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ENVIRONMENT AND WATER RESOURCES

PUBLIC HEALTH SURVEY AND BASELINE HEALTH RISK ASSESSMENT ENVIRONMENTAL AND PUBLIC HEALTH IMPACTS STUDY

PREPARED FOR:

OMNITRANS

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LIST OF ACRONYMS AND ABBREVIATIONS

ADD	Average Daily Dose
CalEPA	California Environment Protection Agency
CalTrans	California Department of Transportation
CARB	California Air Resources Board
CFR	Code of Federal Regulations
COPC	Chemical Of Potential Concern
CSF	Cancer Slope Factor
dL	Deciliter
DTSC	Department of Toxic Substances Control
EPA	Environmental Protection Agency
EPC	Exposure Point Concentrations
FOD	Frequency Of Detection
HI	Hazard Index
HQ	Hazard Quotient
HRA	Health Risk Assessment
kg	Kilogram
LADD	Lifetime Average Daily Dose
Lpm	Liter Per Minute
m	meters
MDL	Method Detection Limit
ug	microgram
mg	milligram
NAS	National Academy of Sciences
nm	nanometers
PRP	Potentially Responsible Parties
ppb	parts per billion
ppbv	parts per billion by volume
QA/QC	Quality Assurance/Quality Control
RAGS	*Risk Assessment Guidance for Superfund*
RfC	Reference Concentration
RfD	Reference Dose
RME	Reasonable Maximum Exposure
SCAQMD	South Coast Air Quality Management District

SIA	Supplemental Investigation and Assessment
SRHS	Self-Reported Health Status
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Compounds
UC	University of California at Riverside
UCL	Upper Confidence Limit
USGS	United States Geologic Survey
USDA	United States Department of Agriculture
VOCs	Volatile Organic Compounds

EXECUTIVE SUMMARY

Komex H2O Science was retained by Omnitrans to perform an Environmental and Public Health Impacts Study of it fueling facilities in accordance with the requirements outlined in California Senate Bill 1927. This assembly bill was generated out of concerns expressed by residents living near the Omnitrans fueling facility at 1700 W. Fifth St., San Bernardino, California.

Omnitrans operates three fueling stations located at 1700 West 5th Street, San Bernardino (Metro Station); 234 South I Street, San Bernardino; and 4748 Arrow Highway, Montclair, California. The stations located on West 5th Street (San Bernardino) and Arrow Highway (Montclair) dispense liquid to compressed natural gas (LCNG) and diesel fuel to buses using the facility. Unleaded gas is also dispensed to staff cars, vans, and trucks. The station located on South I Street dispenses unleaded gasoline to buses using the facility.

The Metro Station fuels a fleet of more than 100 buses, houses two 30,000 gallon, double-walled LCNG storage tanks (Omnitrans, 2002). The daily fuel demand is approximately 11,000 gallons (Omnitrans, 2002). LCNG deliveries via tanker truck to the facility occur six days per week to ensure that tanks are "topped off". An elementary school, Ramona-Alessandro Elementary School is located to the northeast of the Metro Station across Medical Center Drive. The Metro Station has been the main focus of community odor complaints.

Since the construction of the three facilities, 181 odor complaints have been logged with the South Coast Air Quality Management District (SCAQMD). Of the 181 complaints, 164 pertained to the Metro Station facility and 12 to the I street facility.

A reanalysis of the redacted nursing logs from the Ramona-Alessandro Elementary School and Thompson Elementary School covering the period from January 2, 2002 to March 29, 2002 was performed. Thompson Elementary School is located approximately 6.5 miles east of Ramona Alessandro Elementary School in the Highland, California. An analysis of variance (ANOVA) of all the health effects measured above was performed to determine whether there was a difference in the responses that could be attributed to the fugitive emissions from the Omnitrans facility. Two health effects, spontaneous bloody noses and bloody noses caused by impacts, were found to have significant differences between the schools (greater at Ramona Alessandro than Thompson). The p value for spontaneous bloody noses and impacted caused bloody noses were both determined to be less than 0.05 (0.02 and 0.01, respectively). Other

health effects normally associated with exposure to air pollutants, including spontaneous vomiting, motion induced vomiting, nausea and headaches, and respiratory distress were determined not be significantly different between the schools.

Reports of spontaneous vomiting, spontaneous bloody noses, and respiratory distress had a low correlation coefficient with symptoms of nausea/headaches.

Local area business surveys were performed to determine the types of businesses located within one-half mile of the Omnitrans facilities and the types of emissions that were coming from each facility. The types of chemicals used, volumes of materials emitted, and potential emission stacks were noted in the survey. The results of the surveys were used to compile an emission estimate for all surveyed facilities in the vicinity of each Omnitrans facility. In addition to the physical survey of the sites, a search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR) for a radius up to one mile around each Omnitrans facility. A number of facilities were located near each of the Omnitrans facilities that are listed on State or Federal databases as storing, using, or emitting potential hazardous chemicals.

During October 2003, surveyors attempted to interview as many residents located within one-half mile of each of the fueling facilities to estimate public health. At the end of the survey period, a total of 597 residences were contacted; approximately 25% of the residences contacted during the survey process agreed to participate in the survey (151 residences); 54% verbally declined to participate; and 21% of the residences were either abandoned, had dogs on the residence or did not respond.

Requests have been made to the San Bernardino Unified School District (SBUSD) to survey students at the Ramona Alessandro Elementary School. When permission is granted by the SBUSD, the students will be surveyed and the results will be included in the final report.

Statistical testing of the self-reported health status (SRHS) of the residents surveyed in each community demonstrated no relationship between health status and proximity to the Omnitrans fueling stations. A relationship between the health statuses from previous years to current years (5 years ago, 3 years ago, and 1 year ago) was observed. Self-reported health status was primarily "about the same" for the majority of respondents in each community. Self-reported disease prevalence demonstrated no relationship with proximity to the Omnitrans fueling stations. A relationship between self-reported disease prevalence and age (older residents have more diseases) was observed. The current health status for most residents was primarily good or fair for all distances from the fueling stations. A small portion of respondents indicated that their current health status was poor.

The Industrial Source Complex-Short Term (ISCST3) model was performed on the industrial sources identified in within the half-mile radius of the Omnitrans facilities. The model is a steady state Gaussian plume model and is approved by the U.S. EPA for estimating ground level impacts from point and fugitive sources in simple and complex terrain. Meteorological data from the local SCAQMD's monitoring stations were used to represent local weather conditions and prevailing winds. The model was used to calculate the annual average chemical concentrations associated with each emitting source.

The modeling analysis also considered the spatial distribution of each emitting source in the relation to the community. Predicted mass ground level concentrations (GLCs) corresponding to the model output values expressed in micrograms per cubic meter (ug/m^3) were derived.

Several hypothetical receptors (persons) were identified with the objective of identifying those persons who would potentially be at greatest risk from activities at the Sites. The receptor with the greatest estimated potential cancer risks and noncancer hazard indices (HI) was the hypothetical onsite residential receptor whose higher risk is due to the greater exposure potential from longer exposure duration.

In no case evaluated in this risk assessment did the estimates of potential cancer risk and noncancer HI for receptors at the Site exceed the California Environmental Protection Agency's (CalEPA) Department of Toxic Substances Control (DTSC) risk management range. No estimated potential risks exceed the United States Environmental Protection Agency (EPA) acceptable risk range (40 Code of Federal Regulations [CFR] 300.430(e)(2)(I)(A)(2); EPA, 1991). No significant risks to students, residents, or employees were identified in this evaluation.

Conclusions from the study include:

- Self-reported health status demonstrated a larger proportion of respondents reporting a decline in health (past five years) near the Metro station than the other two facilities. The specific cause of the self-reported decline in health is unknown. The reports of health status from all three communities surveyed were normally distributed The health status for each community were not skewed indicating a negative health effect from the refueling stations (the health status in each community were not significantly different);
- There was no difference in the health status when a comparison was made between the sites even when the fuel types dispensed were taken into account;
- A survey of students, those living near the school and those living farther away from the Ramona Alessandro Elementary School, found that most students reported their health as fair to excellent.

- A survey of staff from the Ramona Alessandro Elementary School, found that most reported their health as fair to excellent. Staff members who lived within ½ mile of the site responded that their health was either fair (n=10) or poor (n=2) and that their health had declined somewhat since starting work at Ramona Alessandro Elementary School. The responses from staff members living within ½ mile of the Omnitrans facility appear to have been coordinated or written by the same person, and are suspect;
- Actual risk from emissions from the Omnitrans facilities are unlikely to exceed risk management guidelines set by U.S. EPA or the California EPA;
- The risks to community members from mobile sources emitting diesel particulate emissions exceeds all other risks from fugitive emissions of other sources in the area. According to the most recent SCAQMD study on mobile and stationary sources, the communities adjacent to the 5th Street and I Street stations are in a zone where the risk from mobile sources (I-10, I-215 Freeways) exceed 1,000 in 1,000,000 (SCAQMD, 2003).
- The self-reported health status in each community has not been adversely impacted by the presence of the Omnitrans fueling facilities;
- Multiple sampling events have failed to confirm continuing releases of natural gas used as fuel; and
- Odor complaints generated after the removal of the compressed natural gas system appear to be related to the quarterly pump outs of wastewater sumps at the Metro facility.

TIMELINE OF ENVIRONMENTAL CONCERNS

Emissions from the Omnitrans compressed natural gas system; initially installed in 1998 at the Metro facility have been a source of complaints since 1998. The timeline of complaints include:

- **1998:** Omnitrans began CNG fueling at the Metro Station (Mikels, 2002);
- **August 1998:** First odor complaint received from Ramona-Alessandro Elementary School (Mikels, 2002);
- **July 1999:** Second odor complaint from Ramona-Alessandro Elementary School (Mikels, 2002);
- **July 1999 to December 1999:** Ramona-Alessandro Elementary School logs 19 odor complaints (Mikels, 2002);
- **September 1999:** Omnitrans begins notifying Ramona-Alessandro Elementary School and Fire Department when odors are generated at station (Mikels, 2002);
- **January 2000 to June 2000:** Two odor complaints logged at Ramona-Alessandro Elementary School (Mikels, 2002);
- **November 2000:** Enhancements to address venting issues made to CNG system (Mikels, 2002);
- **November 2000:** Omnitrans staff holds meetings with Ramona-Alessandro Elementary School PTA and with Community at Villaseñor Library (Mikels, 2002);
- **December 2000:** "Southern California Gas Company checked the engines on the 2 natural gas powered compressor units and found that the exhaust pipe to catalytic converter on one engine was cracked, allowing cool air into the converter. Also, the preheaters were not functioning due to electrical shorts in the controls. These operating conditions could allow mercaptan odors to escape from the system" (Complaint Report 138702);

  "Natural gas is compressed and maintained at constant pressures between 3600 PSI and 4000 PSI in a system with constant vibration which leads to possible leaks from the numerous fittings." (Complaint Report 138702);
- **December 6, 2000:** Omnitrans Board authorizes request for proposal (RFP) for a liquid compressed natural gas (LCNG) fueling facility (Mikels, 2002). SCAQMD provides experts to assist in exploring alternatives and take the lead in developing project specifications;
- **December 6, 2000:** Southern California Gas Company tested CNG station for emissions and overall operations of system. System passed and no CNG odors detected on site (Mikels, 2002);

- **December 13, 2000:** Director of the South Coast Air Quality Management District, Barry Wallerstein, attends Omnitrans meeting with Henry Hogo and Jean Ospital. The SCAQMD staff met with neighborhood residents who have complained at recent community meetings about odors and perceived health problems resulting from natural gas leaks at the Omnitrans facility (SCAQMD, 2001b);
- **December 19, 2000:** Two instantaneous gas samples were taken from a compressor vent at the East Valley Fueling Facility at 08:45 AM. The samples were analyzed by SCAQMD for sulfur compounds by Method 307-91. The following was the chemical signature of the source samples:

Compound	Sample 1 (ppmv)	Sample 2 (ppmv)
Hydrogen Sulfide	0.25	0.25
Carbonyl Sulfide	0.00	0.00
Methyl Mercaptan	0.44	0.49
Ethyl Mercaptan	0.59	0.63
Dimethyl Sulfide	0.23	0.25
Isopropyl Mercaptan	0.59	0.65
n-Propyl Mercaptan	0.24	0.27
Unknown Sulfur	0.12	0.14
Total Sulfur as H_2S	2.45	2.69

- **January 16, 2001:** Omnitrans meets with neighborhood at Villaseñor Library (Mikels, 2002);
- **February 1, 2001:** Omnitrans meets with neighborhood at San Bernardino City Hall (Mikels, 2002);
- **February 6, 2001:** Sample SWC-1 was collected on the South West corner of Ramona Alessandro Elementary School during an odor complaint. The sample was analyzed by SCAQMD for sulfur compounds by Method 307-91 and screened for methane by TCA FID. No sulfur compounds were detected above the method-reporting limit (less than 0.001 parts per million by volume (ppmv)). Methane was detected at a concentration of 3 ppm;
- **February 7, 2001:** Omnitrans staff addresses San Bernardino Unified School District Board Meeting (Mikels, 2002);

- **March 2, 2001:** Omnitrans staff meets with neighborhood citizens at Villaseñor Library (Mikels, 2002);
- **March 2, 2001:** Neighborhood newsletter (with Spanish translation) mailed to approximately 2,500 households within one-half mile radius of Metro Station outlining Omnitrans Action Plan. Newsletter also distributed to students at Ramona-Alessandro Elementary School (Mikels, 2002);
- **March 15, 2001:** A notice to comply (NC) is filed with SCAQMD (NC C64659). Under the compliance section of the notice is noted: "Notify the District in advance of any maintenance or repairs or other procedures which may release gas or odors. Telephone the day prior or as soon as possible." (SCAQMD, 2001);
- **April 2, 2001:** Omnitrans' staff makes presentation to San Bernardino City Council (Mikels, 2002);
- **April 3, 2001:** Neighborhood newsletter (with Spanish translation) mailed to approximately 2,500 households within one-half mile radius of Metro Station (Mikels, 2002);
- **April 4, 2001:** Chairperson for Westside Residents for Clean Air Now addresses Omnitrans Board of Directors and requests that specific Board Members meet to discuss odor issues (Mikels, 2002);
- **April 18, 2001:** Omnitrans Board Ad Hoc Committee meets with neighborhood citizens committee to discuss the CNG station. A station tour is also provided (Mikels, 2002);
- **April 25, 2001:** General Manager of Omnitrans and former Board Chairman hold press conference with community regarding plans to eliminate emissions of methyl mercaptan from CNG station (Mikels, 2002);
- **April 25, 2001:** SCAQMD holds Town Hall Meeting at Villaseñor Library (Mikels, 2002).
- **May 2, 2001:** Omnitrans Board votes to replace existing CNG station with a liquefied natural gas station (LNG), eliminating methyl mercaptan from the fueling process. Cost of new Metro Station estimated to be $3.5 million (Mikels, 2002);
- **May 18, 2001:** Former Board Chairman of Omnitrans sends letter (with Spanish translation) to approximately 2,500 households within one-half mile radius of Metro Station regarding plans for installation of LCNG station (Mikels, 2002). The letter also outlines the steps taken to minimize the releases of methyl mercaptan odorant, including round-the-clock inspection by Omnitrans' personnel, the doubling the number of inspections by station maintenance contractor, installation of temporary filters and new valve to remove gas odor during maintenance repairs, and installation of a scrubber on the vent tube to remove odor from unscheduled gas releases (Mikels, 2002);

- **June 6, 2001:** Omnitrans Board votes to discontinue pursuit of filtering system to scrub methyl mercaptan from CNG because it could not be installed until October 2001. Board approves $50,000 contract to USA PRO form LCNG Consulting Services, and the release of an Invitation for Bid for LNG fuel for a five year period (Mikels, 2002);
- **June 13, 2001:** Executive Environmental conducts ambient air monitoring survey of Metro Station and personal sampling of two drivers (Mikels, 2002). At the time of the study, 102 buses were fueled using only one compressor. According EESC (2001) thirty-eight (38) samples were collected and analyzed for sulfur and hydrocarbon compounds that are normally found in compressed natural gas (CNG). During the course of the study it was noted that a "noticeable CNG odor" was present northeast of the compressor (EESC, 2001).

  The thirty-six samples collected during the ambient sampling event measured carbonyl sulfide (COS), carbon disulfide (CS_2), methane (CH_4), and C6+ in most of the samples collected. Ethane was measured in one sample (Location 9 collected from 12:45 AM to 01:40 PM) at a concentration of 0.7 ppm. CS_2 was measured at range from 0.0022 ppm to 0.077 ppm, CH_4 at a range of 2.3 ppm to 33 ppm (Location 9 collected from 12:45 AM to 01:40 PM), and C6+ at a range of 1.9 to 7.9 ppm. Mercapatans and other sulfur were not measured in the samples above the method detection limits.

  The recommendations from the report included:

  To provide the results of the report to employees represented by the air monitoring in accordance with Title 8 Section 340.2 of the California Code of Regulations;

  Employee exposure monitoring records must be retained for a period of 30 years in accordance with Title 8 Section 3204 of the California Code of Regulations; and,

  Conduct additional sampling if any changes occur in the work practices, processes or related equipment usage that may increase employee exposure.
- **June 21, 2001:** South Coast Air Quality Management District Meeting. During the June 21st meeting members of Westside Residents for Cleaner Air Now addressed the Board regarding mercaptan odors emanating from the CNG fueling station for Omnitrans buses located in San Bernardino. According to the meeting minutes, the members of Westside Residents for Cleaner Air NOW stated mercaptan fumes are creating a nuisance to area residents, who believe the fueling station should be relocated to an industrial area in written comments (SCAQMD, 2001b);
- **July 11, 2001:** Omnitrans Board adopts resolution authorizing the use of California Energy Commission funding to construct LNG fueling infrastructure. Hoses connected to vent tubes to vent gas through mixture of bleach water to eliminate odor into air (Mikels, 2002);
- **July 20, 2001:** Representatives from WeCAN speak at SCAQMD Board Meeting opposing the funding of the proposal by Omnitrans to convert its CNG fueling facility in San

Bernardino to LNG. The reason for opposing the funding was that they believe that the existing facility was substandard facility with old, outdated CNG equipment that has had constant leaks. The representatives from WeCAN urged the SCAQMD Board to make the funds to Omnitrans for the LNG conversion contingent upon relocation of the facility to an industrial, non-residential area (SCAQMD, 2001e);

- **August 2001:** HAZOP analysis of Omnitrans fueling facility performed. According to notes from the April 8, 2002 meeting (see below), the HAZOP was done voluntarily by Omnitrans to look at "what happens off site if gas disperses.";
- **August 1, 2001:** Board authorizes leaser of LNG equipment from Applied LNG Technologies for $152,500 from September 1, 2001 until permanent LCNG station is operational (Mikels, 2002);
- **August 7, 2001:** Omnitrans and SCAQMD enter into a Settlement Agreement in which Omnitrans agreed to "install a temporary non-odorized LNG supply to replace the current existing odorized natural gas supply." (SCAQMD, 2001d);
- **September 2001:** EnSafe Inc. (EnSafe) was retained by the SBUSD to perform an environmental assessment at the Ramona Alessandro Elementary School (Ensafe, 2001). According to the EnSafe report, the purpose of the study was to "characterize potential offsite emissions of compressed natural gas (CNG) and associated contaminants. Samples were collected at the boundary of the Omnitrans facility and the elementary school boundary" (EnSafe, 2001).

  Analytical results showed detectable concentrations of hydrogen sulfide (H_2S) present (EnSafe, 2001) at three sampling locations (location 2, 3, and 4, closest to the compressor station on the Omnitrans facility). The first was location 2, due north of the compressor station. A concentration of 63 parts per billion by volume (ppbv) was measured from 10:00 PM on August 14, 2001 to 01:00 PM on August 15, 2001. The second was location 3, south east of the compressor station along the eastern boundary of the Omnitrans facility. A concentration of 36 ppbv was measured from 10:00 PM on August 14, 2001 to 01:00 PM on August 15, 2001. The third was location 4, due east of the compressors on the southwestern corner of the Ramona Alessandro Elementary School property (eastern edge of Medical Center Drive). Concentrations of 31 ppbv and 6.7 ppbv were measured at that location from 07:00 PM to 10:00 PM on August 14, 2001 and from 10:00 PM on August 14, 2001 to 01:00 PM on August 15, 2001, respectively.

  One sample collected had measurable concentrations of isopropyl mercaptan (location 7). Location 7 was the southeast corner of the staff parking lot located on Ramona Street. A concentration of 8.2 ppbv was measured from 07:00 PM to 10:00 PM on August 14, 2001.

The source(s) of the hydrogen sulfide and isopropyl mercaptan measured in the community were not attributed to a particular source(s).

The recommendations of the report included:

That the school grounds be closed to the public during refueling operations, normally from 06:00 P.M. to 01:00 AM;

The existing odor complaint procedures at the school be modified to instruct teachers, staff, and students to move indoors during an odor complaint;

That the results of the report be provided to the SCAQMD to seek their guidance on appropriate additional responses to the sampling results; and,

That the results of the reports also be provided to the Department of Toxic Substances Control (DTSC) toxicologist, Dr. Marilyn Underwood, who attended a meeting with community members and Omnitrans staff, to seek her guidance on appropriate additional responses to the sampling results.

- **October 17, 2001:** SCAQMD provided State Senator Nell Soto with a review of the EESC and EnSafe studies of the East Valley Fueling Station and Ramona-Alessandro Elementary School. The letter stated that it was SCAQMD "staff's opinion that appropriate sampling analysis and quality assurance procedures were employed. However, the results are at best inconclusive, if not inconsistent with Omnitrans natural gas fueling equipment as the source of H_2S (hydrogen sulfide) found" (SCAQMD, 2001).

  The inconsistencies noted by SCAQMD included:

  That only H_2S was found the ambient samples (EnSafe report). The SCAQMD reasoned that since H_2S is typically the lowest concentration natural gas odorant, other odorants should have been found. The other odorants were not found in the ambient samples;

  Given the prevailing wind during the sampling events, other sampling locations should have recorded detectable levels of H_2S based upon the levels of H_2S; measured. No measurable H_2S levels were found in other downwind locations.

  The SCAQMD reasoned that if the source of H_2S was a natural gas leak at the East Valley Fueling Station, hydrocarbons normally found in natural gas such as ethane, propane, or butane should have been measured in samples that had recordable H_2S readings. According to the EnSafe report, none of the samples that measured H_2S measured hydrocarbons above the detection limit of 210 ppm; and

  The final inconsistency noted by SCAQMD was that isopropylmercaptan (IPM) was found in one sample the location furthest from the East Valley Fueling Station. Since no other samples measured IPM, SCAQMD concluded, "it is difficult to identify Omnitrans as the source of the IPM" (SCAQMD, 2001).

  Of the EESC report, SCAQMD determined that both the sampling and analytical techniques used were appropriate. The SCAQMD noted that the "low (<5) parts per billion levels of carbonyl sulfide (COS) and carbon disulfide (CS_2)" reported by EESC were below most published odor threshold limits (SCAQMD, 2001). T

The inconsistencies noted by SCAQMD included:

No consistent pattern of detections for COS and CS_2 at or around the East Valley Fueling Station;

Measured levels of methane did not correlate with measurements of COS and CS_2 or other hydrocarbons normally found in natural gas;

SCAQMD's analysis of the natural gas odorants at the East Valley Fueling Station did not measure COS; and

Performance Analytical, Inc., the contract laboratory that performed the analyses for EESC, suggested that the source of COS and CS_2 may be from the polypropylene fittings used in the sampling process.

SCAQMD stated that staff were collecting periodic "random samples in the evening and early nighttime hours in the area surrounding Omnitrans" (SCAQMD, 2001). At the time of the letter, samplers provide to Ramona Alessandro Elementary School staff and concerned citizens had not detected any sulfur-containing compounds in any samples (SCAQMD, 2001). The letter closed by saying that "As a result of the EnSafe report and your requests, the AQMD last week began an extensive monitoring program at Ramona Alessandro Elementary School in an effort to better understand both the source and magnitude of any ambient H_2S (SCAQMD, 2001).

- **February 5, 2002:** SCAQMD issues Omnitrans a Notice of Violation (P36852) for "odors causing a nuisance to a considerable number of people." The NOV is served on February 13, 2002;
- **February 5 and February 6, 2002:** During an odor incident at the East Valley Fueling Facility, SCAQMD collected 61 samples over a 24-hour period. According to the SCAQMD Monitoring and Analysis Report of Laboratory Analysis (2002), grab samples were collected using a ground glass syringe equipped with a Teflon stopcock. The report states, "Even though there was a strong odor present in the air, the instrument did not detect any reduced sulfur compounds. In order to rule sewer gas as the cause of the odor, a grab sample was collected from a manhole located between Omnitrans and the monitoring station. Low level Hydrogen Sulfide and Sulfur Dioxide were detected at levels consistent with the levels found during the previous weeks manhole testing" (SCAQMD, 2002).

  SCAQMD collected 33 samples on February 5, 2002 from 12:19 PM to 11:52 PM and 28 samples on February 6, 2002 from 12:52 AM to 12:56 PM. Samples were collected along 6th Street, 20 feet west of Medical Center Drive; on Medical Center Drive in front of the SCAQMD monitoring station; on Medical Center Drive half way up 5th street; and from the manhole on Medical Center Drive. The sample was analyzed by SCAQMD for sulfur compounds by Method 307-91. Hydrogen sulfide (H_2S) was not measured in any of the

ambient samples above the method-reporting limit of 1.0 part per billion (ppb). The sample collected at 02:12 PM on February 5, 2002, measured H_2S at a concentration of 2.2 ppb;

- **February 6, 2002:** Omnitrans Board discusses the possibility of hiring a consultant to determine if the fueling station could be moved within the next 20 years. The Omnitrans Board elects to wait until construction of the LCNG station is completed to see if odor complaints are eliminated. The Executive Committee of the Omnitrans Board proposes to look at the issue again after the LCNG station has been operational for a few months (Mikels, 2002);
- **February 14, 2002:** Riverside Mayor and member of the SCAQMD Board, an EPA representative, a representative of Senator Soto's office, and Omnitrans staff meet with the neighborhood. The EPA representative agrees to schedule future meetings with Omnitrans and the neighborhood group to work on odor issues (Mikels, 2002);
- **February 22, 2002:** Senator Soto introduces Senate Bill (SB) 1927, which requires Omnitrans to contract with an independent third party to prepare and submit to the Legislature and Governor a report on the environmental and public health impacts of transit bus fueling stations located within the jurisdiction of the authority and owned and operated by the authority;
- **March 6, 2002:** Omnitrans staff, with EPA representative as mediator, along with representative from Senator Soto's office, meets with neighborhood group at Villaseñor Library (Mikels, 2002);
- **April 8, 2002:** Meeting between Omnitrans, Omnitran's consultants (USAPRO/CNG Systems Consultant and General Physics), California Department of Health Services Environmental Health Investigations Branch (CDHS-EHIB), and the San Bernardino County Fire Marshall (CDHS-EHIB, 2002). The stated purpose of the meeting was to discuss community concerns and safety issues regarding the liquefied compressed natural gas fueling station. The topics of the meeting included:

  A history of CDHS's interest in Omnitrans;
  A history of the Metro facility;
  The installation of the maintenance building, parking, and fueling structures at the Metro facility;
  The August 2001 HAZOP Report of the East Valley Fueling Facility;
  The 1997 CEQA and other applicable CEQA's;
  A description of the Joint Powers Agreement;
  Issues of community concern: Gas releases, citations, and attempts to remedy the problems; the switch from CNG to LCNG;
  Omnitrans Community Outreach efforts: history of calls from the community, community notification processes for incidents, and any other efforts; and,

Applicable health and safety information/reports, including emergency response plans and procedures.

- **April 22, 2002:** Omnitrans began operation odorless liquefied compressed natural gas (LCNG) fueling station at the 1700 5th Street Station.

  Unlike the odorized compressed natural gas that previously fueled the Omnitrans fleet, LNG contains no odorants. In the absence of odorants such as methyl mercaptan, methane sensors have been installed at Omnitrans facility and on its buses to detect gas. The station and its systems have passed review by the California Department of Health Services, the California Division of Occupational Safety and Health (Pressure Vessel Unit), the San Bernardino City Fire Department, and the San Bernardino County Fire Marshal;

- **May 16, 2002:** Omnitrans requests documentation from the SBCUSD to compare the student health at Ramona-Alessandro Elementary School and Thompson Elementary School. Omnitrans requests copies of Nurses Logs for Thompson Elementary School from January 2, 2002 through March 31, 2002; the A.H.E.R.A. Inventory and Action Plan for Ramona Alessandro Elementary School Indoor Air Quality surveys for the previous three years; and the Pesticide Application Logs from January 1, 2001 to May 16, 2001 for Ramona Alessandro Elementary School;
- **September 15, 2002:** Governor Gray Davis signs SB 1927 adding Section99165 to the Public Utilities Code;
- **March 2003:** Two companies submit proposals to conduct study.
- **April 2, 2003:** Omnitrans Board awards contract for Public Health Study to Komex; pending confirmation from Senator Soto that final scope of work meets intent of SB 1927.
- **April 14, 2003:** Omnitrans, Komex, CCAEJ, and WeCAN representatives meet with Senator Soto's staff to resolve any gray areas related to scope of work meeting the intent of the bill;
- **April 23, 2003:** Senator Soto confirms in a letter that Komex's proposed scope of work will meet the requirements of Senate Bill 1927;
- **May 2003:** Proposes scheduling public meetings in June 2003 and July 2003. CCAEJ and WeCAN representatives request that the meetings be postponed to provide the community time to prepare;
- **July 2, 2003:** Komex presents timeline for completion of proposed scope of work to Omnitrans Board of Directors;
- **July 29, 2003:** The first meeting to update the community on the proposed project was held from 6:00 PM to 8:15 PM on July 29, 2003 at the Paul Villaseñor Branch Library (525 North Mt. Vernon, San Bernardino);

- **July 31, 2003:** The second meeting to update the community on the proposed project was held from 6:00 PM to 8:00 PM on July 31, 2003 at Montclair's City Hall in the Council Chambers (5111 Benito Street, Montclair);
- **August 5, 2003:** The third meeting to update the community on the proposed project was held from 6:00 PM to 8:00 PM on August 5, 2003 at the Paul Villaseñor Branch Library (525 North Mt. Vernon, San Bernardino);
- **September 2003:** Meeting minutes summary provided to stakeholders (Omnitrans, SCAQMD, WeCAN). Omnitrans provides comments. No other stakeholders provide comments;
- **October 15, 2003 to October 17, 2003:** Local area survey performed;
- **October 20 to October 25, 2003:** Public health surveys performed.
- **November 19, 2003: Draft report provided to all stakeholders.**
- **November and December 2003:** Omnitrans and SBCUSD provide comments to draft report;
- **November 19, 2003 to January 30, 2004:** Comment Period Ends;
- **January 2004**: Survey of students, staff, and faculty at Ramona Alessandro Elementary School performed; and,
- **February 2004: SCAQMD provides comments.** Finalize report**.**

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1 INTRODUCTION

Komex was retained by Omnitrans to perform an Environmental and Public Health Impacts Study in accordance with the requirements outlined in California Senate Bill 1927 (**Appendix A**).

1.1 OBJECTIVES

This evaluation is a scientific evaluation of potential human health effects associated with fugitive emissions from businesses, primarily the Omnitrans fueling stations, located in San Bernardino and Montclair. The overall objective of this risk evaluation is to evaluate potential health impacts to community members living near the Omnitrans fueling facilities. Omnitrans operates three fueling stations located at 1700 West 5th Street (hereafter referred to as the Metro Station), San Bernardino (Figure 1a), 234 South I Street (hereafter referred to as the I Street Station), San Bernardino (Figure 1a), and 4748 Arrow Highway (hereafter referred to as the West Valley Station), Montclair, California (Figure 1b). The Metro and West Valley Stations dispense liquid to compressed natural gas (LCNG) and diesel fuel to buses using the facility. Unleaded gas is also dispensed to staff cars, vans and trucks. The I Street dispenses unleaded gasoline to buses using the facility.

The risk assessment generally follows standard and customary practice as specified in California Environmental Protection Agency (Cal-EPA) and United States Environmental Protection Agency (EPA) guidelines for the performance of risk assessments (Cal-EPA, 1992 and 1994; and EPA, 1989). The overall approach taken in this risk evaluation is consistent with the Reasonable Maximum Exposure (RME) approach as defined by the EPA (1989). The RME approach is defined as the "highest exposure that is reasonably expected to occur at a site." Because conservative and health-protective assumptions were incorporated into this evaluation, the actual levels of human exposure and the potential health risks at the sites are likely to be substantially less than the quantitative estimates described in this evaluation. Consequently, the estimates of potential risk to current and hypothetical future receptors are likely to be overstated. Risk assessment is an iterative process that strives to define risks as a "not greater than" determination. Many of the assumptions employed in this assessment are conservative and the most protective of health. More scientific, site-specific or otherwise improved approaches would reduce the uncertainty and reduce the upper-bound risk estimates reported herein. Further refinements to the risk assessment methodology and assumptions used therein

would likely result in substantially lower estimates of the most probable risks to current and hypothetical future receptors.

1.2 APPROACH

The approach of this risk assessment is consistent with the guidelines originally published by the National Academy of Sciences (NAS, 1983). The guidelines suggest that risk assessments should contain some or all of the following four steps:

- **Identification of Chemicals of Potential Concern (COPCs) [also known as Hazard Identification]**. An evaluation of site investigation data and identification of COPC with regard to potential health effects;
- **Exposure Assessment**. Identification of the receptors likely to be exposed to site-related chemicals and the likely extent of their exposure under defined exposure scenarios;
- **Toxicity Assessment**. A description of the relationship between the magnitude of exposure (dose) and the probability of occurrence of adverse health effects (response) associated with the COPCs; and
- **Risk Characterization.** Description of the nature and magnitude of potential health risks, comparison to federal criteria regarding health risks at hazardous waste sites, and a discussion of uncertainties in the analysis.

1.3 REPORT ORGANIZATION

The remainder of this report is organized in a manner consistent with the above-mentioned sections of a risk assessment. The sections of the report are as follows:

- Section 2, **Site Background**, describes the site history, background information, and recently collected data used in developing the risk evaluation;
- Section 3, **Public Health Survey**, describes the results of the public health survey recently collected from residents living within ½ mile of the Omnitrans fueling facilities;
- Section 4, **Local Area Survey**, describes the emission inventory prepared of businesses including the Omnitrans fueling facilities, located in each community;
- Section 5, **Dispersion Modeling**, describes the results of the dispersion modeling performed for each site;
- Section 6, **Identification of COPCs**, presents the analytical data used in the risk assessment, discusses the nature and extent of chemicals in soil at the site, and identifies the chemicals that will be evaluated quantitatively in the assessment;

- Section 7, **Exposure Assessment**, presents the likely human receptors of concern and estimates the magnitude of exposure of those receptors to the COPCs;
- Section 8, **Toxicity Assessment**, describes the theoretical basis for derivation of human health criteria for chemicals in general and presents the specific health criteria for the COPCs;
- Section 9, **Risk Characterization**, presents the results of the analysis in which the attendant human health risks associated with the exposures are quantified and described;
- Section 10, **Uncertainty Analysis**, presents the results of the uncertainty analysis;
- Section 11, **Conclusions**, presents the conclusions of the report; and
- Section 12, **References**, presents the references used in the report.

2 SITE BACKGROUND

The following provides a summary of relevant information regarding the fueling stations and issues related to operation of the fueling stations and a brief synopsis of previous investigations performed at or near the sites. The three stations, Metro, I Street, and West Valley, are located at 1700 West 5th Street, San Bernardino, 234 South I Street, San Bernardino, and 4748 Arrow Highway, Montclair, California, respectively. The Metro and West Valley Stations dispense liquid to compressed natural gas (LCNG) and diesel fuel to buses using the facility. Unleaded gas is also dispensed to staff cars, vans and trucks. The I Street Station dispenses unleaded gasoline to buses using the facility.

Omnitrans is a public transit agency serving fifteen cities and the unincorporated areas of the Inland Valley of San Bernardino County in Southern California. The agency employs 660 direct and 240 contracted employees. Omnitrans currently operates 36 fixed bus routes in a 480-square-mile area. Omnitrans also provides OmniLink and Access service. The combined services provide more than16 million passenger trips annually.

Because of concerns over the impacts that diesel emissions have as potential carcinogens and a desire to improve air quality in the South Coast Air Basin, the South Coast Air Quality Management District promulgated Rule 1192, The Clean On-Road Transit Buses. This rule mandates that Omnitrans and other public transit fleet operators **"**acquire alternative-fuel heavy-duty vehicles when procuring or leasing these vehicles to reduce air toxic and criteria pollutant emissions." The rule applies to "public transit fleets with 15 or more public transit vehicle or urban buses, operated by government agencies or operated by private entities under contract to government agencies, that provide passenger transportation services including intra- and intercity shuttle services. "

Under Rule 1192 Alternative-Fuel Heavy-Duty Vehicle "means a heavy-duty vehicle, urban bus or engine that uses compressed or liquified natural gas, propane, methanol, electricity, fuel cells, or other advanced technologies that do not rely on diesel fuel, and meets the emission requirements of Title 13, Section 1956.1 of the California Code of Regulations [adopted by the California Air Resources Board (CARB) on February 24, 2000].

As noted in the timeline above, Omnitrans started putting alternative fuel heavy duty vehicles in to service in 1998.

2.1 METRO STATION, 1700 WEST 5TH STREET, SAN BERNARDINO, CALIFORNIA

The Metro Station is located at 1700 West 5th Street, San Bernardino, California (Figure 1a). The station covers an area approximately 9.4 acres and is bounded to the north by 6th Street, to the east by Medical Center Drive, to the south by 5th Street, and to the west by Gardena Street (Figure 2). The facility consists of the maintenance buildings, office building, wash/steam clean building, fuel dispensing building, LCNG storage building, and the former CNG fueling equipment (Figure 2). The area immediately to the north, west, and east of the station is primarily residential. An elementary school, Ramona-Alessandro Elementary School is located approximately to the northeast of the station across Medical Center Drive. The southern boundary of the station is Nunez Park.

The Metro Station fuels a fleet of more than 100 buses, houses two 30,000 gallon, double-walled LNG storage tanks (Omnitrans, 2002). The tanks store liquefied compressed natural gas (LCNG) at minus 250 degrees Fahrenheit (°F), using vacuum pressure and insulation to keep the fuel cold. The liquid is pumped out of the tanks and passed through a vaporizer, which changes the fuel from a liquid to compressed gas state for transfer to the bus fuel tanks (Omnitrans, 2002). The daily fuel demand is approximately 11,000 gallons of fuel (Omnitrans, 2002). LNG deliveries via tanker truck to the facility occur six days per week to ensure that tanks are "topped off." **Figures 3 through 5** show the volumes and types of fuel delivered to the West 5th Street Station since the year 2001.

The majority of fueling operations occur from 18:00 to 01:00 (EnSafe, 2001).

2.1.1 STATION TIMELINE

- **1978**: Omnitrans moved operations and administration to 1700 W. 5th Street in San Bernardino. Since that time, both diesel fuel and gasoline have been dispensed at this location. Previously, the property was occupied by an auto dealership which also dispensed gasoline on site.
- **1989:** Ground was broken on a new Metro facility at 5th St. and Medical Center Drive. A two-story 22,000 square foot building for housing administration, special transit and operations personnel are constructed along with 2 temporary structures on the 9.4 acre parcel. Funding for the project came from the federal capital assistance grant through Urban Mass Transit Administration, with additional funding from the state of California Local Transit Fund;

- **1991:** First phase began on administration building, fuel island, dynamometer and bus wash, concrete driveways replacing existing asphalt and expanded coach parking. In preparation for construction, a warehouse building was demolished and thousands of yards of earth were removed, then compacted to provide a foundation for the 25,000 square foot building;
- **June 12, 1992:** The new administration building at the Metro station is opened;
- **1995:** A $1.3 million grant for funding alternative fuel projects was received. Over 8.6 million riders boarded fixed-route buses, an increase of 23.2% over 1994;
- **1996:** Omnitrans acquired its first CNG buses. West Valley Facility added a state-of-art CNG fueling station for refueling CNG buses;
- **1997**: Total passengers system-wide exceeded 11 million during the fiscal year. Omnitrans breaks ground on a new Maintenance and Operations Complex at its Metro facility;
- **August 4, 1997:** Omnitrans files a CEQA Notice of Exemption for analysis of East Valley Fueling Facility. The Categorical Exemption claimed for the project is under 23 CFR Part 771.117(d)(8) (Omnitrans, 1997);
- **1998:** Omnitrans began CNG fueling at the Metro Station (Mikels, 2002).
- **August 1998:** First odor complaint received from Ramona-Alessandro Elementary School (Mikels, 2002);
- **July 1999:** Second odor complaint from Ramona-Alessandro Elementary School (Mikels, 2002);
- **July 1999 to December 1999:** Ramona-Alessandro Elementary School logs 19 odor complaints (Mikels, 2002);
- **September 1999:** Omnitrans begins notifying Ramona-Alessandro Elementary School and Fire Department when odors are generated at station (Mikels, 2002);
- **January 2000 to June 2000:** Two odor complaints logged at Ramona-Alessandro Elementary School (Mikels, 2002);
- **April 18, 2000:** Omnitrans takes delivery of 44 new low floor buses. The buses were manufactured by New Flyer of Winnipeg, Canada with final assembly in Crookston, Minnesota (Omnitrans, 2000);

  The funding for the buses, which cost approximately $325,000 each, came from a combination of Federal, State, South Coast Air Quality Management District (AQMD), and local sources. The Federal sources included FTA Section 5307 for urbanized area formula funding, FTA Section 5309 for capital discretionary funding and FTA CMAQ (Congestion Mitigation and Air Quality) discretionary funds used for programs that support clean air.

AB2766 and the Carl Moyer program were funded through AQMD to help with the purchase of large heavy-duty clean fuel buses.

All of the initial order of 44 compressed natural gas (CNG) buses were 40 feet long. Twenty of the buses were replacing worn out vehicles in the fleet and the remainder were for expansion;

- **September 2000:** Omnitrans Board approved contract with Natural Gas Systems, Inc. for CNG maintenance and repair services (Mikels, 2002);
- **November 2000:** Enhancements to address venting issues made to CNG system (Mikels, 2002);
- **November 2000:** Omnitrans staff holds meetings with Ramona-Alessandro Elementary School PTA and with Community at Villaseñor Library (Mikels, 2002);
- **December 2000:** "Southern California Gas Company checked the engines on the two natural gas powered compressor units and found that the exhaust pipe to catalytic converter on one engine was cracked, allowing cool air into the converter. Also, the preheaters were not functioning due to electrical shorts in the controls. These operating conditions could allow mercaptan odors to escape from the system" (Complaint Report 138702).

  "Natural gas is compressed and maintained at constant pressures between 3600 PSI and 4000 PSI in a system with constant vibration which leads to possible leaks from the numerous fittings." (Complaint Report 138702);
- **December 6, 2000:** Omnitrans Board authorizes request for proposal (RFP) for a liquid compressed natural gas (LCNG) fueling facility (Mikels, 2002). SCAQMD provides experts to assist in exploring alternatives and take the lead in developing project specifications;
- **December 6, 2000:** Southern California Gas Company tested CNG station for emissions and overall operations of system. System passed and no CNG odors detected on site (Mikels, 2002);
- **December 6, 2000:**SCAQMD provides information and an interview to Westside Story on Omnitrans and mercaptan (SCAQMD, 2001a);
- **December 13, 2000:** Director of the South Coast Air Quality Management District, Barry Wallerstein, attends Omnitrans meeting with Henry Hogo and Jean Ospital. The SCAQMD staff met with neighborhood residents who have complained at recent community meetings about odors and perceived health problems resulting from natural gas leaks at the Omnitrans facility (SCAQMD, 2001b);
- **January 16, 2001:** Omnitrans meets with neighborhood at Villaseñor Library (Mikels, 2002);

- **February 1, 2001:** Omnitrans meets with neighborhood at San Bernardino City Hall (Mikels, 2002);
- **February 7, 2001:** Omnitrans staff addresses San Bernardino Unified School District Board Meeting (Mikels, 2002);
- **March 2, 2001:** Omnitrans staff meets with neighborhood citizens at Villaseñor Library (Mikels, 2002);
- **March 2, 2001:** Neighborhood newsletter (with Spanish translation) mailed to approximately 2,500 households within one-half mile radius of Metro Station outlining Omnitrans' Action Plan. Newsletter also distributed to students at Ramona-Alessandro Elementary School (Mikels, 2002);
- **March 15, 2001:** A notice to comply (NC) is filed with SCAQMD (NC C64659). Under the compliance section of the notice is noted: "Notify the District in advance of any maintenance or repairs or other procedures which may release gas or odors. Telephone the day prior or as soon as possible." (SCAQMD, 2001);
- **April 2, 2001:** Omnitrans staff makes presentation to San Bernardino City Council (Mikels, 2002);
- **April 3, 2001:** Neighborhood newsletter (with Spanish translation) mailed to approximately 2,500 households within one-half mile radius of Metro Station (Mikels, 2002);
- **April 4, 2001:** Chairperson for Westside Residents for Clean Air Now (WeCAN) addresses Omnitrans Board of Directors and requests that specific Board Members meet to discuss odor issues (Mikels, 2002);
- **April 18, 2001:** Omnitrans Board Ad Hoc Committee meets with neighborhood citizens committee to discuss the CNG station. A station tour is also provided (Mikels, 2002);
- **April 25, 2001:** General Manager of Omnitrans and former Board Chairman hold press conference with community regarding plans to eliminate emissions of methyl mercaptan from CNG station (Mikels, 2002);
- **April 25, 2001:** SCAQMD holds Town Hall Meeting at Villaseñor Library (Mikels, 2002);
- **May 2, 2001:** Omnitrans Board votes to replace existing CNG station with a liquefied natural gas station (LNG), eliminating methyl mercaptan from the fueling process. Omnitrans Board approves contract with General Physics for $5,476,957 for the design, construction, installation, and maintenance of LNCG fueling facilities at Metro and West Valley stations. An additional $100,000 is approved for contract for change orders if required by regulatory agencies. Cost of Metro Station estimated to be $3.5 million (Mikels, 2002);

- **May 18, 2001:** Former Board Chairman of Omnitrans sends letter (with Spanish translation) to approximately 2,500 households within one-half mile radius of Metro Station regarding plans for installation of LCNG station (Mikels, 2002). The letter also outlines the steps taken to minimize the releases of methyl mercaptan odorant, including round-the-clock inspection by Omnitrans' personnel, the doubling the number of inspections by station maintenance contractor, installation of temporary filters and new valve to remove gas odor during maintenance repairs, and installation of a scrubber on the vent tube to remove odor from unscheduled gas releases (Mikels, 2002);
- **June 6, 2001:** Omnitrans Board votes to discontinue pursuit of filtering system to scrub methyl mercaptan from CNG because it could not be installed until October 2001. Board approves $50,000 contract to USA PRO form LCNG Consulting Services, and the release of an Invitation for Bid for LNG fuel for a five year period (Mikels, 2002);
- **June 13, 2001:** Executive Environmental conducts ambient air monitoring survey of Metro Station and personal sampling of two drivers (Mikels, 2002);
- **June 21, 2001:** SCAQMD Meeting. During the June 21st meeting members of WeCAN addressed the Board regarding mercaptan odors emanating from the CNG fueling station for Omnitrans buses located in San Bernardino. According to the meeting minutes, the members of WeCAN stated mercaptan fumes were creating a nuisance to area residents, who believed the fueling station should be relocated to an industrial area in written comments (SCAQMD, 2001b).

  Mayor Pro Tem Leonard Paulitz, of Cities of San Bernardino County, commented that the Omnitrans board voted to replace the CNG fueling stations in both the city of Montclair and the city of San Bernardino with LNG, thereby eliminating the odor problem. He noted also that the CNG station in Montclair was constructed approximately five years ago; however, it was never operable. Therefore, the Omnitrans buses in Montclair were all diesel-fueled, and all of the CNG buses were in San Bernardino (SCAQMD, 2001b).

  A member of WeCAN pointed out that the LNG equipment was not scheduled to be installed at the Omnitrans fueling station in San Bernardino until February 2002. While Omnitrans initially considered installing scrubbers at the facility to control the mercaptan odors in the interim, their board, after learning it would take until October 2001 to install the scrubbers, decided it would not be cost effective for equipment that would only be used for four months (SCAQMD, 2001b).

  In response to concern by Dr. Burke that the fueling facility was located across the street from an elementary school, Dr. Wallerstein commented that staff would be proposing to the Board's Technology Committee a series of grants related to fueling stations, and that one of

the proposed grants relates to providing assistance to Omnitrans for procurement of the new LNG equipment for the San Bernardino site (SCAQMD, 2001b);

- **July 11, 2001:** Omnitrans Board adopts resolution authorizing the use of California Energy Commission funding to construct LNG fueling infrastructure. Hoses connected to vent tubes to vent gas through mixture of bleach water to eliminate odor into air (Mikels, 2002);
- **July 20, 2001:** Representatives from WeCAN speak at SCAQMD Board Meeting opposing the funding of the proposal by Omnitrans to convert its CNG fueling facility in San Bernardino to LNG. The reason for opposing the funding was that they believe that the existing facility was substandard facility with old, outdated CNG equipment that has had constant leaks. According to the representatives of WeCAN the residents in the vicinity had made numerous complaints to the SCAQMD regarding methyl mercaptan odors from gas leaks at the facility. The representatives from WeCAN urged the SCAQMD Board to make the funds to Omnitrans for the LNG conversion contingent upon relocation of the facility to an industrial, non-residential area (SCAQMD, 2001e);
- **August 2001:** HAZOP analysis of Omnitrans fueling facility performed. According to notes from the April 8, 2002 meeting (see below), the HAZOP was done voluntarily by Omnitrans to look at "what happens off site if gas disperses.";
- **August 1, 2001:** Board authorizes leaser of LNG equipment from Applied LNG Technologies for $152,500 from September 1, 2001 until permanent LCNG station is operational (Mikels, 2002);
- **August 7, 2001:** Omnitrans and SCAQMD enter into a Settlement Agreement in which Omnitrans agreed to "install a temporary non-odorized LNG supply to replace the current existing odorized natural gas supply." (SCAQMD, 2001d);
- **September 5, 2001:** Omnitrans Board approves contract to Applied LNG Technologies for LCNG fuel for a five-year period (Mikels, 2002);
- **November 7, 2001:** Omnitrans Board approved amendment to contract with USA Pro for LCNG Consulting Services for an additional $15,000 to handle unforeseen extra work dealing with regulatory agencies (Mikels, 2002);
- **December 5, 2001:**Omnitrans Board approved contract with Complete Coach Works for installation of methane sensing equipment inside the passenger compartment and relocation of existing sensors in the engine compartment, to meet Title 13 requirements, in the amount of $44,494 (Mikels, 2002);
- **2002:** Omnitrans became the first transit authority to use electric/gasoline hybrid coaches that run on Route 2. These buses reduce the amount of emissions significantly than

compressed and liquefied natural gas vehicles. Improvements to the Fontana Transit Center were completed;

- **January 9, 2002:** Omnitrans Board authorized change order with General Physics to facilitate the completion of construction services required under Title 8 regulations (Mikels, 2002);
- **February 5, 2002:** SCAQMD issues Omnitrans a Notice of Violation (P36852) for "odors causing a nuisance to a considerable number of people." The NOV is served on February 13, 2002;
- **February 6, 2002:** Omnitrans Board discussed the possibility of hiring a consultant to determine if the fueling station could be moved within the next 20 years. The Omnitrans Board elects to wait until construction of the LCNG station is completed to see if odor complaints are eliminated. The Executive Committee of the Omnitrans Board proposes to look at the issue again after the LCNG station has been operational for a few months (Mikels, 2002);
- **February 14, 2002:**Riverside Mayor and member of the SCAQMD Board, an EPA representative, a representative of Senator Soto's office, and Omnitrans staff meet with the neighborhood. The EPA representative agreed to schedule future meetings with Omnitrans and the neighborhood group to work on odor issues (Mikels, 2002);
- **February 22, 2002:** Senator Soto introduced Senate Bill (SB) 1927, which requires Omnitrans to contract with an independent third party to prepare and submit to the Legislature and Governor a report on the environmental and public health impacts of transit bus fueling stations located within the jurisdiction of the authority and owned and operated by the authority;
- **March 6, 2002:** Omnitrans staff, with EPA representative as mediator, along with representative from Senator Soto's office, meets with neighborhood group at Villaseñor Library (Mikels, 2002);
- **April 8, 2002:** Meeting between Omnitrans, Omnitran's consultants (USAPRO/CNG Systems Consultant and General Physics), California Department of Health Services Environmental Health Investigations Branch (CDHS-EHIB), and the San Bernardino County Fire Marshall (CDHS-EHIB, 2002). The stated purpose of the meeting was to discuss community concerns and safety issues regarding the liquefied compressed natural gas fueling station. The topics of the meeting included:

  A history of CDHS's interest in Omnitrans.;
  A history of the Metro facility;
  The installation of the maintenance building, parking, and fueling structures at the Metro facility;
  The August 2001 HAZOP Report of the East Valley Fueling Facility;

The 1997 CEQA and other applicable CEQA's;
A description of the Joint Powers Agreement;
Issues of community concern: Gas releases, citations, and attempts to remedy the problems; the switch from CNG to LCNG;
Omnitrans Community Outreach efforts: history of calls from the community, community notification processes for incidents, and any other efforts; and
Applicable health and safety information/reports, including emergency response plans and procedures.

- **April 22, 2002:** Omnitrans began operation odorless liquefied compressed natural gas (LCNG) fueling station at the 1700 5th Street Station.

  Unlike the odorized compressed natural gas that previously fueled the Omnitrans fleet, LNG contains no odorants. In the absence of odorants such as methyl mercaptan, methane sensors were installed at Omnitrans' facility and on its buses to detect gas. The station and its systems passed review by the California Department of Health Services, the California Division of Occupational Safety and Health (Pressure Vessel Unit), the San Bernardino City Fire Department, and the San Bernardino County Fire Marshal.

  All bus fuel and safety monitoring systems were inspected and approved by the California Highway Patrol (Commercial Vehicle Inspection Division). Additionally, Omnitrans secured a five-year contract for maintenance of its LCNG station with General Physics, the firm that manufactured the facility.

  A smaller version of this $3.8 million station currently under construction at Omnitrans' West Valley facility in Montclair, with completion expected in early May, 2002;

- **May 16, 2002:** Omnitrans requested documentation from the SBCUSD to compare the student health at Ramona-Alessandro Elementary School and Thompson Elementary School. Omnitrans requested copies of Nurses Logs for Thompson Elementary School from January 2, 2002 through March 31, 2002; the A.H.E.R.A. Inventory and Action Plan for Ramona Alessandro Elementary School Indoor Air Quality surveys for the previous three years; and the Pesticide Application Logs from January 1, 2001 to May 16, 2001 for Ramona Alessandro Elementary School;
- **September 15, 2002:** Governor Gray Davis signs SB 1927 adding Section99165 to the Public Utilities Code;
- **March 2003:** Two companies submit proposals to conduct study.
- **April 2, 2003:** Omnitrans Board awards contract for Public Health Study to Komex; pending confirmation from Senator Sotos that final scope of work meets intent of SB 1927.
- **April 14, 2003:** Omnitrans, Komex, CCAEJ, and WeCAN representatives meet with Senator Soto's staff to ensure that the scope of work meeting the intent of the bill.

- **April 23, 2003:** Senator Soto confirmed in a letter that Komex's proposed scope of work will meet the requirements of Senate Bill 1927;
- **May 2003:** Proposes scheduling public meetings in June 2003 and July 2003. CCAEJ and WeCAN representatives request that the meetings be postponed to provide the community time to prepare;
- **July 2, 2003:** Komex presented timeline for completion of proposed scope of work to Omnitrans Board of Directors;
- **July 29, 2003:** The first meeting to update the community on the proposed project was held from 6:00 PM to 8:15 PM on July 29, 2003 at the Paul Villaseñor Branch Library (525 North Mt. Vernon, San Bernardino). Minutes for the meeting are presented in **Appendix B**;
- **July 31, 2003:** The second meeting to update the community on the proposed project was held from 6:00 PM to 8:00 PM on July 31, 2003 at Montclair's City Hall in the Council Chambers (5111 Benito Street, Montclair). Minutes for the meeting are presented in **Appendix B**;
- **August 5, 2003:** The third meeting to update the community on the proposed project was held from 6:00 PM to 8:00 PM on August 5, 2003 at the Paul Villaseñor Branch Library (525 North Mt. Vernon, San Bernardino). Minutes for the meeting are presented in **Appendix B**;
- **September 2003:** Meeting minutes summary provided to stakeholders (Omnitrans, SCAQMD, WeCAN). Omnitrans provided comments. No other stakeholders provide comments;
- **October 15, 2003 to October 17, 2003:** Local area survey performed. Results of the survey are presented in **Appendix C**; and
- **October 20 to October 25, 2003:** Public health surveys performed. The survey instrument is provided in **Appendix D**.
- **November 19, 2003:** Draft report provided to all stakeholders.
- **November and December 2003:** Omnitrans and SBCUSD provide comments to draft report;
- **November 19, 2003 to January 30, 2004:** Official Comment Period Ends**;**
- **January 2004:** Survey of students, staff, and faculty at Ramona Alessandro Elementary School performed**;**
- **February 24, 2004:** Written comments from SCAQMD received, and,
- **March 3, 2004:** Finalize report and present before Omnitrans Board of Directors.

2.1.2 SCAQMD ODOR COMPLAINT TIMELINE

Since the construction of the Metro Station Fueling Facility 169 odor complaints have been logged with the SCAQMD by the community. Of the 169 odor complaints logged, 164 were determined by SCAQMD to have originated from the Omnitrans facility. The remaining 5 either did not have an actual source listed or the source was unknown. **Figure 6** shows the number of complaints logged with SCAQMD and the types of complaints logged. The following is a summary of the major complaints logged. The last odor complaint received occurred on August 1, 2003.

- **August 17, 1998:** Ramona-Alessandro Elementary School "was evacuated when the odors from the natural gas system became so bad." (Complaint Report 117760);
- **August 27, 1998:** Children on the playground at Ramona-Alessandro Elementary School become ill after smelling a gas odor. A security guard and parent also smelled the odor, which resembled natural gas (Complaint Report 117760). The Complaint Report states that according to Omnitrans personnel, "a vacuum truck had been pumping out the facility's water clarifier at about the same time as the reported complaints.";
- **March 2, 2001:** Three school employees (two recreation aides and a crossing guard) noticed odors outside the school at 08:45 AM and 08:55 AM. Complaint Number 140157 lists the description of the odors as "diesel". The Inspector Comments noted that the Director of Maintenance for Omnitrans said that Omnitrans had "released 30 to 100 lbs of natural gas to lower pressure in the compressor unit so that seals could be replaced. He said that they had run the gas through a 55 gal drum containing a bleach solution in an effort to neutralize the mercaptan odor, but apparently this was insufficient to neutralize all of the chemical. The seals were leaking and had to be replaced and gas pressure had to be lowered to safely do the maintenance work. This procedure of releasing uncontrolled gas into the atmosphere during regular maintenance and/or emergency repairs is an indicator that controls on the natural gas compressor units are inadequate as far as preventing odors in the neighborhood and consequent complaints." (Complaint Report 140157);
- **March 15, 2001:** Eleven complaints (140375 to 140383, 140486, and 140647) filed with the SCAQMD for "natural gas odor." At the time the inspector was present meeting with complainants, the inspector "did not notice any unusual odors." (Complaint Report 140386). During the investigation by the inspector, an interview was performed with the Omnitrans Director of Maintenance. The Director informed the inspector that "vacuum pumping tanker trucks had been contracted to pump out 3 large, underground clarifier tanks containing tanks are due to bus washing, rain, etc. Omnitrans called the elementary school at 07:30 AM to notify them that there could be some odors released, but was unable to

contact anyone at the school until 07:58 AM. The neighborhood residents were not contacted. The pumping was actually started around 6AM to avoid the active school hours" (Complaint Report 140386).

"The clarifiers are similar in construction to septic tanks and hold the runoff water that goes down the drains when the transit buses are washed with soap and water. Dirt, oil and road grime is removed from buses and the contaminated water must be removed from the property by tanker trucks. A buildup of bacteria causes odors similar to rotten eggs or sewers and the odors may be released during the pumping operations. There is a hissing sound during pumping as described by one of the complainants." (Complaint Report 140386). The Director of Maintenance indicated that Omnitrans did "use a biological agent that is added to the tanks to reduce undesirable bacteria and that the procedure was being changed to add more of the controlling agent." The inspector issued Notice to Comply No. C. 6459 requesting that the SCAQMD be notified in advance of any maintenance or repair work that may cause odors in the area. The inspector determined that the cause of odors was the sumps as detailed above;

- **March 30, 2001:** Four complaints (140732 to 14735) are filed with SCAQMD for "gas odors" "very strong gas odors" and "natural gas odor". The Inspector Comments on Complaint 140732 noted that natural gas odor complaints with Omnitrans as the source had been occurring for months;
- **June 29, 2001:** SCAQMD issues Omnitrans a Notice of Violation (P33468) for "operation of a CNG refueling station in a manner that created a public nuisance." The NOV is served on July 3, 2002. The SCAQMD Engineering and Compliance Division Violation Notice Report with Field Notes from the inspector detailed the incident that occurred on June 29, 2001 including the odor complaints received by SCAQMD by residents of the community and the inspection performed by SCAQMD of the Omnitrans facility. The field notes from the inspector stated:

  "At 19:30 hrs., I arrived at the intersection of 6th and Medical Center in San Bernardino. I parked my District car at the southwest corner and got out to check for odors. I detected natural gas type odors at a 7-8 level based on a 1-10 scale. It should be noted that the location I was standing at is approximately 30 feet to the East of the two Compressed Natural Gas (CNG) compressors located at Omnitrans. The wind was out of the WN/W at approximately 0-3 mph and swirling.

  At 1935 hrs., I drove up wind of the facility onto Gardena St, and checked for the natural gas odors. I did not detect any gas odors.

From 1940 hrs. to 1948 hrs., I checked for odors at the intersections of 6th St./Ramona and 6th St/Caberara. I detected natural gas odors at a 5-6 level based on a 1-10 scale at both locations." The inspector collected a total of 13 complaints from 11 homes in the community.

The report goes onto detail the inspection of the Omnitrans facility from 2040 hrs to 2210 hrs and the detection of natural gas odors adjacent to and downwind of the compressors at a level varying from 5-8 based on a 1-10 scale. The inspector noted that "heavy natural gas odors" were detected "inside and outside both compressor cabinets." "Compressor #1 had natural gas type odors at an 8-9 range being blown out of the "T" fitting. The desiccant tank had natural gas type odors at a 5-7 level being blown out of it." The unit was voluntarily shut down. "Compressor #2 had natural gas type odors at an 4-5 range being blown out of the "T" fitting. The desiccant tank had natural gas type odors at a 3-4 level being blown out of it. Subsequent shutdown of both units, airing them out, and restarting compressor #2 found natural gas odors at a 4-6 level being emitted from inside the compressor cabinet.";

Feb. 5, 2002, Date for which a second NOV for odors was issued by SCAQMD. Date NOV served was 2/13/02,

- **August 1, 2003:** An odor complaint was caused by the quarterly (once every three months) pump out of clarifier tanks at the West 5th Street facility. The clarifiers collect wastewater and run-off from Omnitrans bus wash, fuel island and bus yard. Omnitrans is required by EPA to capture the wastewater. The wastewater has an odor similar to sewer gas. To control the odor, Omnitrans puts enzymes in the tanks weekly to minimize odor build up;

2.1.3 SCAQMD SAMPLING RESULTS

The following is a summary of sampling performed by SCAQMD and community members between the year 2000 and 2002. Tedlar bags were provided by SCAQMD for community members to collect grab samples during periods when odors were detected.

- **December 19, 2000:** Two instantaneous gas samples were taken from a compressor vent at the East Valley Fueling Facility at 08:45 AM. The samples were analyzed by SCAQMD for sulfur compounds by Method 307-91. The following is the summary of the sample analysis for the source samples.

Compound	Sample 1 (ppmv)	Sample 2 (ppmv)	TWA/TLV
Hydrogen Sulfide	0.25	0.25	10

Compound	Sample 1 (ppmv)	Sample 2 (ppmv)	TWA/TLV
Carbonyl Sulfide	0.00	0.00	N/A[1]
Methyl Mercaptan	0.44	0.49	0.5
Ethyl Mercaptan	0.59	0.63	0.5
Dimethyl Sulfide	0.23	0.25	N/A[2]
Isopropyl Mercaptan	0.59	0.65	N/A[3]
n-Propyl Mercaptan	0.24	0.27	0.5
Unknown Sulfur	0.12	0.14	
Total Sulfur as H_2S	2.45	2.69	

1 No permissible exposure limit established by NIOSH or OSHA. Based on the LC50 data, carbonyl sulfide appears to be less toxic than hydrogen sulfide. The acute LC50 for carbonyl sulfide is 1,700 ppm.

2 No permissible exposure limit established by NIOSH or OSHA. Based on the LC50 data, dimethyl sulfide appears to be less toxic than hydrogen sulfide. The acute LC50 for dimethyl sulfide is 42,500 ppm.

3 No permissible exposure limit established by NIOSH or OSHA. Based on the LC50 data, isopropyl mercaptan appears to be less toxic than hydrogen sulfide. The acute LC50 for isopropyl mercaptan is 25,710 ppm.1

- **February 6, 2001:** Sample SWC-1 was collected on the South West corner of Ramona Alessandro Elementary School during an odor complaint. The sample was analyzed by SCAQMD for sulfur compounds by Method 307-91 and screened for methane by TCA FID.

1 The permissible exposure limit (PEL) is defined by the California Department of Occupational Safety and Health (CAL/OSHA) in the California Code of Regulations (CCR), Title 26, Section 5155 and other appropriate sections, where necessary. PELs refer to the airborne concentrations of substances and represent conditions during which it is believed that nearly all the workers may be repeatedly exposed, eight hours per day, for a 40-year working lifetime, without adverse effect. Due to the wide variation in individual susceptibility, however, a small number of workers may experience discomfort to some or all of these chemical substances at concentrations equal to or below the PEL. A still smaller percentage of persons may be affected more seriously from exposures at or below the PEL due to aggravation of a pre-existing condition or by development of an occupational illness.

The PEL is based on research conducted by the National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) and are based on the best available information from industrial experience, animal studies and other sources.
The time-weighted average (TWA) PEL represents an eight (8) hour time-weighted exposure for an 8-hour work day, 40 hours per week. The majority of PELs are expressed as time-weighted averages.

No sulfur compounds were detected above the method-reporting limit (less than 0.001 parts per million by volume (ppmv)). Methane was detected at a concentration of 3 ppm;

- **February 5 and February 6, 2002:** During an odor incident at the East Valley Fueling Facility, SCAQMD collected 61 samples over a 24-hour period. According to the SCAQMD Monitoring and Analysis Report of Laboratory Analysis (2002), grab samples were collected using a ground glass syringe equipped with a Teflon stopcock. The report states "Even though there was a strong odor present in the air, the instrument did not detect any reduced sulfur compounds. In order to rule sewer gas as the cause of the odor, a grab sample was collected from a manhole located between Omnitrans and the monitoring station. Low level Hydrogen Sulfide and Sulfur Dioxide were detected at levels consistent with the levels found during the previous weeks manhole testing" (SCAQMD, 2002);

  SCAQMD collected 33 samples on February 5, 2002 from 12:19 PM to 11:52 PM and 28 samples on February 6, 2002 from 12:52 AM to 12:56 PM. Samples were collected along 6th Street, 20 feet west of Medical Center Drive; on Medical Center Drive in front of the SCAQMD monitoring station; on Medical Center Drive half way up 5th street; and from the manhole on Medical Center Drive. The sample was analyzed by SCAQMD for sulfur compounds by Method 307-91. Hydrogen sulfide (H_2S) was not measured in any of the ambient samples above the method-reporting limit of 1.0 part per billion (ppb). The sample collected at 02:12 PM on February 5, 2002, measured H_2S at a concentration of 2.2 ppb;

2.1.4 EXECUTIVE ENVIRONMENTAL STUDY OF 5TH STREET STATION

On June 13, 2001, Executive Environmental Services Corporation (EESC) conducted ambient air monitoring at and around the Metro Fueling Station (EESC, 2001). At the time of the study, 102 buses were fueled using only one compressor. According EESC (2001) thirty-eight (38) samples were collected (Figure 5) and analyzed for sulfur and hydrocarbon compounds that are normally found in compressed natural gas (CNG). During the course of the study it was noted that a "noticeable CNG odor" was present northeast of the compressor (EESC, 2001).

The purpose of the study was two-fold (EESC, 2001):

- To measure ambient air levels of mercaptans and hydrocarbons around the natural gas compressor and fueling areas; and
- To measure personal employee exposures to mercaptans and hydrocarbons while driving two Omnitrans buses fueled with compressed natural gas (EESC, 2001).

Ambient and personal samples were collected during a midweek workday (**Figure 7**). Ambient air samples were collected over three sampling periods:

- During the early morning bus rollout (approximately 04:15 AM to 07:00 AM);
- The noon refueling (from approximately 11:30 AM to 01:30 PM); and
- During the evening refueling from approximately 07:15 PM to 10:00 PM.

Employee monitoring was conducted on two buses from approximately 09:20 AM to 11:15 AM.

During the sampling event, EESC noted that the "on-site investigation was considered a non-typical workday in terms of odor annoyance because one of the two compressors was inoperative, which resulted in heavier and extended use of the remaining compressor (EESC, 2001). Compressor Number One was being serviced due to a problem with the cylinder heads at the time of the sampling. EESC stated that there was a "noticeable Compressed Natural Gas (CNG) odor to the Northeast of the compressor units during most of the day" (2001).

Sampling devices (Tedlar™ bags and air sampling pumps) were placed in seven rental cars parked throughout the neighborhood. Polypropylene tubing was connected to each bag and positioned in the left rear window of each vehicle. The Tedlar™ bags and air sampling pumps were placed in the trunk of six vehicles and behind the driver's seat in the last vehicle. The sampling locations are shown on Figure 5. The locations included:

- Four locations along 6th Street to the north of the East Valley Fueling Station. Locations 1, 2, and 3 were on the north side of the street. Location 8 was on the south side of the street closest to the compressors;
- Three locations on Medical Center Drive. Locations 4 and 6 were on the east side of the street and location 5 was on the west side of the street. Location 4 was 10 feet south of 7th Street;
- Location 7 was in the overflow parking lot on the eastern most portion of the Omnitrans property;
- Three locations (Locations 9, 10, and 11) surrounding the CNG compressors and fueling station; and
- One control location (Location 12), in the Southwest corner of the employee parking lot near the corner of 5th Street and Gardena Street. The sampling equipment was place in the back seat of Omnitrans vehicle number 398.

The employee exposure monitoring was performed on two fully fueled, fully operative CNG buses that had been taken out of service for the monitoring (EESC, 2001). The buses were driven along Foothill Boulevard for approximately two hours, simulating passenger loading by

opening the doors and idling at bus stops. The handicap access platform was lowered for approximately five minutes to simulate wheelchair loading (EESC, 2001).

Samples were collected in accordance with SCAQMD Method 307.91 and ASTM Method D5504-98 (EESC, 2001). Samples were collected in 10-Liter Tedlar™ bags with polypropylene fittings and the pumps were set to draw 0.05 liters of air per minute (lpm). A BIOS Dry Cal DC-Lite standard was used to calibrate the pumps before and after the sampling. According to EESC (2001) the Tedlar™ bags were delivered to the analytical laboratory within 12 hours of collection and analyzed by gas chromatography. All samples were analyzed by Performance Analytical, Inc. within 24 hours of collection.

Thirty-eight samples were collected in the course of this study. Two samples were taken during the personal monitoring sampling event and 36 samples (3 at each sampling location) were taken at the 12 sampling locations at the East Valley Fueling Station and around the neighborhood.

Personal sampling inside the bus confirmed the fuel system on the bus was not leaking. The two samples collected during the personal sampling event measured CS_2, CH_4, and C6+. CS_2 was measured at 0.001 parts per million (ppm), CH_4 at a range of 2.5 ppm to 3.1 ppm, and C6+ at a range of 4.4 to 6.0 ppm. Mercapatans and other sulfur compounds were not measured in the samples above the method detection limits.

Sampling around the Omnitrans facility and in the neighborhood showed one location where natural gas fuel was leaking (adjacent to the compressor). The thirty-six samples collected during the ambient sampling event measured COS, CS_2, CH_4, and C6+ in most of the samples collected. Ethane was measured in one sample (Location 9 collected from 12:45 AM to 01:40 PM) at a concentration of 0.7 ppm. CS_2 was measured at range from 0.0022 ppm to 0.077 ppm, CH_4 at a range of 2.3 ppm to 33 ppm (Location 9 collected from 12:45 AM to 01:40 PM), and C6+ at a range of 1.9 to 7.9 ppm.

The recommendations from the report included:

- To provide the results of the report to employees represented by the air monitoring in accordance with Title 8 Section 340.2 of the California Code of Regulations;
- Employee exposure monitoring records must be retained for a period of 30 years in accordance with Title 8 Section 3204 of the California Code of Regulations; and
- Conduct additional sampling if any changes occur in the work practices, processes or related equipment usage that may increase employee exposure.

2.1.5 RAMONA ALESSANDRO ELEMENTARY SCHOOL

The Ramona Alessandro Elementary School is located at 670 Ramona Avenue, San Bernardino, California. According to the San Bernardino Unified School District (SBUSD) website (SBUSD, 2003). The school is located on approximately 12 acres and is located to the northeast of the 1700 West Fifth Street Station. The school operates on a year round schedule with three tracks. At any given time there are approximately 650 students on campus.

2.1.5.1 Nursing Log Review Of Ramona Alessandro Elementary School

Redacted nursing logs from the Ramona-Alessandro Elementary School and the Thompson Elementary School, covering the period from January 2, 2002 to March 29, 2002 were reviewed for a list of symptoms/illnesses reported by the SBCUSD. No identifying information such as student name, age, and grade were provided. The photocopied pages include the date; a description of the problem; the student's temperature (if taken); first aid if given; and whether the child was sent back to class, the parent was contacted by phone or sent home.

The Thompson School was selected previously by the SBCUSD for comparison with the Ramona Alessandro Elementary School because the schools had approximately the same number of students and approximately the same type of demographics. Two significant differences between the schools are that the Ramona-Alessandro Elementary School is adjacent to Omnitrans facility and that the Thompson Elementary School is in a census tract identified by the SCAQMD as having a background risk of approximately 1,500 in 1,000,000 from mobile sources (**Figure 19)**.

During the initial analysis of nursing logs by Omnitrans in 2002, six categories of illness were documented (spontaneous vomiting, motion induced vomiting, nausea/headache, spontaneous bloody noses, impact related bloody noses, and respiratory problems). A total of 23 cases of spontaneous vomiting, two cases of motion induced vomiting, 239 cases of nausea/headache, 39 cases of spontaneous bloody noses, seven cases of impact related bloody noses, and nine cases respiratory problems were reported. It is not clear from the analysis performed if all of the cases were for single ailments or if there were multiple symptoms reported by each child. In addition, the disposition of the child (return to class, sent home) is not reported.

The greatest number of reporting symptoms of nausea/headaches (the most frequently reported symptom) occurred on the following dates:

- January 2, 2002 – 12 reports of Nausea/Headaches; and,
- March 4, 2002 – 12 reports of Nausea/Headaches.

Reports of spontaneous vomiting, spontaneous bloody noses, and respiratory distress had a low correlation coefficient with symptoms of nausea/headaches. Nausea and headaches are classic symptoms of methane, hydrogen sulfide, and methyl mercaptan exposure. Methane is the principle component of natural gas and has no odor. Mercaptans are intentionally added to compressed natural gas as an odorant, to provide an olfactory warning system.

During the same period (January 2, 2002 to March 29, 2002) a total of 13 cases of spontaneous vomiting, no cases of motion induced vomiting, 255 cases of nausea/headache, 21 cases of spontaneous bloody noses, no cases of impact related bloody noses, and six cases respiratory problems were reported at Thompson Elementary School. Thompson Elementary School is located approximately 6.5 miles east of Ramona Alessandro Elementary School in the Highland, California. Thompson Elementary School is located at 7401 Church in Highland California.

A statistical test of the reported symptoms was performed to determine if there was a significant difference in the number and types of symptoms reported at each school. An analysis of variance of all the health effects measured above was performed. The *a priori* assumption of the test is that all mean values of each group are the same. Two health effects, spontaneous bloody noses and bloody noses caused by impacts, were found to have statistically significant differences between the schools. The p-value for spontaneous bloody noses and impacted caused bloody noses were both determined to be less than 0.05 (0.02 and 0.01, respectively). Other health effects, including spontaneous vomiting, motion induced vomiting, nausea and headaches, and respiratory distress were determined not be significantly different between the schools.

Figures 6a through 6f show the relative distribution of the symptoms during the period evaluated for each school. Figures 6g through 6l show the absolute difference between each school for the symptoms reported. For vomiting induced by motion and bloody noses caused by trauma there are a higher number of cases at Ramona Alessandro Elementary then at Thompson Elementary School. For the other symptoms, respiratory distress, spontaneous vomiting, headaches/nausea, and spontaneous bloody noses, the absolute difference between each day appears to be evenly distributed. That is to say that there were just as many days where the symptoms reported at Thompson Elementary exceeded the number of symptoms reported by Ramona-Alessandro Elementary. Even on or near days where odor complaints were high for the 5th Street Station (February 5 and February 6, 2002), symptoms reported at Ramona Alessandro Elementary School did not show an elevated trend when compared with the Thompson Elementary School..

2.1.5.2 Environmental Assessment Of Ramona Alessandro Elementary School

In September 2001, EnSafe Inc. (EnSafe) was retained by the SBUSD to perform an environmental assessment at the Ramona Alessandro Elementary School (Ensafe, 2001). The purpose of the study was to "characterize potential offsite emissions of compressed natural gas (CNG) and associated contaminants. Samples were collected at the boundary of the Omnitrans facility and the elementary school boundary" (EnSafe, 2001).

The sampling was performed on August 14, 2001 at seven fixed-point locations in the community (Figure 7). The sampling location was adjacent to the property boundary of the fueling station and the elementary school. The first location was immediately north of the fueling station located on the northern boundary of the Omnitrans facility. The second location was immediately north of the compressors (located at the north-eastern boundary of the Omnitrans facility). The third sampling location was the eastern boundary of the Omnitrans facility southeast of the compressors along Medical Center Drive. The fourth sampling location was due east of the compressors on the southwestern corner of the Ramona Alessandro Elementary School property (eastern edge of Medical Center Drive). The fifth sampling location was on the western boundary of the Ramona Alessandro Elementary School property (halfway between the northern and southern boundaries of the school along the eastern edge of Medical Center Drive). The sixth sampling location was on the northwestern corner of the Ramona Alessandro Elementary School property (near the corner of 7th Street and Medical Center Drive). The seventh sampling location was the southeast corner of the staff parking lot located on Ramona Street. The locations were selected after consultation with the SBUSD, the principal of Ramona Alessandro Elementary, and concerned citizens met on August 14, 2001.

Samples were collected in evacuated 6-liter Siloniter SUMMA canisters with flow controllers adjusted to collected an integrated sample over a three-hour period (EnSafe, 2001). Three sets of samples were collected at each location during evening and noon fueling times at the 1700 West 5th Street station. Samples were sent to Air Toxics Ltd., in Folsom, California for analysis via American Society for Testing and Materials (ASTM) D-1945 for Natural Gas Components and ASTM method D-5504 modified for associated sulfur compounds.

The majority of fueling operations occur from 06:00 PM to 01:00 AM each day. Limited fueling operations occur from 10:00 AM to 01:00 PM each day (EnSafe, 2001). Three sets of samples were collected at the locations over a 24-hour period (August 14, 2001 to August 15, 2001). The first set of samples (designated with an A suffix) were collected from 07:00 PM to 10:00 PM on

August 14, 2001. The second set of samples (designated with an B suffix) were collected from 10:00 PM on August 14, 2001 to 01:00 AM on August 15, 2001. The third set of samples (designated with an C suffix) were collected from 10:00 AM to 01:00 PM on August 15, 2001.

The analytical results showed detectable concentrations of hydrogen sulfide (H_2S) present (EnSafe, 2001) at three sampling locations (location 2, 3, and 4, closest to the compressor station on the Omnitrans facility). The first was location 2, due north of the compressor station. A concentration of 63 parts per billion by volume (ppbv) was measured from 10:00 PM on August 14, 2001 to 01:00 PM on August 15, 2001. The second was location 3, south east of the compressor station along the eastern boundary of the Omnitrans facility. A concentration of 36 ppbv was measured from 10:00 PM on August 14, 2001 to 01:00 PM on August 15, 2001. The third was location 4, due east of the compressors on the southwestern corner of the Ramona Alessandro Elementary School property (eastern edge of Medical Center Drive). Concentrations of 31 ppbv and 6.7 ppbv were measured at that location from 07:00 PM to 10:00 PM on August 14, 2001 and from 10:00 PM on August 14, 2001 to 01:00 PM on August 15, 2001, respectively.

One sample collected had measurable concentrations of isopropyl mercaptan (location 7). Location 7 was the southeast corner of the staff parking lot located on Ramona Street. A concentration of 8.2 ppbv was measured from 07:00 PM to 10:00 PM on August 14, 2001.

The source(s) of the hydrogen sulfide and isopropyl mercaptan measured in the community were not attributed to a particular source(s).

The recommendations of the report included:

- That the school grounds be closed to the public during refueling operations, normally from 06:00 P.M. to 01:00 AM;
- The existing odor complaint procedures at the school be modified to instruct teachers, staff, and students to move indoors during an odor complaint;
- That the results of the report be provided to the SCAQMD to seek their guidance on appropriate additional responses to the sampling results; and
- That the results of the reports also be provided to the Department of Toxic Substances Control (DTSC) toxicologist, Dr. Marilyn Underwood, who attended a meeting with community members and Omnitrans staff, to seek her guidance on appropriate additional responses to the sampling results.

2.1.6 SCAQMD EVALUATION OF AMBIENT AIR STUDIES

On October 17, 2001, the SCAQMD provided State Senator Nell Soto with a review of the EESC and EnSafe studies of the East Valley Fueling Station and Ramona-Alessandro Elementary School. The letter stated that it was SCAQMD "staff's opinion that appropriate sampling analysis and quality assurance procedures were employed. However, the results are at best inconclusive, if not inconsistent with the Omnitrans natural gas fueling equipment as the source of H_2S (hydrogen sulfide) found" (SCAQMD, 2001).

The inconsistencies noted by SCAQMD included:

- That only H_2S was found the ambient samples (EnSafe report). The SCAQMD reasoned that since H_2S is typically the lowest concentration natural gas odorant, other odorants should have been found. The other odorants were not found in the ambient samples;
- Given the prevailing wind during the sampling events, other sampling locations should have recorded detectable levels of H_2S based upon the levels of H_2S measured. No measurable H_2S levels were found in other downwind locations;
- The SCAQMD reasoned that if the source of H_2S was a natural gas leak at the East Valley Fueling Station, hydrocarbons normally found in natural gas such as ethane, propane, or butane should have been measured in samples that had recordable H_2S readings. According to the EnSafe report, none of the samples that measured H_2S measured hydrocarbons above the detection limit of 210 ppm; and,
- The final inconsistency noted by SCAQMD was that isopropylmercaptan (IPM) was found in one sample the location furthest from the East Valley Fueling Station. Since no other samples measured IPM, SCAQMD concluded that "it is difficult to identify Omnitrans as the source of the IPM" (SCAQMD, 2001).

Of the EESC report, SCAQMD determined that both the sampling and analytical techniques used were appropriate. The SCAQMD noted that the "low (<5) parts per billion levels of carbonyl sulfide (COS) and carbon disulfide (CS_2)" reported by EESC were below most published odor threshold limits (SCAQMD, 2001).

The inconsistencies noted by SCAQMD included:

- No consistent pattern of detections for COS and CS_2 at or around the East Valley Fueling Station;
- Measured levels of methane did not correlate with measurements of COS and CS_2 or other hydrocarbons normally found in natural gas;

- SCAQMD's analysis of the natural gas odorants at the East Valley Fueling Station did not measure COS; and,
- Performance Analytical, Inc., the contract laboratory that performed the analyses for EESC, suggested that the source of COS and CS_2 may be from the polypropylene fittings used in the sampling process.

SCAQMD stated that staff were collecting periodic "random samples in the evening and early nighttime hours in the area surrounding Omnitrans" (SCAQMD, 2001). At the time of the letter, samplers provide to Ramona Alessandro Elementary School staff and concerned citizens had not detected any sulfur-containing compounds in any samples (SCAQMD, 2001). The letter closed by saying that "As a result of the EnSafe report and your requests, the AQMD last week began an extensive monitoring program at Ramona Alessandro Elementary School in an effort to better understand both the source and magnitude of any ambient H_2S (SCAQMD, 2001).

None of the information collected by SCAQMD during the extensive monitoring program was provided for the preparation of this report even after multiple requests. Multiple requests were made for the date through Freedom of Information Act Requests and through e-mails and phones calls to the designated contacts at SCAQMD. No reason was given by SCAQMD for not providing the data.

2.2 234 SOUTH I STREET, SAN BERNARDINO, CALIFORNIA

The I Street refueling station located at 234 South I Street, San Bernardino, California (**Figure 8**), is approximately 4.7 acres, has storage areas, and services approximately 60 plus vehicles. In addition to the refueling operations at the site, a private autobody repair shop is maintained on the facility. **Figure 9** show the volumes of fuel delivered to the I Street Station since the year 2001.

Twelve odors complaints, all received on July 30, 2001, have been received by the SCAQMD for the I Street Station.

2.3 4748 ARROW HIGHWAY, MONTCLAIR, CALIFORNIA

The West Valley refueling station is located at 4748 Arrow Highway in Montclair, California. The facility coves approximately 5.5 acres and consists of operations, maintenance, a fuel island, a bus wash; and a LCNG fueling station (**Figure 10**). **Figures 11 through 14** show the volumes and types of fuel delivered to the West 5th Street Station since the year 2001.

No odor complaints have been received by the SCAQMD for the Arrow Highway Station.

3 PUBLIC HEALTH SURVEY

The following provides a synopsis of the public health survey performed within each of the communities. Between October 20, 2003 and October 25, 2003, surveyors attempted to interview as many residents located within ½ mile of each of the fueling facilities. The complete results of the statistical analysis of the public health survey are presented **Appendix H**.

The survey attempted to survey as many residents as possible over a 5 day period. Residents were sent flyers in Spanish and English notifying them that a survey team would be in the neighborhood to collect information from all of the residents. The survey teams were able to get responses from approximately 600 residences in the areas surrounding the Metro, I Street, and West Valley Stations. For the Metro Station and I Street Station areas, the number of residences surveyed encompassed more than 75 percent of the residences in the area. For the West Valley station, the number of residences encompassed more than 30 percent of the residences in the area. The response rates from the door-to-door surveys were higher (30% to 75%) than the blinded surveys to students and staff at the school. The results from the door-to-door survey may well represent the potential impacts on the community better than the school survey.

3.1 METRO STATION SURVEYS

The study area around the Metro station was bounded by Union Street to the north, North Garcia Street to the west, Kingman Street to the south, and Mount Vernon Avenue to the east. The focus of the study was the homes that are adjacent to the Metro Station, including Medical Center Drive, Tiajuana Avenue, Ramona Avenue, Cabrera Avenue, Western Avenue, Hancock Street, Madison Street, Victoria Street, Wilson Street, Gardena Street, 6th Street, and 7th Street. A representative sample was collected from the residents of this area over a three-day period (**Figure 15**).

At the end of the three-day period of surveying, a total of 344 residences were contacted in the surveying process. Approximately 30 % of the residences contacted during the survey process agreed to participate in the survey (102 residences). Approximately 52% of the residences contacted (178) refused verbally or did not respond to multiple attempts to make contact. The remaining residences contacted, approximately 18% or 64 residences, were abandoned, had dogs in the yard, or were absent.

3.2 I STREET STATION SURVEYS

The study area around the I Street Station was bounded by 3rd Street to the north, Prospective Avenue to the west, Huff Street to the south, and E Street to the east. The focus of the study were the homes that are adjacent to the I Street Station, including Congress Street, Bellview Street, Rialto Avenue, 2nd Street, I Street, J Street, K Street, L Street, and Eureka Avenue. A representative sample was collected from the residents of this area over the survey period (**Figure 16**).

At the end of the surveying, a total of 167 residences were contacted in the surveying process. Approximately 21 % of the residences contacted during the survey process agreed to participate in the survey (35 residences). Approximately 58% of the residences contacted (97) refused verbally or did not respond to multiple attempts to make contact. The remaining residences contacted, approximately 21% or 35 residences, were abandoned, had dogs in the yard, or were absent.

3.3 WEST VALLEY STATION SURVEYS

The study area around the West Valley station was bounded by Union Street to the north, North Garcia Street to the west, Kingman Street to the south, and Mount Vernon Avenue to the east. The focus of the study was the homes that are adjacent to the Metro Station, including Medical Center Drive, Tiajuana Avenue, Ramona Avenue, Cabrera Avenue, Western Avenue, Hancock Street, Madison Street, Victoria Street, Wilson Street, Gardena Street, 6th Street, and 7th Street. A representative sample was collected from the residents of this area over the survey period (**Figure 17**). Surveying was interrupted by the wild fires that blanketed San Bernardino in late October 2003.

At the end of the surveying, a total of 86 residences were contacted in the surveying process. Approximately 16 % of the residences contacted during the survey process agreed to participate in the survey (14 residences). Approximately 56% of the residences contacted (48) refused verbally or did not respond to multiple attempts to make contact. The remaining residences contacted, approximately 28% or 24 residences, were abandoned, had dogs in the yard, or were absent.

3.4 SCHOOL SURVEYS

In January 2004 a survey of students at the Ramona Alessandro Elementary School was performed with the approval of the San Bernardino City Unified School District (SBCUSD). A

one page survey instrument, in English and Spanish, was provided to all students attending during the month of January 2004. A total of 700 surveys were supplied to the school for distribution to students. Each survey was supplied in a self-addressed stamped envelope to ensure anonymity for the respondents. During this period two of the three tracks of students are in attendance. This constitutes approximately 650 of the 850 students who attend the school. In addition, at the request of one of the staff members who is also a member of WeCAN, a survey of staff members of the Ramona Alessandro Elementary School was also performed in January 2004. After approval by SBCUSD, a one page survey instrument, similar to the one supplied to students was sent to the school for distribution. Each survey was supplied in a self-addressed stamped envelope to ensure anonymity for the respondents.

A total of 68 out of 700 student surveys were returned prior to February 25, 2004. The response rate of approximately 10% from the surveys provided to the school. Approximately 42 out of the 68 of the respondents (62%) lived within ½ mile of the school. Of the remaining 26 respondents, 25 lived more than ½ mile from the school. One student chose not to indicate where they lived.

The Self Reported Health Status for Students Living Within ½ Mile of the School

Status	Count	Cumulative Count	Percent	Cumulative Percent
Excellent	8	8	32	32
Very Good	8	16	32	64
Good	4	20	16	80
Fair	3	23	12	92
Poor	0	23	0	92
Missing	2	25	8	100

The Self Reported Health Status for Students Living More Than ½ Mile of the School

Status	Count	Cumulative Count	Percent	Cumulative Percent
Excellent	3	3	7	7

Status	Count	Cumulative Count	Percent	Cumulative Percent
Very Good	11	14	26	33
Good	14	28	33	67
Fair	11	39	26	93
Poor	2	41	5	98
Missing	1	42	2	100

For students that lived near the school approximately 93% reported that their health status was fair to excellent. For students that lived more than ½ mile from the school 92% reported that their health status was fair to excellent.

The Self Reported Change In Status for Students Living Within ½ Mile of the School

Change in Status	Count	Cumulative Count	Percent	Cumulative Percent
Improved Significantly	1	1	4	4
Improved Somewhat	0	1	0	4
Stayed About The Same	17	18	68	72
Declined Somewhat	4	22	16	88
Declined Significantly	3	25	12	100
Don't Know	0	25	0	100

The Self Reported Change In Health Status for Students Living More Than ½ Mile of the School

Change in Status	Count	Cumulative	Percent	Cumulative Percent

		Count		
Improved Significantly	0	0	0	0
Improved Somewhat	0	0	0	0
Stayed About The Same	17	17	40	40
Declined Somewhat	18	35	43	83
Declined Significantly	2	37	5	88
Don't Know	5	42	12	100

For students that lived near the school approximately 68% reported that their health status had not changed while 4% reported that their health had improved significantly since attending Ramona Alessandro Elementary. A total of 28% reported that their health had declined somewhat or declined significantly since attending Ramona Alessandro Elementary. For students that lived more than ½ mile from the school approximately 40% reported that their health status had not changed since attending Ramona Alessandro Elementary. A total of 48% reported that their health had declined somewhat or declined significantly since attending Ramona Alessandro Elementary.

For both sets of students the responses approximated a normal distribution of responses. Most students reported that their health was excellent, very good, or good.

A total of 37 out of 100 staff surveys were returned prior to February 25, 2004. The response rate of approximately 37% from the surveys provided to the school. Approximately 12 out of the 37 of the respondents (32%) lived within ½ mile of the school. The 25 respondents or 68% of the respondents lived more than ½ mile from the school.

The Self Reported Health Status for Staff Living Within ½ Mile of the School

Status	Count	Cumulative Count	Percent	Cumulative Perce
Excellent	0	0	0	0

Very Good	0	0	0	0
Good	0	0	0	0
Fair	10	10	83	83
Poor	2	12	17	100

The Self Reported Health Status for Staff Living More Than ½ Mile of the School

Status	Count	Cumulative Count	Percent	Cumulative Percent
Excellent	6	6	24	24
Very Good	7	13	28	52
Good	5	18	20	72
Fair	5	23	20	92
Poor	2	25	8	100

For staff that lived within a ½ mile of the school approximately 83% reported that their health status was fair. The remaining 17% reported their health status as poor. For staff that lived more than ½ mile from the school 92% reported that their health status was fair to excellent.

The Self Reported Change In Status for Staff Living Within ½ Mile of the School

Change in Status	Count	Cumulative Count	Percent	Cumulative Percent
Improved Significantly	0	0	0	0
Improved Somewhat	0	0	0	0
Stayed About The Same	0	0	0	0
Declined Somewhat	12	12	100	100

Change in Status	Count	Cumulative Count	Percent	Cumulative Percent
Declined Significantly	0	12	0	100

The Self Reported Change In Health Status for Students Living More Than ½ Mile of the School

Change in Status	Count	Cumulative Count	Percent	Cumulative Percent
Improved Significantly	0	0	0	0
Improved Somewhat	0	0	0	0
Stayed About The Same	12	12	48	48
Declined Somewhat	8	20	32	80
Declined Significantly	3	23	12	92
Don't Know	2	25	8	100

For staff that lived near the school approximately 100% reported that their health status had declined somewhat since starting work at Ramona Alessandro Elementary. For staff that lived more than ½ mile from the school approximately 48% reported that their health status had not changed since starting work at Ramona Alessandro Elementary. A total of 44% reported that their health had declined somewhat or declined significantly since starting work at Ramona Alessandro Elementary.

The responses from staff living more than ½ mile from the school approximate a normal distribution. The responses from staff living within ½ mile of the Omnitrans facility were identical in the responses questions, including the number of hours of exposure (24 hours), overall health status (declined somewhat), cause of health decline (attributed to Omnitrans facility), and conditions that keep the respondent from working (asthma, breathing problems, nosebleeds, and nausea). The responses from staff members living within ½ mile of the

Omnitrans facility appear to have been coordinated or written by the same person, and are suspect. The staff respondents living more than ½ mile from the school had a higher self-reported health status, years working at the school, and overall health status.

In addition to the responses asked for in the survey, several respondents included comments on the survey or self-addressed envelopes. Copies of the comments are provided in **Appendix E.**

3.5 STATISTICAL ANALYSES OF PUBLIC HEALTH SURVEY RESULTS

All survey data were analyzed to evaluate whether there were relationships between self-reported health status and the presence of the three Omnitrans facilities. Variables evaluated included distance from three Omnitrans facilities, individuals age, and various health criteria. Health was scored on a scale from 1 (self reported very healthy) to five (self reported very unhealthy)

The Self Reported Health Status for Residents Surveyed Near Metro Station

Status	Count	Cumulative Count	Percent	Cumulative Perce
Excellent	14	14	4	4
Very Good	50	64	13	17
Good	198	262	51	68
Fair	91	353	24	91
Poor	33	386	9	100

For residents surveyed living near the Metro Station 91% reported that their health was Fair to Excellent. Only 9% of those surveyed (33 respondents) reported that their health was poor. Of that 9% of residents who reported that their health was poor, none reported that they had a health limiting condition.

The Self Reported Health Status for Residents Surveyed Near I Street Station

Status	Count	Cumulative Count	Percent	Cumulative Perce

Status	Count	Cumulative Count	Percent	Cumulative Perce
Excellent	8	8	5	5
Very Good	27	35	18	23
Good	97	132	63	86
Fair	22	154	14	100
Poor	0	154	0	100
Missing				

For residents surveyed living near the I Street Station 100% reported that their health was Fair to Excellent. No residents reported that their health was poor. None of the residents reported that they had a health limiting condition.

The Self Reported Health Status for Residents Surveyed Near West Valley Station

Status	Count	Cumulative Count	Percent	Cumulative Perce
Excellent	0	0	0	0
Very Good	8	8	12	12
Good	41	49	63	75
Fair	16	65	25	100
Poor	0	65	0	100
Missing	0	65	0	100

For residents surveyed living near the West Valley Station 100% reported that their health was Fair to Very Good. No residents reported that their health was poor. None of the residents reported that they had a health limiting condition.

An analysis of variance for health status comparing the three communities found no statistical difference between the self-reported health status. Based on the fuels used at each of the sites (LCNG or gasoline) there appears to be no health effect on the communities.

Tables 1, 2 and 3 show the change in self-reported health status for the three communities surrounding the Metro, the I Street, and Arrow Highway Omnitrans Stations. The self-reported health status five years ago for residents near the Metro Station showed a potentially statistically significant relationship, where people have self reported poorer health as they live farther from the Omnitrans Facility, but this relationship is not necessarily causal. The self-reported health status for residents three years ago and one year ago did not show a relationship with distance to the Omnitrans facility, but did show a relationship to perceived health status from the previous years. The Arrow Highway Station showed a statistically significant relationship where poorer health is associated to proximity (closeness) to the Omnitrans facility in years three and five, but this may be due to covariation and the small N. Moreover this relationship does not hold up with further analysis, for proximity to the Arrow Highway facility was not related to any health problem as demonstrated in the paragraph below. The I Street Station showed no relationship with self reported health and the distance of ones home from the facility. Generally, self reported health at Years one, three, and five had a positive relationship and were statistically significant.

Tables 4, 5, and 6 show the relationship between distance from facility, age, and a variety of physical ailments. **Table 4** shows the relationship between the age of an individual and the distance from the 5^{tb} Street Omnitrans facility with vision, hearing, arthritis, back, bone, other, heart, stroke, hypertension, diabetes, lung, cancer, weight, kidney, circulation, tumor, lupus, tendonitis, seizure, multiple sclerosis, polio, Parkinsons, carpal tunnel, hernia, ulcer, Graves disease and migraine. While proximity of the Omnitrans was not positively correlated with any aliment, as one might expect, age was positively correlated with the self reported frequency of the following ailments: vision, hearing, arthritis, back, bone, heart, hypertension, diabetes cancer, circulation, Parkinsons, carpal tunnel, hernia, Graves disease. **Table 5** shows that there is no positive relationship between any disease and proximity to the Omnitrans I Street facility. **Table 5** also shows, as one might expect, that age is positively correlated with self reported frequency of the following ailments: vision, hearing, arthritis, back, bone, hypertension, diabetes, cancer, weight, tumor, tendonitis, carpal tunnel, hernia, ulcer, Graves disease and migraine. **Table 6** shows no relationship between distance from Arrow Highway Omnitrans facility and any of the ailments. **Table 6** does show a relationship between age and cancer, however.

Concurrent with the assessment of the relationships above, an analysis of variance (ANOVA) test was performed to determine whether there was a specific relationship between self-reported health status and discrete distances to the Omnitrans facilities (less than 500 feet; 500 feet to 1000 feet; 1000 feet to 1500 feet; 1500 feet to 2000 feet; and 2000 feet to 2500 feet) and self-reported health status five years ago, three years ago, and one year ago.

The ANOVA confirmed that there was a relationship between self-reported health status and distance to the Omnitrans facility (p value less than 0.05). A post hoc comparison of the self-reported health status and distance to the sites showed a statistically significant relationship for most categories of self-reported status. No clear pattern of decreased health status or increased health status was present in any of the comparisons.

4 LOCAL AREA SURVEY

Contaminant release information and associated chemical species were identified through a review of available documentation and through a coordinated survey of local businesses located within a half-mile of each fueling facility. **Appendix C** presents the results of the local business surveys and the emission rate calculations for each source considered in the assessment.

In addition to the physical survey of the sites, a search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR) for a radius up to one mile around each Omnitrans facility. The reports meet the government records search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-00 and are included in Appendix G. Databases reviewed included federal and state listing of permitted facilities, hazardous waste spills, and repositories.

The executive summaries from each search are presented below.

4.1 METRO STATION SURVEYS

The study area around the Metro station was bounded by Union Street to the north, North Garcia Street to the west, Kingman Street to the south, and Mount Vernon Avenue to the east. The surveys were performed from October 15, 2003 to October 17, 2003.

4.1.1 EDR REPORT

In addition to the physical survey of the sites, the EDR review of the Metro Station revealed the following sites of interest:

STATE ASTM STANDARD

CHMIRS: The California Hazardous Material Incident Report System contains information on reported hazardous material incidents, i.e., accidental releases or spills. The source is the California Office of Emergency Services. A review of the CHMIRS list, as provided by EDR, and dated 12/31/2002 revealed that there are two CHMIRS sites within approximately one mile of the target property.

1. 1215 N. MEDICAL CENTER

2. 1685 SANTA FE WAY

SWF/LF: The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data come from the Integrated Waste Management Board's Solid Waste Information System (SWIS) database.

A review of the SWF/LF list, as provided by EDR, has revealed that there is one SWF/LF site within approximately half a mile of the target property.

1632 WEST 5TH ST. KORITAS TIRE'S

CA FID: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board. A review of the CA FID UST list, as provided by EDR, has revealed that there is 1 CA FID UST site within approximately a quarter mile of the target property.

1545 W 5TH ST C-STAR

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there are two HIST UST sites within approximately a quarter mile of the target property.

1. 1632 W 5TH ST 5TH AVE. TIRE & MINI MART

2. 1545 W 5TH ST LERNER OIL STATION

STATE OR LOCAL ASTM SUPPLEMENTAL

HAZNET: The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000-1,000,000 annually, representing approximately 350,000-500,000 shipments. Data from non-California manifests & continuation sheets are not included at the present time. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, & disposal method. The source is the Department of Toxic Substance Control is the agency. A review of the HAZNET list, as provided by EDR, has revealed that there are five HAZNET sites within approximately a quarter of a mile of the target property.

1. 555-595 N GARDENA ST OMNI TRAN

2. 520 FLORES ST HAPPY BOY CARWASH

3. 670 RAMONA SBCUSD/ROMONA ALESSANDRO ELEMENTARY

4. 1582 W FOURTH ST PRIETO AUTO BODY REPAIR

5. 1545 W 5TH STREET C STAR STATION/EDITH WOOD

DEHS Permit System: San Bernardino County Fire Department Hazardous Materials Division.

A review of the San Bernardino Co. Permit list, as provided by EDR, has revealed that there is one San Bernardino Co. Permit site within approximately a quarter of a mile of the target property.

1717 5TH ST CI-SB CITY/NUNEZ PARK

Due to poor or inadequate address information, the following sites were not mapped:

572 S MT VERNON AV	CHMIRS, San Bern. Co., permits
HWY 58 2 MI WEST OF HWY 359	CHMIRS, EMI
RIALTO LILAC STREET	CHMIRS, EMI
ALTA DENA DAIRY	LUST, Cortese
ARCO #5181	LUST, Cortese
ROESH LINES, INC.	LUST, Cortese
SECCOMBE LAKE STATE REC AREA	CERC-NFRAP
CALTRANS PANARAMA PT.MAINT.ST.	LUST
J HUBBS&SONS/7TH ST DUMP	UST
5TH AVE. TIRE & MINI MART	CA FID UST
UNOCAL SERVICE STATION #5961	HAZNET
CIRCLE K STORES INC STATION #5700	HAZNET
RAIL SHOP AREA/470 NORTH "L" ST.	ERNS
CUCO CARBURATOR	San Bern. Co. Permit
FELIX AUTOMOTIVE	San Bern. Co. Permit
TINOS AUTO REPAIR	San Bern. Co. Permit
RAMIREZ AUTO REPAIR	San Bern. Co. Permit

4.1.2 LOCAL SURVEY

To the degree practical, all contaminant emissions generated from each source location were considered in the analysis. The limiting factor for the inclusion of a compound was the availability of published exposure factors and other toxicity data enabling risks to be quantified and, where appropriate, target organs identified. Thirty individual businesses (autobody shops, auto mechanics, markets and bakeries, laundries, restaurants, and trucking facilities) were identified within the half-mile radius of the Metro Station. Six businesses (including the Metro Station) from 5th Street were identified as potential sources of emissions (more than one gallons of solvents used in a month or more than 1 pound of volatile organic chemicals emitted in a day) during the survey process. Survey response was generally positive, with a few negative responses from surveyed businesses. A list of emitted compounds for each source is outlined in **Table 7** for sources near the Metro Station.

Based upon risk estimates made by the SCAQMD (2003), the local businesses surveyed have a much smaller impact on the community's health compared with mobile source emissions (See Section 4.4). SCAQMD (2003) estimated the cumulative health risk from mobile source emission for the community adjacent to the 5th Street station to be approximately 1,000 in 1,000,000.

4.2 I STREET STATION SURVEYS

The study area around the I Street Station was bounded by 3rd Street to the north, Prospective Avenue to the west, Huff Street to the south, and E Street to the east. The surveys were performed from October 15, 2003 to October 17, 2003.

4.2.1 EDR REPORT

In addition to the physical survey of the sites, the EDR review of the I Street Station revealed the following sites of interest:

FEDERAL ASTM STANDARD

CERCLIS: The Comprehensive Environmental Response, Compensation and Liability Information System contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). CERCLIS contains sites, which are either proposed to or on the National Priorities

List (NPL), and sites, which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the CERCLIS list, as provided by EDR, and dated 09/11/2003 has revealed three CERCLIS sites within approximately half a mile of the target property.

1. 835 E. 3RD STREET PHIL'S BURGER & DRUMS
2. 740 CONGRESS ST SOUTHWEST METAL CO
3. 456 SO. I ST QUALITY PLATING INC

RCRIS: Resource Conservation and Recovery Information System. RCRIS includes selective information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs): generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRIS-SQG list, as provided by EDR, and dated 09/10/2003 has revealed two RCRIS-SQG sites within a quarter of a mile of the target property.

1. 272 S I ST QUIEL BROS SIGN CO INC
2. 740 CONGRESS ST SOUTHWEST METAL CO

STATE ASTM STANDARD

CHMIRS: The California Hazardous Material Incident Report System contains information on reported hazardous material incidents, i.e., accidental releases or spills. The source is the California Office of Emergency Services. A review of the CHMIRS list, as provided by EDR, and dated 12/31/2002 has revealed one CHMIRS site within approximately one mile of the target property.

702 WEST 2ND ST. Not reported

STATE OR LOCAL ASTM SUPPLEMENTAL

REF: This category contains properties where contamination has not been confirmed and which were determined as not requiring direct DTSC Site Mitigation Program action or oversight. Accordingly, these sites have been referred to another state or local regulatory agency. A review of the REF list, as provided by EDR, and dated 08/31/2003 has revealed one REF site within approximately a quarter of a mile of the target property.

740 CONGRESS STREET SOUTHWEST METAL COMPANY

HAZNET: The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000-1,000,000 annually, representing approximately 350,000-500,000 shipments. Data from non-California manifests & continuation sheets are not included at the present time. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, & disposal method. The source is the Department of Toxic Substance Control is the agency. A review of the HAZNET list, as provided by EDR, has revealed that there are nine HAZNET sites within approximately a quarter of a mile of the target property.

BUNKER REFRIDGERATION	215 SOUTH I ST
CAL. DEPT TRANS/CAL TRANS	197 S. I ST
SMOOTH MOVE INC	207 S WACKAINSHAW
HUD INTOWN PROPERTIES	1047 CONGRESS ST
HUB CONSTRUCTION INC	789 W RIALTO AVE
QUIEL BROS SIGN CO INC	272 S I ST
PLANA	346 SOUTH I STREET
A.C. BEYER TRUCKING	767 CONGRESS STREET
A C BYERS TRUCKING INC	767 CONGRESS

DEHS Permit System: San Bernardino County Fire Department Hazardous Materials Division. A review of the San Bern. Co. Permit list, as provided by EDR, has revealed that there are eight San Bern. Co. Permit sites within approximately a quarter of a mile of the target property.

APPLIANCE REPAIR	225 S I ST
SMOOTH MOVE INC	207 S WACKAINSHAW
QUIEL BROS SIGN CO INC	272 S I ST
PERFORMANCE TECHNIQUES	346 S I ST
PLAN A INC	346 S I ST
JSI IND INC	346 S I ST STE 19

A C BYERS TRUCKING	767 CONGRESS ST
HUB CONSTRUCTION	379 S 'I' ST

Former Manufactured Gas (Coal Gas) Sites:

The existence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative. A review of the Coal Gas list, as provided by EDR, has revealed one Coal Gas site within approximately one mile of the target property.

SAN BERNARDINO GAS LIGHT CO.	220-240 ARROWHEAD AVE.

Due to poor or inadequate address information, the following sites were not mapped:

572 S MT VERNON AV	CHMIRS, San Bern. Co., Permit
HWY 58 2 MI WEST OF HWY 359	CHMIRS, EMI
RIALTO LILAC STREET	CHMIRS, EMI
UNOCAL #3444	LUST, Cortese, CA FID UST
ALTA DENA DAIRY	LUST, Cortese
ARCO #5181	LUST, Cortese
UNION OIL SERVICE STATION #606	LUST, Cortese, CA FID UST
INLAND BEVERAGE COMPANY	LUST, Cortese
CHEVRON	LUST, Cortese
SECCOMBE LAKE STATE REC AREA	CERC-NFRAP
CALTRANS PANARAMA PT.MAINT.ST.	LUST
SOUTH WESTERN MOTORS	CA FID UST, San Bern. Co. Permit
HECTOR CERDA	HAZNET
UNOCAL SERVICE STATION #5961	HAZNET
CIRCLE K STORES INC STATION #5700	HAZNET
572 SOUTH MOUNTH VERNON AVE	ERNS
572 SOUTH MT. VERNON AVE	ERNS

4.2.2 LOCAL SURVEY

To the degree practical, all contaminant emissions generated from each source location were considered in the analysis. The limiting factor for the inclusion of a compound was the availability of published exposure factors and other toxicity data enabling risks to be quantified

and, where appropriate, target organs identified. Approximately 55 individual businesses (whole sale appliance, printing, appliance repair, gasoline service stations, dry cleaner, plating shop, plumbing and heating supplies, autobody shops, auto mechanics, markets and bakeries, laundries, and restaurants) were identified within the half-mile radius of the I Street Station. Seven businesses (including the I Street Station) were identified as potential sources of emissions (more than one gallons of solvents used in a month or more than 1 pound of volatile organic chemicals emitted in a day) during the survey process. Survey response was generally positive, with several negative responses from surveyed businesses. A list of emitted compounds for each source is outlined in **Table 8** for sources near the I Street Station.

Based upon risk estimates made by the SCAQMD (2003), the local businesses surveyed have a much smaller impact on the community's health compared with mobile source emissions. SCAQMD (2003) estimated the cumulative health risk from mobile source emission for the community adjacent to the I Street station to be approximately 1,000 in 1,000,000.

4.3 WEST VALLEY STATION SURVEYS

The study area around the West Valley station was bounded by . The surveys were performed from October 15, 2003 to October 17, 2003.

4.3.1 EDR REPORT

In addition to the physical survey of the sites, the EDR review of the Arrow Highway Station revealed the following sites of interest:

FEDERAL ASTM STANDARD

RCRIS: Resource Conservation and Recovery Information System. RCRIS includes selective information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs): generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste. A review of the RCRIS-SQG list, as provided by EDR, and dated 09/10/2003 has revealed nine RCRIS-SQG sites within approximately a quarter of a mile of the target property.

CALMAT CO CLAREMONT	4711 HUNTINGTON DR
FRANKS PRECISION AUTOMOTIVE	4701-D ARROW HWY
REO CIRCUITS INC	4711 #D ARROW HWY
ORR AUTO	4711 ARROW HWY UNIT A
HIGH TECH AUTO REPAIR	4711 ARROW HWY UNIT C
KARL HERTZ TRANS INC	4791 ARROW WAY
M & M CLEANERS	8945 MONTE VISTA
SEARS ROEBUCK & CO #1748	5080 MONTCLAIR PLAZA
WESTERN ROCK CO	4952 E ARROW

STATE ASTM STANDARD

CHMIRS: The California Hazardous Material Incident Report System contains information on reported hazardous material incidents, i.e., accidental releases or spills. The source is the California Office of Emergency Services. A review of the CHMIRS list, as provided by EDR, and dated 12/31/2002 has revealed four CHMIRS sites within approximately one mile of the target property.

Not reported	5225 ARROW
Not reported	SAN JOSE ST / MONTE V
Not reported	9041 CENTRAL AVENUE
Not reported	9400 CENTRAL

STATE OR LOCAL ASTM SUPPLEMENTAL

VCP: Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs. A review of the VCP list, as provided by EDR, and dated 08/31/2003 has revealed one VCP site within approximately half a mile of the target property.

MONTCLAIR TOWNE SQUARE	8914-9095 MONTE VISTA A

STATE OR LOCAL ASTM SUPPLEMENTAL

DRYCLEANERS:A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; drycleaning plants except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

A review of the CLEANERS list, as provided by EDR, and dated 03/11/2003 has revealed that there are two CLEANERS sites within approximately a quarter of a mile of the target property.

DC PRINTING	4650 W ARROW HWY STE F1
M & S CLEANERS	8945 MONTE VISTA

HAZNET: The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000-1,000,000 annually, representing approximately 350,000-500,000 shipments. Data from non-California manifests & continuation sheets are not included at the present time. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, & disposal method. The source is the Department of Toxic Substance Control is the agency. A review of the HAZNET list, as provided by EDR, has revealed 17 HAZNET sites within approximately a quarter of a mile of the target property.

B & G TRUCKING SHOP	8950 MT VISTA BLVD
INDUSTRIAL ASPHALT	4711 HUNTINGTON DR
CALMAT PROPERTIES	4711 HUNTINGTON DR
ORR AUTOMOTIVE	4711 A ARROW HWY
CLAREMONT TIRE & AUTO CENTER	4711 ARROW HWY UNIT B
VANTAGE TOOLS, INC	4741 ARROW HWY, UNIT A
ARROW COLLISION CENTER	4741 ARROW HWY
CPL	4650 ARROW HWY
DC PRINTING	4650 W ARROW HWY STE F1
KARL HERTZ TRANS INC	4791 ARROW WAY
MONTCLAIR SERVICE CENTER	4839 ARROW HWY
HOUSING AND URBAN DEVELOPMENT	8924 FELIPE AVE
INTOWN PROPERTIES INC/HUD	8936 FELIPE CT
BRUIN PAINTING CORPORATION	4650 ARROW HIGHWAY G11
1X B G TRUCKING	8950 MONTA VISTA AVENUE
M & S CLEANERS	8945 MONTE VISTA
GREASE MONKEY	8949 MONTE VISTA

DEHS Permit System: San Bernardino County Fire Department Hazardous Materials Division. A review of the San Bern. Co. Permit list, as provided by EDR, has revealed that there are 21 San Bern. Co. Permit sites within approximately a quarter of a mile of the target property.

VULCAN MATERIALS	4711 HUNTINGTON DR

VULCAN MATERIALS	4711 HUNTINGTON DR
CI-FIRE STATION #1	8901 MONTE VISTA AVE
CLAREMONT TIRE & AUTO CENTER	4711 ARROW HWY UNIT B
MC TIER IMPORT REPAIR	4681 ARROW HWY 'B'
ARROW COLLISION CENTER	4741 ARROW HWY
US AIRCONDITIONING DISTRIBUTOR	4751 ARROW HWY
SIERRA AUTOMOTIVE	4701 ARROW HWY 'B'
JT AUTOMOTIVE	4711 ARROW HWY C
TOWN & COUNTRY POOL SUPPLIES,	4711 ARROW HWY 'D'
ORR AUTOMOTIVE	4711 ARROW HWY A
PRIME MARINE	4721 ARROW HWY C
PREMISES METALS	4791 ARROW HWY
PREMISES METALS	4791 ARROW HWY
KARL HERTZ TRANSPORTATION	4791 ARROW HWY
MONTCLAIR SERVICE CENTER	4839 ARROW HWY
ADVANCED CADILLAC SERVICE	4849 ARROW HWY
SCE-SAN ANTONIO SUBSTATN	ARROW / MONTE VISTA
ABC AUTO SERVICE	8938 MONTE VISTA AVE
ABC AUTOMOTIVE SERVICE	8950 MONTE VISTA AVE
GREASE MONKEY	8949 MONTE VISTA

BROWNFIELDS DATABASES

VCP: Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs. A review of the VCP list, as provided by EDR, and dated 08/31/2003 has revealed that there is one VCP site within approximately half a mile of the target property.

MONTCLAIR TOWNE SQUARE	8914-9095 MONTE VISTA A

Due to poor or inadequate address information, the following sites were not mapped:

CLAREMONT ONE HR CLNR-SOUTH	RCRIS-SQG, FINDS, CLEANERS
MONTCLAIR PLAZA CLEANERS	HAZNET, CLEANERS
1X ACQUIPORT FIVE	HAZNET, CHMIRS
CHUNG'S MARKET	LUST, Cortese
LIVE OAK DEBRIS DISPOSAL SITE	SWF/LF, WMUDS/SWAT

KRCA-TV62	UST
SIXTH STREET DUMP-CLAREMONT	WMUDS/SWAT
CO SANITATION DISTRICT OF LOS ANGE	HAZNET
GMS REALTY	HAZNET
GMC REALTY LLC	HAZNET
AUTO EXPO INC	HAZNET
AMERICAN STORES PROPERTIES, INC.	HAZNET
MARTIN F MCLOUD DC	HAZNET
JIM COX	HAZNET
PILGRIM PLACE	HAZNET
A T N T CORP	HAZNET
JB PALLETS	HAZNET
1X THE CLAREMONT COLLEGES	HAZNET
PILGRAM PLACE	HAZNET
CITY OF CLAREMONT	HAZNET
CAL SELECT BUILDERS	HAZNET
LARRY CARBURETOR SHOP	RCRIS-SQG, FINDS, HAZNET
INDUSTRIAL ASPHAULT	HAZNET
KENNETH WAYNE JACKSON	HAZNET
JI YOUNG LEE	HAZNET
RON FITZGERALD	HAZNET
MACY'S WEST INC	HAZNET
THE PICTURE PEOPLE INC	HAZNET
ROBINSONS-MAY DEPT STORES	HAZNET
ACQUIPORT 5 CORP	HAZNET
JC PENNEY	HAZNET
SEARS ROEBUCK AND CO 1748/6828	HAZNET
1X MONTCLAIR PLAZA	HAZNET
EXPRESSLY PORTRAITS	HAZNET
1X GOODYEAR AUTO SERVICE CTR #9362	HAZNET
MONTCLAIR PLAZA DENTAL GROUP	HAZNET
FAITH CENTER	HAZNET
HUD	HAZNET
HUD/ASSET MANAGEMENT SPECIALTIES I	HAZNET
KATHRYN CARNEAL	HAZNET
SHELL	HAZNET

AMER TELE & TELE CO PADUA HILLS	RCRIS-SQG, FINDS
TEXACO SERVICE STATION	RCRIS-SQG, FINDS
SHELL SERVICE STATION	RCRIS-SQG, FINDS
A-S TRANSMISSION	San Bern. Co. Permit
PHILPAC	San Bern. Co. Permit
SEARS AUTO CENTER	San Bern. Co. Permit
STRESSCOAT INC	San Bern. Co. Permit
UPLAND NISSAN SERVICE	San Bern. Co. Permit
UPLAND NISSAN SERVICE	San Bern. Co. Permit
R & R ROTARY	San Bern. Co. Permit
R & L AUTOMOTIVE REPAIR	San Bern. Co. Permit
GERMAN AUTO WORKS	San Bern. Co. Permit
EXOTIC MOTORCARS	San Bern. Co. Permit
CLAREMONT UNIVERSITY CENTER	CA SLIC

4.3.2 LOCAL SURVEY

To the degree practical, all contaminant emissions generated from each source location were considered in the analysis. The limiting factor for the inclusion of a compound was the availability of published exposure factors and other toxicity data enabling risks to be quantified and, where appropriate, target organs identified. Approximately 50 individual businesses (retail market place, printing, dry cleaning collection, autobody shops, auto mechanics, construction storage, fire station, Metro train station, optical laboratory, asphalt mixing, and restaurants) were identified within the ½ mile radius of the West Valley Station. Thirteen businesses (including the West Valley Station) were identified as potential sources of emissions (more than one gallons of solvents used in a month or more than 1 pound of volatile organic chemicals emitted in a day) during the survey process. Survey response was generally positive, with a several negative responses from surveyed businesses. A list of emitted compounds for each source is outlined in **Table 9** for sources near the West Valley Station.

Based upon risk estimates made by the SCAQMD (2003), the local businesses surveyed have a much smaller impact on the community's health compared with mobile source emissions. SCAQMD (2003) estimated the cumulative health risk from mobile source emission for the community adjacent to the Montclair station to be less than 1,000 in 1,000,000.

4.4 SCAQMD ENVIRONMENTAL JUSTICE STUDY

In August 2003, SCAQMD published the "White Paper on Potential Control Strategies to Address Cumulative Impacts From Air Pollution" in which a regional evaluation of air quality was used to determine the risks posed to neighborhoods from mobile and stationary sources. According to the document "Estimated risks from air toxic measurement at 10 monitoring stations for residents of the Basin are ~1,400 in a million (based on a range from about 1,120 in a million to about 1,740 in a million), with some areas experiencing higher risks. Reducing emissions throughout the Basin would decrease the overall risk on a regional basis and will lower neighborhood risks by varying degrees, depending on the localized circumstances."

According to the results of the study (SCAQMD, 2003), for the areas of interest in San Bernardino, the communities adjacent to the 5th Street Station and I Street Station in San Bernardino, the background risk from mobile sources is approximately 1,000 in 1,000,000 (**Figure 20**), while the background risk from stationary sources is approximately 100 in 1,000,000 (**Figure 21**). For the areas immediately east of the 215 Freeway the risk is approximately 1,500 in 1,000,000 (**Figure 19**).

For the area of interest in Montclair, the background risk from mobile sources is approximately is less than 1,000 in 1,000,000 (**Figure 20**) while the background risk from stationary sources is approximately 100 in 1,000,000 (**Figure 21**).

5 DISPERSION MODELING

Dispersion modeling was performed for all three stations to estimate the potential impact on each community. Local meteorological data was incorporated in the model were possible. In general prevailing winds are from the west, southwest during the day time. At night, the prevailing winds switch, with off-shore breezes dominating the wind flow. Emission estimates from the Omnitrans facilities and significant polluters in each area were modeled to determine the cumulative concentration of each chemical where possible. The results of the model will be used in the health risk estimate (**Section 6**).

The Industrial Source Complex-Short Term (ISCST3) model was performed on the industrial sources identified in within the half-mile radius of each facility. The model is a steady state Gaussian plume model and is approved by the U.S. EPA for estimating ground level impacts from point and fugitive sources in simple and complex terrain. Meteorological data from the local SCAQMD's monitoring stations were used to represent local weather conditions and prevailing winds. The model was used to calculate the annual average chemical concentrations associated with each emitting source.

The ISCST3 model output files are presented in **Appendix G.** The modeling analysis also considered the spatial distribution of each emitting source in the relation to the community. Predicted mass ground level concentrations (GLCs) corresponding to the model output values expressed in micrograms per cubic meter (ug/m^3) were derived.

6 DATA COLLECTION, EVALUATION, AND IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

This section includes an evaluation of the quality assurance/quality control (QA/QC) information associated with the data, classes of chemicals, frequency of detection, essential nutrients, site historical information, background concentrations, fate and transport criteria (aqueous and solvent solubility and expected mobility), as well as the presentation of representative concentrations.

6.1 THE SELECTION PROCESS

Cal-EPA indicates that a quantitative evaluation that includes all chemicals of potential concern (COPCs) is "the most thorough approach for assessing potential health risks (Cal-EPA 1992, Chapter 5, pg. I). For this baseline health risk assessment (BHRA), a chemical selection process was initiated that involved the review of existing analytical data. An evaluation of the QA/QC information associated with the data, classes of chemicals, frequency of detection, historical information, background concentrations, and chemical toxicity was performed as part of the COPCs selection process.

6.2 QA/QC EVALUATION OF THE DATA

The data was evaluated for QA/QC parameters including holding times, laboratory control samples, matrix spikes, reporting limits and conformance with control limits. None of the samples collected were rejected on this basis.

Data accuracy was determined as part of the laboratory QA/QC procedures by evaluating method blanks, laboratory control samples, laboratory control sample duplicates, matrix spikes, and matrix spike duplicates. The laboratory QA/QC procedures were carried out at the specified frequency and were reported correctly for each of the sampling events.

6.3 SUMMARY OF CHEMICAL SELECTION PROCESS

The chemicals of potential concern (COPCs) are generally defined as those chemicals present at a site that are most likely to be of concern to human health and the environment. Based on the results of the local business area surveys, the following are COPCs:

Compound	Source
• Gasoline vapors	• Gasoline
• Methyl Ethyl Ketone (MEK)	• Paint
• Acetone	• Paint, degreasers
• Isopropanol	• Paint thinner, degreasers
• Ethyl Benzene	• Paint thinner
• Methyl Alcohol	• Degreasers
• Toluene	• Paint, degreasers, brake cleaners
• Butyl Benzyl Phthalate	• Paint
• VM&P Naphta	• Paint thinner
• Xylenes	• Paint thinner, carbuerator cleaners
• Acetaldehyde	• Charbroilers
• Methylene Chloride	• Carbuerator cleaners, degreasers

Natural gas is a complex mixture of light gases separated from raw natural gas consisting of aliphatic hydrocarbons having carbon numbers in the range of C1 through C4, predominantly methane (C1) and ethane (C2); may contain carbon dioxide (CO2). Methane, a simple asphixiant with no known effects at low concentrations (less than 10 ppm) is the principal component of natural gas, making up approximately 90% of the compressed natural gas. The balance is typically ethane, another simple asphixiant with no known effects at low concentrations (less than 10 ppm). Due to the low toxicity of these compounds, the lack of detections above 10 ppm in samples previously taken at the fueling stations, and the reconfiguration of the 5th Street and Montclair stations to liquid compressed natural gas, they will not be considered as COPCs. Based on the current monitoring program in place at the refueling stations, there is no indication that LCNG is leaking from the current fueling system.

Chemicals not evaluated directly in this risk assessment that are likely to have a significant impact on the health of the communities are emissions from mobile sources in the area. Those

chemicals include benzene, formaldehyde, 3-butadiene, and diesel particulates which are components of automobile and diesel exhaust. As stated in Section 4.4, the risk to the communities of interest in San Bernardino from mobile sources have been previously estimated by SCAQMD to be approximately 1,000 in 1,000,000 west of the 215 Freeway (**Figure 20**) and in excess of 1,500 in 1,000,000 east of the 215 Freeway (**Figure 19**). Further evaluation of those compounds in this assessment is not likely to yield significant new results given the effort already undertaken by SCAQMD.

7 CHEMICAL CHARACTERISTICS

7.1 FATE AND TRANSPORT OF CHEMICALS

This Section discusses the chemical and Site-specific parameters relevant to the fate and transport of the COPCs at the Site. Fate and transport data are integrated with sampling data in order to evaluate which environmental media should be considered as sources of potential exposure. In general, chemicals introduced into the environment may adsorb to soils, dissolve into bodies of water, leach from soil, volatilize from either soil or water into the atmosphere, or be absorbed from soil by vegetation. The fate and transport of chemicals detected at the Site are governed by properties of the chemicals, as well as by properties of the media in which they are found. The interaction of chemicals and media is affected by a variety of processes that control the mobility of chemicals. These processes include adsorption, ion exchange, precipitation, complexation, volatilization, and biodegradation, which will determine the partitioning of compounds into water, air, or solid phases.

7.2 TOXICITY ASSESSMENT

A Toxicity Assessment is the process of evaluating whether a potential exists for an increase in the incidence of an adverse health effect (*e.g.* cancer, birth defect) due to human exposure to a substance. The process identifies the relationship between the dose of a substance and the likelihood of an adverse effect on the exposed population (Preuss and Ehrlich, 1987). Although there are some data on human exposures, most available information about the dose-response relationship is based on data collected from animal studies and theoretical perceptions about what might occur in humans. The highest degree of uncertainty identified with most Risk Assessments is associated with the extrapolation of results obtained from animals tested at high doses to those results which could be anticipated at low doses, which humans are more likely to encounter in the environment. Toxicity values used in the risk characterization of the Sites are presented in **Tables 10 through 12**.

In the identification of appropriate toxicity criteria for carcinogens, California cancer potency factors are given priority over Federal CSFs. Although different terminology is used in reference to carcinogenic toxicity by CalEPA and the EPA, they are functionally identical. The CSF factor represents an estimate of the "largest possible linear slope (within the 95% confidence limit) at low extrapolated doses that is consistent with the data."(EPA, 1994) A

mathematical model such as the linearized multistage model was used for this purpose. In the event that a cancer potency factor was not available from CalEPA, EPA CSFs were used.

EPA-verified reference doses (RfDs and RfCs) were used in the evaluation of noncarcinogenic effects of the COPCs. According to the EPA, an RfD "is a provisional estimate (with uncertainty spanning perhaps an order of magnitude) of the daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk or deleterious effects during a portion of the lifetime, in the case of subchronic [RfC] or [RfD], or during a lifetime, in the case of a chronic [RfC] or [RfD]."(EPA, 1993)

RfDs generally refer to oral reference criteria in units of mg/kg/day. RfC refers to inhalation reference criteria in units of mg/m^3. Due to federal research priorities, RfDs are more readily available in comparison to RfCs. In this BHRA, EPA chronic oral RfDs have been used as surrogates for the dermal and inhalation reference criterion when the latter are not available.

7.2.1 CARCINOGENIC CHEMICALS

Chemicals that exhibit carcinogenicity are generally considered to have no threshold (*i.e.*, exposure to any amount of the chemical would result in some risk of cancer). Most modeling for quantitatively estimating the carcinogenic nature of chemicals at the low doses to which people would be exposed under environmental conditions is based on experience with human exposure to radiation (Paustenbach, 1989). Although this assumption may be appropriate for radiation, many members of the scientific community believe that this model may not be suitable for all chemical carcinogens. Radiation is known to be genotoxic (*i.e.*, it reacts directly with DNA) and an initiator of cancer. The dose is linearly related to the dose received at the target organ.

Chemical carcinogens fall into at least three major categories: cytotoxicants (*i.e.*, chemicals toxic to cells), initiators, and promoters (*i.e.*, chemicals that promote the growth of cancer cells) (Anderson, 1988). The EPA uses the linearized multistage low-dose extrapolation model as the basis for estimating chemical-specific cancer risk at low doses. This model is recognized as a conservative approach to ensure potential risk is not underestimated. Cancer slope factors are indices of carcinogenicity and are used in performing quantitative calculations to estimate carcinogenic risk.

The information in this section characterizes the relationship between the dose of a substance and the likelihood of an adverse effect on the exposed populations (Preuss and Ehrlich, 1987).

The potential for inducing a health effect due to chemical exposures is dose-dependent. Higher doses result in a greater probability of inducing health effects.

Although there are some data on human exposures, most available information about dose-response relationships is based on data collected from animal studies and theoretical perceptions about what might occur in humans. The nature and strength of the evidence of the causation of cancer is an important aspect of the evaluation (NAS, 1983). The strength of evidence has been evaluated by the EPA and is indicated by their classification of each chemical as to its carcinogenicity.

Carcinogenic classifications were developed by the EPA's Cancer Assessment Group. The EPA's Cancer Assessment Group classified candidate chemicals into one of the following groups, according to the weight of evidence for and against carcinogenicity from animal and epidemiological studies (EPA, 1989a):

- Group A - Human Carcinogen (sufficient evidence of carcinogenicity in humans);
- Group B - Probable human carcinogen;
- Group B1 - Limited evidence of carcinogenicity in humans;
- Group B2 - Sufficient evidence of carcinogenicity in animals with inadequate evidence in humans;
- Group C - Possible human carcinogen (limited evidence of carcinogenicity in animals; absence of human data);
- Group D - Not classifiable as to human carcinogenicity; and
- Group E - Evidence of non-carcinogenicity for humans (no evidence of carcinogenicity in adequate studies).

Of the chemicals identified as COPCs in **Section 6.3**, 2 (acetaldehyde and gasoline vapors) are considered by CalEPA and EPA to be either known human carcinogens, probable human carcinogens or possible human carcinogens (EPA weight-of-evidence Groups A, B, or C).

7.2.2 NONCARCINOGENIC CHEMICALS

Chemicals that exhibit adverse effects other than cancer or mutation-based developmental effects are believed to have a threshold (*i.e.*, a dose below which no adverse health effect is expected occur). When extrapolating animal data to identify safe levels of human exposure, most researchers have focused on the use of a safety factor or uncertainty factor. The magnitude of the safety factor is, in turn, dependent on a number of quantitative and qualitative determinations of the type, duration, and results of the research study.

The EPA has used these approaches in establishing exposure route-specific RfDs for noncarcinogenic chemicals. An RfD is a daily dose level to which humans may be exposed throughout their lifetimes with no adverse health effect expected. RfDs used in this HRA are presented in **Tables 10 through 12.** During the course of this BHRA, when RfDs could not be located for a particular chemical, surrogate RfDs were substituted from other exposure routes. The hierarchy for selection of toxicity criteria followed CalEPA's recommended hierarchy (CalEPA, 1995).

7.2.3 ODOROUS CHEMICALS

Thousands of odorous chemicals (odorants) are associated with the urban environment. Individuals are exposed to hundreds of odorants each day while driving, eating, cleaning, bathing, and exercise. Each odorant has a unique character, odor threshold, and risk to human health. Odor sources around the Omnitrans facilities include trucking facilities, gas stations, auto service shops, autobody shops, coin laundry shops, beauty salons, sewer lines, municipal solid waste in dumpsters, and restaurants. Common urban odorants include alcohols, aldehydes, ketones, volatile fatty acids, solvents, and a wide variety of sulfur and nitrogen compounds. While odors may be noxious or be perceived as a nuisance, they do not necessarily indicate a risk. For example the odor thresholds for many compounds do not exceed the threshold at which they may pose a risk to an individual. Methyl mercaptans are detectable at 0.02 parts per billion by volume while potential health effects are seen only after exposure levels reach 57,000 parts per billion (ATSDR, 2003).

7.2.3.1 Natural Gas Odorants

Natural gas is composed mainly of methane, an odorless combustible gas. Natural gas is commonly odorized with sulfur containing volatile organic compounds (SVOC) such as methyl mercaptan; which has a very low odor threshold concentrations (OTC). Odorizers for natural gas can also include a variety of other sulfur containing mercaptans as well. The OTC for methyl mercaptan is only 0.02 parts per billion by volume (ppbv) or 20 parts per trillion by volume (pptv) (Ruth, 1986). OTCs have been determined for many urban odorants (**Table 1**). Urban odor typically results from a mixture of many of the compounds, and the urban odor character changes as the odorant mixtures change. Odor can be qualitatively measured in terms of character (**Figure 18**) or in quantitatively measured in terms of OTCs (**Tables 13 through 17**).

Hydrogen sulfide and isopropyl mercaptan have been detected in close proximity to the Omnitrans Metro facility. These odorants were detected when the Omnitrans facility was using

odorized natural gas. In November of 2001 the Omnitrans busses converted to liquefied natural gas containing no odorants. In April 2002, the Metro station was fully converted to odorless liquid compressed natural gas. Prior to the full conversion of the Metro site in April 2002 the temporary equipment installed in November 2001, the equipment using odorized pipeline gas, was used frequently as a back up supply. Any potential current sulfur odor emissions from the Omnitrans facility hence do not result from the fuel used by the bus fleet. Reduced sulfur gasses could result from any standing water, with sulfate and microorganisms in solution.

7.2.3.2 Other Urban Odorants

While most of the Omnitrans busses are fueled by clean burning natural gas, automobiles are a common odor source resulting from exhaust odorants include benzene, 1,3 butadiene, formaldehyde, acetaldehyde, ozone, diesel particles. Gasoline stations in the areas around each site, and gasoline fueling at Omnitrans sites may release methyl tert-butyl ether (MTBE), toluene, benzene and other hydrocarbon fuel odors. Chlorinated solvents odors are released mainly from dry cleaners, and perchloroethylene is the "dry cleaner" smell.

The aroma of toasted wheat bread is similar to that of the wheat bread crust and is described as roasty, malty and buttery. Aroma extract dilution analysis showed 36 neutral/ basic and 15 acidic compounds to be potent odorants including: 2-acetyl-1-pyrroline, (E,E)-2,4-decadienal, methional, guajacol, (E)-2-nonenal, 3-methylbutanal, 4-hydroxy-2,5-dimethyl-3(2H)-furanone and 2- and 3-methylbutanoic acid were those with the highest flavor dilution (FD) factors. Besides these, methylpropanal, 2,3-butanedione und dimethyl trisulfide (Rychlik, 1996).

Pan-fried beef patties were also described as cardboard and metallic. Kerler (1996) revealed that both a decrease of the desirable odorants 4-hydroxy-2,5-dimethyl-3(2H)furanone, 3-hydroxy-4,5-dimethyl-2(5H)furanone and an increase of hexanal and trans-4,5-epoxy-(E)-2-decenal were responsible for ODOR formation in beef (Dutsche Forschungsanstalt, 1997).

Based on high flavor dilution (FD) factors, the key aroma compounds of the in total 50 detectable odorants of freshly cooked chicken were found to be: (E,E)- and (E,Z)-2,4-decadienal, 4-hydroxy-2,5-dimethyl-3(2H)furanone (furaneol), butyric acid, 3-hydroxy-4,5-dimethyl-2(5H)furanone (sotolon), 2-furfurylthiol, 2-acetyl-2-thiazoline, acetic acid, hexanal, 1-octene-3-one, methional, (E)-2-nonenal, 2/3-methylbutyric acid, (E,E)-2,4-nonadienal, methanethiol, dimethyl trisulfide, acetaldehyde and methylpropanal (Dutsche Forschungsanstalt, 1997).

During this project the San Bernardino fires resulting in a great deal of smoke released into the environment. Smokey odors result from combustion of organic waste producing cyclic oxidized molecules such as guaiacol, pyrans and furans.

Most cultures agree that the most unpleasant odor in the urban environment is sewage odor. Feces odor and sewage odor results from reduced sulfur compounds such as hydrogen sulfide, methyl mercaptan and ethyl mercaptal. These compounds have very low OTCs of 0.5, 0.02 and 0.01 ppbv, respectively (**Tables 13 through 17**) (Ruth 1986).

Sewage vapor also includes ammonia (pungent odor) and trimethyl amine (fishy odor) (**Tables 13 through 17**). Manure odor results from nitrogen compounds including ammonia and trimethyl amine, but also includes nitrogen-containing compounds such as skatole, which have been reported to have very low odor threshold of 0.4 pptv (Ruth 1986) (Rosenfeld and Henry, 2001).

Some body odors and garbage odors present in the area result from the presence of volatile fatty acids. Volatile fatty acids such as acetic acid (vinegar) are found at municipal solid waste facilities and in garbage cans. Volatile fatty acids, such as butryric acid, are responsible for many of the more unpleasant body odors and can have very low OTCs. The OTC for butyric acid is only 1 ppbv. Volatile fatty acids form when bacteria breakdown of organic matter in anaerobic conditions.

Aldehydes and ketones are sweet pungent component of restaurant, garbage, and wastewater odor. Nail polish remover (acetone) is an example of a ketone. While both ketones and aldehydes are the sweet component of many odors, aldehydes such as acetaldehyde (OTC of 0.1 ppbv) generally have a much lower OTC than ketones (**Tables 13 through 17**). While the sweet solvent-like odors of ketones and aldehydes may not be perceived as unpleasant alone, mixed with other odorants they contribute to a generally pleasant odor (food) or unpleasant odor (garbage) (Rosenfeld et al, 2002).

The moldy and musty odors associated with damp rooms/homes result from geosmin and related compounds. Sulfur compounds can also be released from damp anaerobic areas where organic matter is present.

The lemon, mint, and pine odors result from the presence of terpenes such as limonene, menthol and alpha-pinene (**Figure 18**). These odors are associated with cleaning agents and detergents.

Odors associated with urban environments include a wide variety of chemicals. This is a brief summary of the wide variety of odor chemicals in the urban environment. The Urban Odor Wheel (Figure 1) is a useful tool when trying to identify odors in the urban environment. **Table 18** summarized the lowest odor detection limit for a wide variety of odorants. Odor sources, particularly in urban environments are difficult to pin-point.

7.2.3.3 Omnitrans Odor Investigation

Due to ongoing odor complaints related to natural gas fueling equipment, Omnitrans hired Executive Environmental Services Corp. to complete an ambient air monitoring survey on June 13, 2001. The analysis screened for 20 sulfur compounds and five hydrocarbons. Very low levels of carbon disulfide (max 5.7 ppb) and carbonyl sulfide (max 7.7 ppb) were detected in samples. These detected levels are well below established levels of concern for chronic exposure and potential health risk of 1,000 ppb (NIOSH permissible exposure level). Low levels of methane were detected in neighborhood and levels were elevated near the compressor within the Omnitrans perimeter fence. The residents pointed out that the times of the sampling did not fully coincide with the refueling. Therefore, the results were consistent with a non-refueling period at the facility. Also, the on-site investigations was considered a non-typical workday in terms of odor annoyance because on of the two compressors was inoperative. According to the report, there was a noticeable CNG odor to the northeast of the compressor units during most of the day. Thirty-six ambient air samples in the surrounding neighborhood were collected by air sampling equipment placed in several parked cars (Executive Environmental Services, 2001).

Ensafe Inc. (Ensafe) was retained by the San Bernardino City Unified School District (September 2001) to perform an environmental site assessment at the Ramona Alessandro Elementary School in San Bernardino, California. The assessment was designed to determine if compressed natural gas (CNG) fueling operations at the Omnitrans facility are adversely impacting air quality at the adjacent elementary school. The samples were collected in SUMMA canisters with flow controllers adjusted to collect an integrated sample over a three-hour period. Each analysis was analyzed by American Society for Testing and Materials (ASTM) method D-1945 for natural gas components and by a modified ASTM method D-5504 for associated sulfur compounds. Four samples found hydrogen sulfide at concentrations of 63, 36, 31, and 6.7 ppb. Isopropyl mercaptan was found at a concentration of 8.2 ppb for the period monitored, well below any reasonable level that could cause health effects (10,000 ppb using Hydrogen Sulfide as a surrogate compound). Ensafe recommended that school property no be used by the public during the evening fueling hours. Ensafe also recommended that students and teachers move

inside from exterior play areas whenever noticeable CNG odors are detected to reduce the potential for human exposure. Since this event, Omnitrans switched from odorized natural gas to non-odorized liquefied natural gas. Hence the odor events resulting from sulfur molecules can no longer be attributed to refueling. However, sulfur compounds may also be volatilized from sewer pipes, decomposing vegetation, dog feces, or any anaerobic water with sulfate enzymatically converting to sulfide.

8 EXPOSURE ASSESSMENT

Exposure assessment, as defined by the National Academy of Sciences, (NAS, 1983), is the process of measuring or estimating the intensity, frequency, and duration of human exposure to an agent in the environment. This section of the risk evaluation discusses the mechanisms by which people might come in contact with COPCs and the estimated intensity, frequency, and duration of contact between potential human receptors and the chemicals. The quantitative assessment of exposure, based on the chemical concentrations and the degree of absorption of each chemical, provides the basis for estimating chemical uptake (dose) and associated health risks. The exposure assessment follows, as much as possible, the recommendations for conducting an exposure assessment provided by the EPA in the *Risk Assessment Guidance for Superfund* (RAGS) (EPA, 1989), and the *Supplemental Guidance for Human Health Risk Assessments* and *Preliminary Endangerment Assessment* by CalEPA (CalEPA, 1992, 1994).

In accordance with this guidance, an exposure assessment consists of three basic steps:

- Characterization of the exposure setting (physical environment and potentially exposed receptors);
- Identification of exposure pathways (chemical sources, points of release, and exposure routes); and
- Quantification of pathway-specific exposures (exposure concentrations and intake assumptions).

The purpose of the first step is to characterize the salient features of the Site environment that might influence human exposure and identify potentially exposed populations. The exposure pathways are identified in the second step by characterizing the chemical sources, points of release, and potential exposure routes. In the third step, the qualitative information from the first two steps is integrated with the estimates of exposure concentrations and intake assumptions to quantitatively estimate exposure (dose). These components are described in greater detail in the following subsections.

8.1 CHARACTERIZATION OF THE EXPOSURE SETTING

Potential exposure to chemicals at the Site depends on a number of factors related to the physical characteristics of the school grounds and surrounding neighborhoods and the physical activities of potentially exposed persons. These factors were considered in conducting the exposure assessment for this risk evaluation.

8.1.1 SELECTION OF RECEPTORS TO BE EVALUATED

Based on the physical setting discussed above, several receptors were identified for evaluation. These potential receptors are:

- residents (adult and child);
- students; and
- adult workers.

8.2 IDENTIFICATION OF EXPOSURE PATHWAYS

This evaluation is being conducted to determine whether potential risks to community members (residents, students and adult workers near the Sites) associated with potential releases of chemicals into the air.

An exposure pathway is defined by four elements (EPA, 1989):

1. A source and mechanism of chemical release to the environment;
2. An environmental medium receiving or transporting (*e.g.* air, soil) the released chemical;
3. A point of potential contact with the medium of concern; and
4. An exposure route (*e.g.* ingestion) at the contact point.

An exposure pathway is considered "complete" if at least elements 1, 3, and 4 are present. Element 2 (a transport or receiving medium) is not necessary if exposure occurs to the medium to which the chemical was released, such as direct contact with soil. If a chemical is present in a medium (*e.g.* groundwater) to which people are not exposed, the pathway is incomplete for that medium. However, if the chemical can migrate from one medium (*e.g.* soil) to another (*e.g.* ambient air) to which people are exposed, the pathway may be complete. If the data on the receiving medium (in this case ambient air) indicate that this migration does occur, the pathway is considered "complete." If, however, data on the receiving medium are not available and the presence of chemicals is only surmised, then the pathway is considered "potentially complete." Similarly, if the exposure is not occurring currently, but may occur in the future, the pathway is considered "potentially complete" as well.

8.3 SOURCES, MECHANISMS OF RELEASES, AND MECHANISMS OF TRANSPORT

This evaluation focuses on exposure to chemicals emanating into the air. The primary sources of chemicals into the air of the community are the fueling and repair activities at the Omnitrans facilities and other industrial sources.

8.4 RESIDENTIAL RECEPTORS

The residential receptor represents a *conservative* worst-case land use. The residential receptors are assumed to reside within half a mile of the Sites and to be directly exposed to chemicals in the soil via inhalation of vapors in the ambient air. Residents were assumed to live in the same area for 70 years (6 years as a child and 64 years as an adult).

8.5 STUDENT RECEPTORS

Children in grades K (Kindergarten) through sixth attend school near the Metro Site as students. In addition to attending the school, they also may play at the school after classes are dismissed. The student receptors are also assumed to be directly exposed to chemicals via inhalation of vapor in the ambient air. It was assumed that the student is exposed the full time he/she is at school, whether indoors or outdoors and whether they are near these areas or not.

8.6 ADULT WORKER RECEPTORS

Adult workers at the Site are also potentially exposed directly to chemicals present in the ambient air. Workers were assumed to be in the same location for 40 years.

8.7 QUANTIFICATION OF EXPOSURE POTENTIAL

Potential exposure to chemicals in the environment is directly proportional to concentrations of the chemicals in environmental media (*e.g.*, air) and characteristics of exposure (*e.g.*, frequency and duration). The concentrations at exposure points are generally referred to as exposure point concentrations (EPCs). The characteristics of exposure are estimated using various exposure parameters. The following subsections describe how these values are determined and combined to estimate chemical exposures.

8.7.1 EXPOSURE POINT CONCENTRATIONS

The Industrial Source Complex-Short Term (ISCST3) model was performed on the industrial sources identified in within the half-mile radius of each facility. The model is a steady state Gaussian plume model and is approved by the U.S. EPA for estimating ground level impacts from point and fugitive sources in simple and complex terrain. The model was used to calculate the annual average chemical concentrations associated with each emitting source.

The model requires various input parameters including chemical emission data and local meteorology. Meteorological data from the SCAQMD's Riverside and Upland monitoring stations were used to represent local weather conditions and prevailing winds.

To determine contaminant impacts during hours when the most sensitive receptors (school children) could be exposed, ground level concentrations were predicted for emissions generated from the hours of 08:00 AM to 06:00 PM.

The modeling analysis also considered the spatial distribution of each emitting source in the relation to the community. The ISCST3 model output file is presented in **Appendix G**. Predicted mass ground level concentrations (GLCs) corresponding to the model output values expressed in micrograms per cubic meter (ug/m^3) are listed in **Tables 10 through 16.**

8.7.2 EXPOSURE DOSE

Exposure dose (also called an administered dose) is defined as the amount of a chemical that a receptor contacts. Exposure is measured in terms of EPC in air. Intake is the physical movement of a chemical through the outer boundary of the body (*e.g.* mouth or nose) via inhalation. Uptake is the absorption of a chemical across the skin or other exposed tissue. There are several estimates of intake and uptake; these include applied dose, potential dose, administered dose, internal dose, delivered dose, and biologically effective dose. For risk assessment purposes, potential dose, applied dose, and internal dose are the most relevant. Potential dose is the amount of chemical (concentration) in material that is ingested, inhaled, or applied to the skin. Potential dose is analogous to the administered dose in a toxicity study. Applied dose is the amount of chemical in contact with the primary absorption boundaries (*e.g.* lungs) and available for absorption. Internal dose is the amount of chemical actually crossing the absorption barrier (*i.e.* the amount absorbed). For inhalation exposures (intake), it is generally assumed that the amount of chemical crossing the outer boundaries (mouth and nose) equals the amount present at absorption boundaries (lungs).

The type of dose estimate used for a particular chemical in a risk assessment is dependant on the route of exposure at the Site (inhalation), the route of administration in the toxicity study used to derive the toxicity value, and the manner in which absorption information was used in deriving the toxicity value. In the risk characterization, dose estimates are combined with toxicity criteria to estimate potential health risks. It is important that this calculation be made with analogous estimates. As indicated, a potential dose for an environmental exposure at a site is analogous to an administered dose in a toxicity study and internal dose is analogous to an absorbed dose.

The Lifetime Average Daily Dose (LADD)" or Average Daily Dose (ADD) are the parameters used to quantify exposure doses in site risk assessments. Because carcinogens are assumed to elicit a carcinogenic response in a linear dose-response relationship (*i.e.*, each exposure event results in an increased incremental lifetime risk of cancer over the entire duration of a person's lifetime), the appropriate averaging time is a person's lifetime (70 years x 365 days/year = 25,550 days). The LADD is used for estimating potential cancer risks from carcinogens, and it addresses exposures that may occur over varying durations from a single event to an average 70-year human lifetime. Noncarcinogens are assumed to have a threshold dose, often referred to as the RfD, below which effects do not occur. It is therefore necessary to estimate the ADD for comparison with the RfD. Since non-carcinogens have a threshold dose, the period of interest for evaluating potential health effects from exposure to a COPC is the period over which exposure may occur. Thus, the averaging time used for noncarcinogens is the exposure duration (i.e., number of years exposed x 365 days/year). The ADD is used as a standard measure for characterizing long-term non-carcinogenic effects.

8.7.2.1 Inhalation Exposures

The potential dose for inhalation of VOCs is calculated using the following equation:

$$\text{LADD or ADD} = (C_{air} \times IR \times EF \times ED)/(BW \times AT)$$

where:

C_{air}	=	concentration of COPC in air (mg/m^3)
IR	=	inhalation rate (m^3/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)

for carcinogenic effects: 70 years x 365 days
for non-carcinogenic effects: ED x 365 days

8.7.3 EXPOSURE POINT SUMMARY

In the steps outlined above, the method for estimating the potential exposure of any potential receptor to chemicals in the community is performed in a manner to overestimate the potential exposure. The duration, frequency, and other input parameters were selected to overestimate exposure to the potentially exposed individual and are not an accurate portrayal of actual exposure.

9 RISK CHARACTERIZATION

Risk characterization is defined as the description of the nature and magnitude of potential human health risk, including attendant uncertainty. Risk characterization integrates the results of the human exposure assessment and the toxicity assessment to estimate potential carcinogenic risks and non-carcinogenic health effects associated with exposure to chemicals. This integration provides quantitative estimates of either cancer risk or non-cancer hazard index (HIs) that are compared to standards of acceptable risk.

Various demarcations of acceptable risk have been established by regulatory agencies. Cancer risks in excess of 1×10^{-5} per chemical have been deemed unacceptable pursuant to the California Safe Drinking Water and Toxic Enforcement Act of 1986, otherwise known as Proposition 65 (California Health and Safety Code Sections 25249,5 *et seq.*; 22 California Code of Regulations Section 12703(b)). The Department of Toxic Substances Control (DTSC) has a risk management range equivalent to an estimated potential cancer risk range of 1×10^{-6} to 1×10^{-4} and/or the HI is greater than 1. The EPA generally deems health risks to be significant if cancer risk exceeds the EPA acceptable risk range of 1×10^{-6} to 1×10^{-4} and/or the HI is greater than 1 (40 Code of Federal Regulations part 300.430(e)(2)(I)(A)(2) (1998); EPA, 1991). SCAQMD has outlined it's risk management requirements for new and existing source review (Rules 1401 and 1402) the cumulative increase in maximum individual cancer risk (MICR) shall not exceed: one in a million (1×10^{-6}) if best available control technology is not used; or, ten in a million (10×10^{-6}) if best available control technology is used. Depending upon the degree and nature of conservative assumptions used in a risk assessment and other Site-specific factors, the risk manager may find more refined risk assessment or remediation is not warranted if risks are within the DTSC risk management range.

Regulation/Agency	Lower Risk Limit	Upper Risk Limit
40 CFR part 300.430(e)(2)(I)(A)(2)	1×10^{-6} for carcinogens	1×10^{-4} for carcinogens 1 for noncarcinogen
Proposition 65		10×10^{-6} for carcinogens
DTSC	1×10^{-6} for carcinogens	1×10^{-4} for carcinogens 1 for noncarcinogen
SCAQMD	1×10^{-6} without T_BACT	10×10^{-6} with T-BACT

Risk assessment is an iterative process where site (refueling stations and other industrial sources), receptors (community members; Omnitrans and school staff; and school children), and chemical-specific data are used when available to estimate potential adverse health effects resulting from chemical exposure. When specific data are not available, conservative, health protective assumptions are utilized. The combined use of many conservative assumptions can lead to overly conservative estimations of potential risk, but this approach will certainly provide an upper-bound estimate of the actual risk. Thus, for the refueling stations and surrounding communities, the estimated risk level reflects an upper-bound estimate of the most probable risk. The most probable risk is likely to be much less, perhaps as low as zero, and almost certainly not measurable in the potentially exposed population.

The risks estimated in this assessment represent an upper-bound estimate of potential risks as many conservative assumptions, exposure scenarios, and models were employed in the process of estimating the risks posed by the refueling stations and other polluters in the area.

For the inhalation pathway described in **Section 8**, the potential carcinogenic risks and non-cancer HIs were estimated as described above. This approach is appropriate for an initial screening risk evaluation of the potential health risks to the community posed by the refueling stations and other polluters in the area.

9.1 CARCINOGENIC RISK CHARACTERIZATION

In order to estimate the theoretical upper-bound excess lifetime carcinogenic risk associated with exposure to a chemical, the product of the medium-specific CSF and the LADD estimated for the exposure pathway of concern is determined. The calculation of the theoretical excess lifetime cancer risk is shown below:

Potential Cancer Risk = LADD x CSF

This approach to estimating carcinogenic risk assumes that the increased risk of cancer resulting from exposure to a chemical is linearly proportional to the amount of chemical intake averaged over a lifetime.

The potential carcinogenic risks associated with the exposures to chemicals were estimated by adding the chemical-specific risks to yield exposure pathways risks. Implicit in this approach is the assumption that potential carcinogenic risks from multiple chemical exposures are additive such that the total pathway-specific risk is equal to the sum of the individual chemical-specific risks. Similarly, the excess lifetime cancer risks for each carcinogenic compound were also

added from each exposure pathway. The resulting total chemical-specific risks represent the upper-bound potential risk of developing cancer from that chemical upon exposure to that medium (*i.e.*, the risk may be lower, but is unlikely to be greater).

9.2 NONCARCINOGENIC RISK CHARACTERIZATION

Adverse non-carcinogenic effects are evaluated by comparing the estimated daily intake of a chemical to its associated RfD. The RfD is the point of reference for evaluating the potential effects of non-carcinogenic chemical exposures. Exposure doses less than the RfD are not likely to be associated with adverse health effects and are, therefore, not of regulatory concern. However, doses, which exceed the RfD, are considered to present the potential for adverse effects. The relationship is expressed numerically using parameters known as the Hazard Quotient (HQ) and HI. The HQ is obtained by dividing a chemical-specific ADD by its respective RfD as presented below.

$$HQ = ADD/R_fD$$

Each dose calculation, or combination of chemical, receptor, and exposure pathway, will have a distinct HQ. The sum of the HQs for all chemicals (a, b, c,…, z) will yield an HI for each receptor, as indicated:

$$HI = HQ_a + HQ_b + HQ_{ib} + \ldots HQ_z$$

An HI value less than one indicates that an adverse effect would not be anticipated. Conversely, an HI equal to or greater than 1.0 indicates that there is a potential for a non-carcinogenic health effect to occur as a result of exposure to chemicals released from the Site. All chemical-specific HQs are added at the initial exposure screening level, regardless of the actual toxic endpoint. On a scientific basis, the HI approach is considered highly conservative and not reflective of the true organ-specific mechanistic bases of chemical toxicity. Thus, adverse effects that might not be cumulative are artificially combined using this approach.

9.3 ESTIMATES OF POTENTIAL CANCER RISKS AND NONCARCINOGENIC HEALTH EFFECTS

The estimated potential cancer risks and noncancer HI for the three receptors evaluated are presented in **Tables 4 through 10**

The receptor with the greatest estimated potential cancer risks and noncancer HI was the onsite worker at the Omnitrans facility. Residential receptors east of the facility for 70 years had

cumulative health risk of less than 2 in 1,000,000 (2×10^{-6}). The noncancer HI for residential receptors east of the Metro Facility was estimated to be 1.5. The greatest proportion of the estimated potential noncancer risk for residents (more than 90%) came from the potential inhalation of acetaldehyde and toluene from auto repair facilities and charbroilers operated in each community. As stated in Section 4.4, the risk to the communities of interest in San Bernardino from mobile sources have been previously estimated by SCAQMD to be approximately 1,000 in 1,000,000 west of the 215 Freeway and in excess of 1,500 in 1,000,000 east of the 215 Freeway.

10 UNCERTAINTY EVALUATION

The assumptions, procedures, and parameters used in this risk assessment are subject to various degrees of uncertainty. Uncertainty is inherent in the risk assessment process. The uncertainty analysis provides an understanding of the limitations in interpretation of the quantitative estimates of risk presented in this BHRA.

10.1 SAMPLE COLLECTION AND ANALYSIS

Environmental sampling and analysis error can stem from improper sample collection and handling procedures, inadequate sample numbers, laboratory analysis errors, and the statistical biases in the sampling due to heterogeneity of site soil. The use of standard techniques such as the collection of duplicates, and the use of triplicate and method blanks can be used to reduce the likelihood of errors. Errors in data analyses can occur from the simplest tabulation and typographical errors to complex interpretational errors. Matrix interferences due to the presence of high concentrations often raise the detection limits of other chemicals in the analytical procedure and introduce uncertainty in the method of data analyses.

The quantification of potential exposures is based on statistical summaries of environmental sampling results. In the case of reasonable maximum exposure (RME) conditions, the EPCs represented by the 95% upper confidence limit (UCL) concentration were used unless it was greater than the maximum concentration. In those cases, the maximum concentration was used to calculate the RME risk. These methods tend to add to the likelihood of overestimating risk.

10.2 EXPOSURE PARAMETERS

Exposure scenarios that incorporate the most likely Site-specific exposure pathways and represent the greatest potential for exposure were selected to evaluate potential exposure. Conservative assumptions consistent with State and Federal guidelines were used to quantitatively define the exposure scenarios. The methods and procedures contribute to an overall overestimation of potential exposure. Numerous conservative exposure assumptions were made in selecting the exposure parameters used in this assessment. Duration, frequency, and other input parameters were selected to overestimate exposure to the potentially exposed individual and are not an accurate portrayal of actual exposure. This is particularly true for the RME conditions; however, it is also true for the estimates of risk for the average exposure conditions. The quantitative effect of these uncertainties contributes to an overall overestimate of potential health risks.

The RME evaluation incorporates highly conservative assumptions that may represent an overestimate of exposure parameters and a corresponding overestimate of risk.

10.3 TOXICOLOGICAL DATA

Several aspects of the toxicological data employed in this BHRA contain a high degree of uncertainty that affects estimates of potential risk. These uncertainties arise in two primary areas. First, cancer slope factors (CSFs) used in this assessment were estimates representing the 95% UCL. This assumption means actual risks are likely to be lower than the risk estimates calculated in this assessment. Use of the 95% UCL CSF values is consistent with the approach of determining risk as indicated by CalEPA and the EPA.

Second, results of animal studies are often used to predict the potential human health effects of a chemical. Extrapolation of toxicological data from animal tests is one of the largest sources of uncertainty in the human health risk evaluation process. There may be important but unidentified differences in uptake, metabolism, distribution, and elimination of chemicals between test species and humans. Animal studies are usually conducted under high-dose conditions, whereas humans are rarely exposed to such high doses. The dose level itself may be responsible for the observed carcinogenic effects. Animal life expectancies tend to be less than two years, and assumed human life expectancy is 70 years.

In the absence of pathway-specific toxicological criteria, surrogate values were used in an effort to quantify the risk of potential adverse health effects. This type of surrogate-based calculation will provide estimates of risk that reflect a high degree of uncertainty. Although efforts have been made to use conservative assumptions in performing surrogation, the net effect to an estimate of risk is unknown.

10.4 UNCERTAINTIES ASSOCIATED WITH COMBINATIONS OF CONSERVATIVE ASSUMPTIONS

Uncertainties from different sources may be compounded in the risk assessment methodology. This evaluation followed State and Federal agency guidelines by consistently incorporating conservative assumptions in calculating risk. The overall effect of using conservative assumptions in each step of the risk assessment is likely to result in an overestimation of potential risk. Thus, evaluation results must be reviewed with an understanding of the uncertainties involved and how they effect risk estimations. The quantitative effect of the conservative nature of the uncertainties inherent in the methodology and procedures is emphasized by the EPA in the following statement: "The ... risk is characterized as an upper-

bound estimate, *i.e.*, the true risk to human, while not identifiable, is not likely to exceed the upper-bound estimate and in fact may be lower". Findings of insignificant risk may reflect conditions close to reality; however, findings of measurable risk may reflect conditions that result from the conservative nature of the evaluation.

11 CONCLUSIONS AND RECOMENDATIONS

11.1 CONCLUSIONS

This assessment found estimated potential risks do not exceed the EPA acceptable risk range (40 Code of Federal Regulations [CFR] 300.430(e)(2)(I)(A)(2); EPA, 1991) and identified no significant risks to the students at Ramona Alessandro Elementary School, the school staff, the Omnitrans staff, or to community residents.

The calculated estimates of risk identified in this HRA are contingent upon the available data base, evaluation assumptions, and procedures. The uncertainty inherent in the various risk assessment parameters is discussed in **Section 10**. These discussions are not merely caveats to the estimates of risk, but these parameters directly affect the estimated potential risk as calculated herein. There is an overall low degree of uncertainty that the potential health risks identified herein may be underestimated and an overall moderate to high degree of certainty that the potential health risk is likely to be overestimated (*i.e.* health protective).

In no case evaluated in this risk assessment did the estimates of potential cancer risk and noncancer HI for receptors based on fugitive emission from the sites exceed the California Environmental Protection Agency's (CalEPA) risk management range. No estimated potential risks based on fugitive emission from the sites exceed the United States Environmental Protection Agency (EPA) acceptable risk range (40 Code of Federal Regulations [CFR] 300.430(e)(2)(I)(A)(2); EPA, 1991). No significant risks to community members were identified in this evaluation.

Conclusions from the study include:

- Self-reported health status demonstrated a larger proportion of respondents reporting a decline in health (past five years) near the Metro station than the other two facilities. The specific cause of the self-reported decline in health is unknown. The reports of health status from all three communities surveyed were normally distributed The health status for each community were not skewed indicating a negative health effect from the refueling stations (the health status in each community were not significantly different);
- There was no difference in the health status when a comparison was made between the sites even when the fuel types dispensed were taken into account;

- A survey of students, those living near the school and those living farther away from the Ramona Alessandro Elementary School, found that most students reported their health as fair to excellent.
- A survey of staff from the Ramona Alessandro Elementary School, found that most reported their health as fair to excellent. Staff members who lived within ½ mile of the site responded that their health was either fair (n=10) or poor (n=2) and that their health had declined somewhat since starting work at Ramona Alessandro Elementary School. The responses from staff members living within ½ mile of the Omnitrans facility appear to have been coordinated or written by the same person, and are suspect;
- Actual risk from emissions from the Omnitrans facilities are unlikely to exceed risk management guidelines set by U.S. EPA or California EPA;
- The risks to community members from mobile sources emitting diesel particulate emissions exceeds all other risks from fugitive emissions of other sources in the area. According to the most recent SCAQMD study on mobile and stationary sources, the communities adjacent to the 5th Street and I Street stations are in a zone where the risk from mobile sources (I-10, I-215 Freeways) exceed 1,000 in 1,000,000 (SCAQMD, 2003).
- The self-reported health status in each community has not been adversely impacted by the presence of the Omnitrans fueling facilities;
- Multiple sampling events have failed to confirm continuing releases of natural gas used as fuel; and
- Odor complaints generated after the removal of the compressed natural gas system appear to be related to the quarterly pump outs of wastewater sumps at the Metro facility.

11.2 RECOMENDATIONS

- Improve coordination with the San Bernardino Unified School District and in particular with the Ramona Alessandro Elementary School staff, to ensure that activities that may generate fugitive emissions at the Metro Station are limited and, or performed after school hours;
- Omnitrans continue to work with the involved communities to share information and provide opportunities to participate in planning of activities that may impact the community;
- Omnitrans create an "evergreen" information system, either through a web site or regular newsletter mailings to the community;
- Omnitrans should work with its service provides to ensure that appropriate odor abatement systems are in place prior to initiating any work at the Metro Station; and

- Omnitrans should continue to perform community outreach through regularly meetings and or newsletters.

12 CLOSURE

This HRA for the exclusive use of the parties involved as it pertains to the continued investigation of the Sites. Our professional services have been, and will be, performed using that degree of care and skill ordinarily exercised under similar circumstances by other professionals practicing in this field. No other warranty, express or implied, is offered as to any professional advice provided by Komex.

Any opinions and recommendations provided by Komex apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of any document prepared by Komex.

Respectfully submitted,
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