution Control Officers Association

CARB - California Air Resources Board

CAS Number - Chemical Abstract Service Registry Number. A number consisting of up to nine digits and used to identify toxic substances on the "Hot Spots" list of substances included in the Inventory Criteria and Guidelines Report.

Cavity Region - A recirculating region of air adjacent to an obstruction of the wind flow.

Centroid Locations - The location at which calculated ambient concentration is assumed to represent the entire subarea, typically the geometric centroid of an area, but possibly the population-weighted centroid of the area.

Census Tract - A physical area used by the U.S. Census Bureau to compile population and other statistical data.

CERCLA - Comprehensive Environmental Response, Compensation and Liability Act

Chronic (noncancer chronic) - In relation to exposure and toxicity, chronic exposure refers to exposure that occurs over prolonged periods of time; noncancer chronic adverse health effects are those non-neoplastic effects associated with chronic exposure to a toxicant.

Complex Terrain - A terrain located above the plume height.

Composite Sample - A nondiscrete sample composed of more than one specific sample collected at various sampling sites and/or times and mixed and treated as one.

CTDMPLUS - Complex Terrain Dispersion Model Plus. A refined Gaussian model used for all stability conditions in complex terrain.

CTSCREEN - A screening model designed to provide worst-case 1-hour concentration estimates for receptors located on terrain above stack height. CTSCREEN is the screening version of CTDMPLUS.

Cumulative Distribution Function - A function $F(x)$ is the probability that the value of a random variable will be less than or equal to **x**. Therefore, $F(x) = P(x \leq \mathbf{x})$

Default - A value used when specific information that applies to a specific situation is not available.

Deposition Velocity - Deposition velocity is a measure of the rate at which a pollutant can be retained at a surface exposed to ambient air. It involves the sum of gravitational settling for larger particles and turbulent and molecular diffusion for gases, vapors and fine particles and can occur as the result of chemical absorption, adsorption, impaction, photosynthesis, and other biological, chemical and physical processes.

Dermal Absorption Fraction (ABS) - The amount of chemical absorbed through the skin compared to the amount of chemical applied to the skin surface. The ABS may be based on the total amount retained after washing the skin, or on the amount that has been systemically absorbed.

Dermis - The highly vascular layer of skin that contains blood vessels, lymphatics, and nerves, and provides the connection between the epidermal layer of the skin and the systemic circulation.

Deterministic - Definite; not subject to random variation, as in following a physical law such as the law of gravity.

Dispersion Coefficients - Coefficients used in air dispersion models to account for horizontal and vertical spread of the plume resulting from turbulent transport and pseudodiffusion in the atmosphere.

Dispersion Model - A group of related mathematical algorithms used to estimate (model) the dispersion of pollutants in the atmosphere due to transport by the mean (average) wind and small scale turbulence. Ψ

Disposition - The absorption, distribution, metabolism, and elimination of chemicals throughout the organism.

District - see *Local Air District*

Dominant Pathway - As defined in this document, the dominant pathway is any exposure pathway which contributes 35% or greater to the overall risk.

Dose, applied - The amount of chemical at the exposure barrier (skin, lung, gastrointestinal tract) available for absorption.

Dose, internal - The amount of chemical that has been absorbed and is available for interaction with biologically significant receptors.

Dose, potential - The amount of chemical ingested, inhaled, or in material applied to the skin.

Dose-response assessment - The process of characterizing the relationship between the exposure to an agent and the incidence of an adverse health effect in exposed populations.

Downwash - A phenomenon associated with the aerodynamic flow around an object that causes pollutants to be entrained into the wake of the object, e.g., around a building (building downwash) or around a smokestack with too low an exit velocity (stack-tip downwash).

DTSC - Department of Toxic Substances Control

ED - Rural Enumeration District. A geographical unit smaller than a census tract used to report census data.

Emission Inventory Criteria and Guidelines - Regulation and Report adopted by the California Air Resources Board specifying criteria and procedures for the preparation of Air Toxics "Hot Spots" Act Emission Inventory Reports (Title 17, California Code or Regulations, Sections 93300-93300.5)

Empirical Distribution - That probability distribution derived from empirical data.

Epidermis - The thin non-vascular outer layer of skin cells, including the stratum corneum.

Exposure - The condition of a chemical contacting the outer boundary of a person.

Exposure Pathway - A route of exposure by which xenobiotics enter the human body, e.g., inhalation, ingestion, dermal absorption.

Fisher - A person who catches noncommercial fish.

Flat Terrain - A special case of Simple Terrain.

Fugitive Particulate - Particle emissions that are not released by a point emission source such as a dust or stack, but that occur from distributed sources such as storage piles or from unpaved roads.

Fumigation - A transient phenomenon that eliminates the inversion layer containing a stable plume below, causing mixing of pollutants downward and resulting in uniform concentration with height beneath the original plume centerline.

Gastrointestinal relative absorption factor (GRAF) - The fraction of contaminant absorbed by the gastrointestinal tract relative to the fraction of contaminant absorbed from the matrix used in the study.

Gaussian Model - An air dispersion model based on the assumption that the time-averaged concentration of a species emitted from a point source has a Gaussian distribution about the mean centerline.

General Population - The population living within the zone of impact.

GMT - Greenwich Mean Time. The time at the 0° meridian.

Gravitational Settling - A physical process that causes airborne pollutants, especially particulate matter, to settle under the action of gravity.

Hazard Index (HI) - The sum of individual acute or chronic hazard quotients (HQs) for each substance affecting a particular toxicological endpoint.

Hazard Quotient (HQ) - The estimated concentration divided by the acute or chronic reference exposure level for a single substance and a particular endpoint.

Hydration - Absorption of water.

Hydrophilic - The ability of a chemical to dissolve in water.

Inductively Coupled Plasma Atomic-Emission Spectrometry - An instrument used to measure concentrations of metals in water samples, extracts, and digests.

Inferential Statistics - A theory of statistics that allows general statements (conclusions) about a large body of potential observations (the population), from a smaller sample of actual observations taken from the population.

Inhalation Rate - The amount of air inhaled in a specified time period (e.g., per minute, per hour, per day, etc.); also called breathing rate and ventilation rate.

Interindividual Variability - Variability in the human population, e.g., with respect to response to a toxicant.

Intermediate Terrain - A terrain located above the stack height and below the plume height.

Inventory Guidelines - see *Emission Inventory Criteria and Guidelines*

Inventory Guidelines Report - see *Emission Inventory Criteria and Guidelines*

Inverse Cumulative Distribution Function - A function $F^{-1}(x)$, the inverse of the cumulative distribution function.

Inversion - An atmospheric condition defined by temperature increase with elevation that normally inhibits the upward transport of pollutants. The term is also used to define the atmospheric layer where such condition exists.

In vitro - The description of a biological or physiological system studied outside of an intact animal. *In vitro* systems include isolated organ systems, isolated cell preparations, and purified cellular components.

In vivo - The description of a biological or physiological system studied in a living organism.

ISCLT - Industrial Source Complex - Long-Term (dispersion model).

ISCST - Industrial Source Complex - Short-Term (dispersion model).

Kolmogorov Smirnoff Test - A highly conservative test used to determine whether or not a distribution is normal. The test assumes that (1) the sample $X_1, X_2,...,X_n$ is a random sample and that (2) the hypothesized population Cumulative Density Function is continuous and known (if it has parameters, their values are known).

K_{ow} - The equilibrium concentration ratio of a chemical between an octanol and a water layer, representing a measure of the relative lipophilicity of a chemical; often expressed as a logarithm (log K_{ow}).

Kurtosis - The fourth moment about the mean and a measure of the distribution's peakedness.

$$\text{Mathematically, kurtosis} = \frac{\sum_{i=1}^{n} (x_i - \bar{x})^4 \ p(x)}{s^4}$$

Limiting Tracer Method - A method of estimating soil ingestion that assumes the maximum amount of soil ingested by a subject corresponds to the lowest estimate from the tracers used.

Lipophilic - The ability of a chemical to dissolve in a lipid phase; also called hydrophobic.

Local Air District - An air pollution control district or air quality management district created or continued in existence pursuant to Health and Safety Code, Part 3, and as defined in Health and Safety Code Section 39025.

Lognormal Distribution - A probability distribution that is distributed lognormally such that the log of the values is a normal distribution.

Mass Balance Approach- A method used in soil ingestion tracer studies where ingestion of food and medicine is accounted for in addition to soil.

Matrix - The material in which a substance is embedded or dissolved; often a complex mixture.

Mean - The arithmetic average**.**

Median - The 50th percentile in a distribution; the point at which half the values are below and half the values are above that value. In a normal distribution, the mean is equal to the median.

MEIR - Maximum Exposed Individual at an existing Residential receptor

MEIW - Maximum Exposed Individual Worker (at an existing occupational receptor

Metabolism - Chemical changes caused by biological activity. In skin, metabolism takes place in the viable-epidermal layer and the dermis. Metabolism does not occur in the stratum corneum.

Meteorology - The science that deals with the phenomena of the atmosphere especially weather and weather conditions. In the area of air dispersion modeling, *meteorology* is used to refer to climatological data needed to run an air dispersion model including: wind speed, wind direction, stability class and ambient temperature.

Minute Ventilation - The volume of air inhaled per minute.

Mixing Height - The depth through which atmospheric pollutants are typically mixed by dispersive processes. Ψ

Monte Carlo Simulation - Application of random sampling to obtain an approximate value of an expression.

MPRM - Meteorological Processor for Regulatory Models, recommended by U.S. EPA.

MPTER - Multiple Point Gaussian Dispersion Algorithm with Terrain Adjustment. A refined air dispersion model capable of handling multiple point sources.

Multipathway - The ability of certain airborne emissions to enter the body by routes in addition to the inhalation route.

Multistage Study - Random samples that are selected from increasingly smaller groups in a population.

NCDC - National Climatic Data Center. The federal agency responsible for distribution of the National Weather Service upper air, mixing height and surface observation data.

Noncommercial Fish - Fish that are not purchased from commercial sources.

Non-metabolized Tracer Element - An element introduced into a matrix (e.g., soil) that is not absorbed or involved in the metabolic pathway following ingestion and which can be measured in the excretory products.

Nonparametric - A variate based on a model-free assumption in regards to its distribution, i.e., no distribution is assumed.

Non-viable Epidermis - see S*tratum Corneum*

Normal Distribution - A probability distribution that is distributed normally.

NWS - National Weather Service

OEHHA - Office of Environmental Health Hazard Assessment

On-site Data - Data collected from a meteorological measurement program operated in the vicinity of the site to be modeled in the dispersion analysis. Ψ

Order Statistics - The sample values observed after they have been arranged in increasing order.

Parametric - Characterized by a particular distributional model, usually normal or lognormal.

Parametric Distribution - A distribution that is characterized by a particular distributional model.

PCRAMMET -Meteorological processor recommended by U.S. EPA.

PCSTAR - Software for processing stability array (STAR) data recommended by U.S. EPA.

Percutaneous Absorption -The absorption of a chemical across the skin surface.

Permeability Coefficient - The rate at which a chemical penetrates the skin (or other barrier), in centimeters per hour.

Pica - An abnormal craving for eating nonfood items including soil.

PM10 - Particulate matter less that 10 μm in diameter.

PMI - Point of Maximum Impact

Point Estimate - A single value estimate for a given variate.

Prioritization - A process by which stationary sources in the Hot Spots program are ranked based on their emission estimates, proximity to receptors, and other factors.

Probability Distribution Function - Probability Density Function: In the most generalized form, any function *f* can serve as a density of a continuous random variable **x** if it satisfies the following:

$$\int_{-\infty}^{\infty} f(x)\, dx = 1$$

where: $f(x) \geq 0$
                  $-\infty < x < \infty$

Probability Quantile Scores - The fractional ranks, based on quantile scores (i.e., percentiles) are used to find normal scores that are a linear function of the raw data if the data are normally distributed. That is, a unique rank (e.g., the highest or lowest value) of a ranked datum will be found at a certain point on a normally distributed curve and assigned a certain value that should be a linear function of the raw datum of the same rank. The normal score is computed as follows: $y_i = \Phi^{-1}(r_i - 3/8)/(n+1/4)$ where Φ^{-1} is the inverse cumulative normal function, r_i is the rank of the ith observation, and n is the number of nonmissing observations for the ranking variable.

PROC Univariate - A SAS software program which yields many descriptive statistics.

Quantile Estimate - Values of a variate dividing the distribution of the individuals into a given number of groups of equal frequency.

RCRA - Resource Conservation and Recovery Act

Reference Exposure Level - A concentration in air at or below which adverse health effects are not expected for a specified exposure (e.g., acute or chronic).

Refined Models - Air dispersion models designed to provide more representative concentration estimates than screening models taking into account actual meteorological conditions.

Regulatory Options - A prescribed set of options, switches or parameters that must be set or entered into an air dispersion model for the results to be recognized as valid by a regulatory agency, such as an Air District.

Residency - Living at a single address.

Risk Assessment - A comprehensive analysis of the dispersion of hazardous substances in the environment, their potential for human exposure, and a quantitative assessment of both individual and population-wide health risks associated with those levels of exposure.

Risk Isopleth - Contours of constant estimated risk or constant hazard index (HI), typically corresponding to contours of constant pollutant concentration.

Rolling Terrain - A gradually rising terrain.

RTDM - Rough Terrain Diffusion Model used to estimate pollutant concentrations in complex terrain.

SAS - An Institute which produces a wide variety of statistical software.

Sample Variance - $s^2 = \dfrac{\sum\limits_{i=1}^{n}(x_i - \bar{x})^2}{n-1}$. The variance measures the degree of variability about some measure of central tendency, usually the mean.

Scenario - A description of a plausible association of exposure factors. Values used for the individual variates should be within the range of normal, known variation, but the assemblage of factors may be unique.

SCRAM BBS - Support Center for Regulatory Air Models - Bulletin Board System. An electric bulletin board system used by U.S. EPA for disseminating air quality dispersion models, modeling guidance, and related information. Ψ

Screening Models - Dispersion models used to provide a maximum concentration that is likely to overestimate public exposure.

Screening Risk Assessment - A risk assessment based on a screening air dispersion model.

Sensitive Receptor - An individual who may be more sensitive to toxic exposures of a particular pollutant than the general population, e.g., persons suffering from asthma or heart disease, or children.

Settling Velocity - A physical process that causes airborne pollutants, especially particulates, to settle on a surface.

Simple Terrain - A terrain located below stack height.

Skewness - The third moment about the mean and a measure of symmetry. The larger the absolute value of a measure of skewness is, the less symmetrical the distribution is.

$$\text{Mathematically, skewness} = \frac{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^3}{s^3}$$

Soil-loading -The weight of soil per skin area (e.g. mg soil / cm^2 skin).

Spirometry - The measurement of the capacity of the lungs using instruments.

Stability (atmospheric) - Resistance to vertical mixing, often, but not necessarily associated with temperature inversions.

Stability Class - Stability Class describes the potential of atmospheric conditions to disperse pollutants through the process of turbulent diffusion. A relatively stable atmosphere contains very little turbulence so that pollutant concentrations remain high. Unstable atmospheric conditions promote vertical mixing and, thus, lower pollutant concentrations. The original Pasquill Stability Classifications consisted of six classes; A, the most unstable, through F, the most stable.

STAR - STability ARray, a joint frequency distribution summary of stability category, wind speed and wind direction. The STAR data are used as input for the ISC Long Term and other dispersion models. Ψ

Stochastic - A process that involves random variation.

Stratum Corneum - The thin outermost layer of skin, consisting of dead, flattened epidermal cells; also called the non-viable epidermis. In general, penetration of stratum corneum is the rate-limiting step in dermal uptake.

Subcensus Tract - Smaller population unit within a census tract.

Surrogate - As used in this document refers to a single substance category used to represent a family of related chemical compounds, e.g., gasoline vapors or POM (polycyclic organic matter) in place of benzo(a)pyrene.

Triangular Distribution - A distribution that can be characterized by a triangle.

TSP - Total Suspended Particulate. A measure of ambient particle concentrations measured by a high-volume sampler and formerly the method by which the ambient air quality standard for particles was expressed.

UNAMAP - User's Network for Applied Modeling of Air Pollution. A collection of dispersion models and closely related support utilities used for disseminating models prior to the SCRAM BBS. Ψ

Uncertainty - True uncertainty is that which is not known about a factor that influences its value.

Unit Risk Factor - The theoretical upper bound probability of extra cases occurring in the exposed population assuming a lifetime exposure by inhalation to the chemical when the air concentration is expressed in exposure units of per microgram/cubic meter - $(\mu g/m^3)^{-1}$.

UTM Coordinates - Universal Transfer Mercator Coordinates. Coordinates used to define a specific location by means of two values (i.e., easting and northing coordinates).

Vapor Pressure - The pressure exerted by a chemical vapor in equilibrium with its liquid or solid phase at any given temperature, used to calculate the rate of evaporation of a substance.

Variability - Change due to the randomness in nature.

Variance, sample - A measure of the degree of variability about some measure of central tendency, usually the mean; the square of the standard deviation.

$$\text{Mathematically, Sample Variance} = s^2 = \frac{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2}{n-1}$$

Variate - A variable quantity associated with a probability distribution.

Ventilation Rate - The amount of air inhaled in a specified time period (e.g., per minute, per hour, per day, etc.); also called breathing rate and inhalation.

Vertical Extent - Refers to the verticle region occupied by a pollutant in the immediate vicinity of the point of discharge, e.g., the region between the discharge point of a stack and the height at which the discharge levels out.

Viable Epidermis - The metabolically active, morphologically changing, and dividing multicellular epidermal layer of skin. It is located between the dermis and the stratum corneum (non-viable epidermis).

Volatile - Chemicals that rapidly pass off from the liquid state in the form of vapors.

Wake Region - The regions of disturbed airflow behind an object.

Wind Profile Exponent - The value of the exponent used to specify the profile of wind speed with height according to the power law. Ψ

Worst-Case Meteorology - The most unfavorable meteorological conditions (i.e., those resulting in the highest concentration estimates) that can be reasonably expected to exist at a given location.

Zone of Impact - A geographical area surrounding the source used to assess health risks. For carcinogenic analysis, the zone of impact is that area in which the total excess lifetime cancer risk from inhalation and noninhalation exposure to all emitted carcinogens is greater than a certain level (generally 10^{-6}). For noncarcinogenic analysis, the zone of impact is that in which the hazard index (HI) from inhalation and noninhalation exposure is greater than a certain level (generally 1).

Ψ Taken from "User's Guide for the Industrial Source Complex (ISC3) Dispersion Models - Volume I:User Instructions". U. S. Environmental Protection Agency. EPA-454/B-95-003a. Research Triangle Park, NC. 1995.