Appendix A

1995 Adopted EIR

Kimley»Horn

FOCUSED ENVIRONMENTAL IMPACT REPORT

PROPOSED LOCKHEED SOIL VAPOR EXTRACTION SYSTEM

(State Clearinghouse Number: 95061010)

Local Agency/EIR Prepared By:

City of Burbank
Community Development Department
275 East Olive Avenue
Burbank, California 91510
Contact Person: William Jacobs
Telephone: (818) 238-5270

With Assistance From:

DAMES & MOORE, INC.
6 Hutton Centre Drive, Suite 700
Santa Ana, California 92707

October 1995

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CITY OF BURBANK
275 EAST OLIVE AVENUE, P.O.BOX 6459, BURBANK, CALIFORNIA 91510-6459

Dear Reader:

The Planning Division of the City of Burbank, acting as the Lead Agency for environmental review, has prepared this Draft Environmental Impact Report (DEIR) for the proposed Lockheed Vapor Extraction System (VES). The applicant, Lockheed Martin, is proposing a 6,000 square foot carbon adsorption facility for the treatment of vapors from soil vapor extraction vents. The project includes a 50 foot high emissions stack and underground vent field piping system on vacant property. The project is located at 1705 Victory Place, on the former Lockheed Plant B-1 site.

The VES is designed to extract contaminated soil vapors and treat them in carbon filters to air quality limits established by the South Coast Air Quality Management District (SCAQMD). From 50 to 70 percent of the treated air will be re-injected in the ground and the remainder will be emitted through a 50 foot high exhaust stack. Lockheed submitted a similar proposal in May, 1994, and then re-applied in December with an enhanced system which would emit one fourth the emissions of the original system. After the City required that an EIR be done, Lockheed included additional environmental safeguards in the project description, as provided in the DEIR.

Supporting documentation used in preparation of the DEIR is on file at the Planning Division Public Counter and the Office of the City Manager, both at City Hall, 275 East Olive Ave., and at all three public libraries in the City of Burbank.

Written comments must be received by 5 p.m., December 1, 1995. For reference purposes, please include State Clearinghouse Number 95061010 in your correspondence.

A City Planning Board hearing on the DEIR is scheduled for November 13, 1995 at 6 p.m. in the Burbank City Council Chambers, located at 275 East Olive Ave. The purpose of the hearing will be to receive comments on the DEIR; no decision by the City as to the merits of the proposed project or any permission to proceed with development will be made at this meeting.

Additional information regarding this project is available from William Jacobs at (818) 238-5270.

Sincerely,

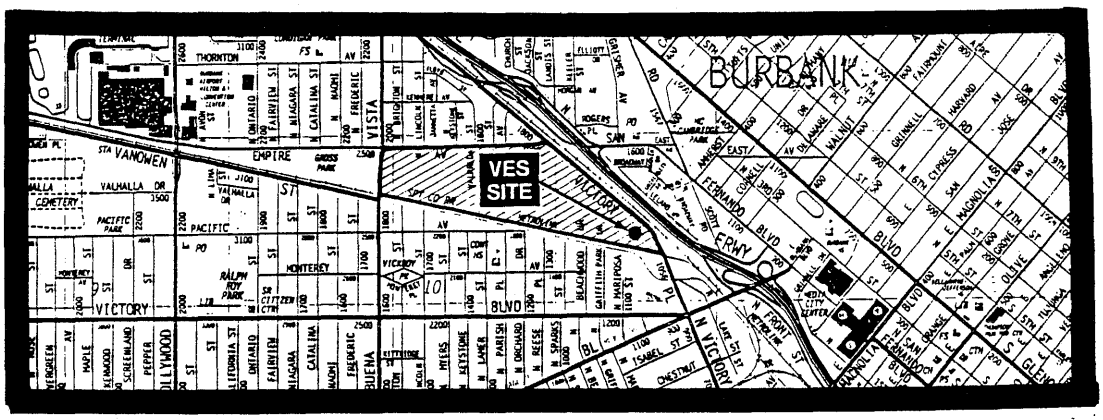
William Jacobs, AICP
City Of Burbank

CITY OF BURBANK
275 EAST OLIVE AVENUE, P.O.BOX 6459, BURBANK, CALIFORNIA 91510-6459

**NOTICE OF AVAILABILITY FOR PUBLIC REVIEW
DRAFT ENVIRONMENTAL IMPACT REPORT FOR PROPOSED LOCKHEED
ENHANCED SOIL VAPOR EXTRACTION SYSTEM (VES)
AND NOTICE OF PUBLIC HEARING BEFORE CITY PLANNING BOARD
TO RECEIVE COMMENTS ON DRAFT EIR**

NOTICE IS HEREBY GIVEN that on Monday November 13, 1995, at 6:00 p.m., in the City Council Chambers of City Hall, at 275 East Olive Avenue, Burbank, California, the City Planning Board will hold a public hearing to receive comments on the Draft Environmental Impact Report (DEIR) for the proposed Lockheed Enhanced Soil Vapor Extraction System (VES) (Conditional Use Permit 94-13 and Development Review 94-12) as part of the 45-day review and public comment period which ends on December 1, 1995.

The VES is designed to extract contaminated soil vapors and treat them in carbon filters to air quality limits established by the South Coast Air Quality Management District (SCAQMD). From 50 to 70 percent of the treated air will be re-injected in the ground and the remainder will be emitted through a 50 foot high exhaust stack. Lockheed submitted a similar proposal in May, 1994, and then re-applied in December with an enhanced system which would emit one-fourth the emissions of the original system. After the City required that an EIR be done, Lockheed included additional environmental safeguards in the project description, as provided in the DEIR.



The Lockheed VES DEIR is available for public review at all branches of the Burbank Public Library, and at the City Planning Division public counter at 275 East Olive Avenue. You are encouraged to review the DEIR and submit written comments on the document no later than 5 p.m., December 1, 1995. Please mail your comments to City of Burbank, Planning Division, attn: William Jacobs, P.O. Box 6459, Burbank, California 91510-6459, or deliver in person to the Planning Division office. You can also provide oral comments during the Planning Board hearing on November 13, 1995. The purpose of this hearing will be to receive comments on the DEIR; no decision by the City as to the merits of the proposed project or any permission to proceed with development will be made at this meeting.

In accordance with the California Environmental Quality Act, all comments received, both oral and written, will be responded to in the Final EIR.

DATE: October 18, 1995

Rick Pruetz
City Planner

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EXECUTIVE SUMMARY

Lockheed proposes to construct and operate a soil vapor extraction (VES) system at the northwest corner of the junction of Victory Place and the Southern Pacific Railroad right-of-way in the City of Burbank. The objective of the project is to restore the remaining approximately 10 acres of contaminated soil on the 87.4-acre Plant B-1 site to a condition satisfactory to the California Regional Water Quality Control Board, Los Angeles Region, such that further remedial action and monitoring would no longer be necessary. The soil has been contaminated by industrial materials and contains chemical compounds that are a potential public health concern (particularly perchloroethylene, trichloroethylene, carbon tetrachloride, and vinyl chloride).

This Focused Environmental Impact Report (EIR) has been prepared to evaluate concerns regarding this VES system. Section 15063(c)(3) of the California Environmental Quality Act Guidelines provides for an EIR to be focused on specific topics when the potentially significant impacts of a project are limited in number. The following sections present a summary of principal information and findings included in the main document: Introduction And Project History, Project Description, Environmental Impact Evaluation, Mitigation Measures, Cumulative Impact Evaluation, Alternatives and Unavoidable Adverse Impacts.

INTRODUCTION AND PROJECT HISTORY

In 1987, the Los Angeles Region of the California Regional Water Quality Control Board (RWQCB) ordered Lockheed to clean up and abate soil contamination beneath its Plant B-1 site. The first phase of this clean up effort involved the excavation of soil from portions of this site. In some instances, the soil was transported to an off-site landfill for disposal; in other instances, when the soil did not contain enough contaminants to be considered a regulated material, it was stockpiled on site. The portion of the Plant B-1 site proposed for this VES system was covered by clean fill. This excavation process is separate from the project at hand. However it is discussed at various points in this EIR because some components of the excavation phase are still ongoing and must be acknowledged.

The RWQCB Order required Lockheed to submit a soil remedial work plan to the RWQCB for review. The technology selected for this project by Lockheed and approved by the RWQCB was a VES. The proposed system included a 50-foot high emission stack, which required Planning Board approval of a Conditional Use Permit (CUP) since it would be a structure greater than 35 feet in height. The initial application was made to the City on

June 20, 1994. However, the City determined that the application was incomplete and Lockheed suspended the processing of its application in October, 1994. While the application was suspended, Lockheed redesigned the VES system to reduce air emissions from what had been originally proposed.

In November, 1994, the Redevelopment Agency hired two consultants, Dames & Moore and The Peartree Group Inc., to provide an objective opinion as to the health risks of this enhanced VES system, including any and all cumulative impacts.

The City's consultants reported to the City Council on May 23, 1995 that they found the enhanced VES technology proposed by Lockheed to be the best control technology available. The consultants advised that certain conditions should be placed on the operation of the system and that further studies on outstanding environmental issues be conducted. The City therefore concluded that an EIR would be required and that this EIR should be focused on issues identified as potentially significant in the Initial Study: air quality, health hazards, geologic problems and mandatory findings of significance.

PROJECT DESCRIPTION

Operation of the project will involve extraction of soil vapor from the vent field through low and high vacuum systems. Vapor will be transported by the manifold pipeline collection system to the treatment plant. The extracted vapor will be drawn through a filter with a blower, cooled, and treated in a granulated activated carbon adsorption unit, designed to soak up chemicals in the vapor. Treated air will be discharged through the plant stack or reinjected into the well field. Treated wastewater will be discharged to the sewer; off-specification water will be temporarily stored in a holding tank prior to being trucked to a licensed offsite disposal facility. The project lifetime is expected to be 8.5 years.

Among the required permits and approvals, the proposed project will require a Conditional Use Permit and Development Review from the City of Burbank.

Since the completion of the Initial Study, Lockheed has submitted a revised project description intended to address all environmental concerns. Since many of the project features mitigate environmental impacts, they would become conditions placed on approval of the project and are consequently written in the form of conditions of approval.

The proposed project, also known as the enhanced VES, shall include four main elements:

- A vent field and piping manifold system to remove volatile contaminants as vapors from the soil
- A treatment plant (6,000 square feet) which utilizes a granulated activated carbon adsorption system to remove volatile organic compounds (VOCs) from the soil vapor collected by the vent system
- A 50-foot exhaust stack
- An air reinjection system capable of reinjecting up to 70 percent of the treated air.

The proposed project shall include the following design and environmental protection features to minimize the potential for occurrence of significant impacts.

Reinjection

Design capacity for reinjection of up to 70 percent of treated air. Lockheed shall reinject at least 50 percent of treated air and intends to operate the reinjection system so as to maintain the maximum percentage feasible of treated reinjection air.

Emissions Control/Shutdown Procedure

The VES shall be controlled and monitored by programmable logic controllers contained within the treatment plant. The controllers shall monitor and record data and manage automated system shut downs in the case of system component malfunctions, or in the event that emissions approach the 9.8 pounds per day average limit of VOCs. The controllers shall monitor the VES through a system of temperature, pressure and/or flow sensors throughout the treatment plant. The controllers shall automatically alter the facility configuration and throughput to ensure that the 9.8 pounds per day average VOC limit is not exceeded.

During startup, and at any time a major change is made in what enters the VES system, the carbon cycle time shall be closely monitored and adjusted to maintain the emissions rate of less than 9.8 pounds per day on average as determined by the stack flow rate and

measured emissions concentrations. Emissions shall start out at a set point and be adjusted upward according to VES efficiency determined during the startup period. If the daily emissions rate is found to be approaching or reaches the set point limit, (not to exceed 9.8 pounds per day), the polishing unit shall be automatically placed on line.

If the emissions again approach the set point, the field extraction rate shall be reduced. If the set point is then reached, the facility shall be automatically shut down. All of these automatic changes shall be recorded for system analysis and adjustment. The controllers are equipped with an autodial message system for 24 hour monitoring and response.

Emissions from the VES shall be monitored to ensure that system operations are consistent with the assumptions used in the health risk assessment. The soil to be treated by the VES has been thoroughly characterized using soil gas analysis and soil borings. Based on this investigation, emissions from the VES are predicted to be composed primarily of PCE and TCE. The remainder of the emissions should consist of small quantities of other chemicals including vinyl chloride and carbon tetrachloride.

In order to ensure that operation of this VES system does not result in any significant health effects, conditions shall be imposed limiting emissions of all VOCs including PCE and TCE to less than 9.8 pounds per day (daily average for 1-month periods).

VOC concentrations following treatment shall be measured on a continuous basis using a continuous emission monitor (CEM). Emissions in units of pounds per day shall be calculated from these concentration readings and an estimate of flow out of the stack. The CEM shall be established and utilized as follows:

- Lockheed shall pay for the City to hire an independent testing laboratory to test samples weekly within the first 30 days of operation and calibrate the monitor accordingly.

- Once a month, Lockheed shall send to the City's independent testing laboratory a written report indicating VOC emissions for each day that month. The City's independent testing laboratory shall compare the Lockheed data with its own independent monthly sample and send a written report to the City each month which states whether or not the system that month has operated within the limit of 9.8 pounds of VOCs per day.

In addition to controlling the total VOC emissions from the plant, Lockheed shall also determine the concentrations of perchloroethylene, trichloroethylene, vinyl chloride, and carbon tetrachloride in the emissions from the VES. These chemicals shall be used as indicators of a potential change in excess cancer risk should there be a change (decrease or increase) in the concentration level of individual chemicals in the mix of chemicals. The objective is to ensure that unexpected changes in the concentrations of these chemicals in the emissions do not represent an unacceptable cancer risk to the public.

These data shall be used to ensure that emissions from the VES remain within the following limits.

- Vinyl chloride concentrations shall be limited to 0.14 lb/day as a monthly average.

- The measured concentrations of trichloroethylene, vinyl chloride, and carbon tetrachloride along with design concentrations of other listed South Coast Air Quality Management District (SCAQMD) Rule 1401 chemicals shall be used to calculate the excess cancer risk and ensure that it remains below one in one million assuming that emissions remain at this level for a full seventy years.

- The measured concentrations of perchloroethylene, trichloroethylene, vinyl chloride, and carbon tetrachloride shall be used to calculate the excess cancer risk and ensure that it remains below one in one million assuming that emissions remain at this level for the entire life of the project, that is 8.5 years.

The following procedure for testing, adjusting and reporting shall be used.

- During the first three months of operation, the City's independent testing laboratory, funded by Lockheed, shall sample emissions once per week for the four contaminants. The independent laboratory shall use these samples to perform the two health risk assessments (HRAs) described above. If the health risk threshold is not exceeded in the first two years or for any consecutive two year period, this frequency shall be decreased to once per year. If the health risk threshold of one per million, based on a monthly average, is not exceeded for either HRA during the first three months, or during any consecutive three month period thereafter, the sampling frequency shall be reduced to the rate of once per month for the next six

months. If the health risk threshold is not exceeded in this six month period, sampling frequency shall be decreased to once per quarter.

- Using these samples, the City's independent testing laboratory, funded by Lockheed, shall perform the two HRAs as described above to determine whether the one per million risk threshold has been exceeded. For the purpose of this requirement, these HRAs shall be a spread sheet calculation that computes risks for monitored chemicals. This information shall be included in the independent laboratory's monthly report to the City.

In the event that the excess cancer risk calculated by either approach exceeds one in one million based on the analysis of any one monthly or quarterly sample, the sampling frequency shall be increased to at least one sample per week for at least one month. The monthly average emission rate of the four contaminants shall be calculated from four consecutive weekly samples, one of which shall be the sample which triggered the increase in sampling frequency.

- The 70 year HRA (in accordance with SCAQMD Rule 1401) will be conducted for informational purposes.

- When the monthly average emission rate results in a calculated risk over the project life in excess of one per million, plant operations shall be adjusted to ensure that the monthly average emission rate for the next month is far enough below the threshold to entirely compensate for the exceedance in the prior month. In other words, the average emission rate for the two months together shall not exceed the one per million risk threshold. The monthly written report from the City's independent laboratory shall state whether or not these adjustments, if needed, have achieved this requirement.

- If the operational adjustments cause the expected project life to be extended, the health risk assessments shall use the extended project life rather than the 8.5 years currently expected.

- If the vinyl chloride limit of 0.14 pounds per day is exceeded in any month, the emissions in future months must be reduced so that the monthly average for a three month period which includes the month of violation meets the emission limit.

- If the reports from the City's independent laboratory indicate a consistent pattern of failure to achieve these project requirements, the City shall take appropriate enforcement action based on violations of conditions of approval of the CUP.

- The system shall also include the following features:

  - Programmable logic controllers that can automatically alter or shutdown facility operations in the event of problems.

  - The operations monitoring system shall have an alarm system at a City facility with personnel on duty 24 hours per day. The alarm would notify City personnel of a condition in which emissions in excess of 9.8 pounds VOC occurred. Lockheed shall also supply a second signal to a City facility with 24 hour personnel which indicates that the facility has been shut down. Lockheed shall provide personnel on duty 24 hours per day to ensure that manual shut down of the plant can be achieved within one hour of the breakthrough in the event that the automatic shut down feature fails. Should the system have to be shut down manually, Lockheed shall notify the City of such shut down within one hour of the exceedance.

  - The applicant shall submit an emergency response plan, to the satisfaction of the Fire Chief, which specifies how emergency-response agencies will be deployed in the event that the reclaimed liquid contaminants spill either at the site or in transport.

  - The applicant can modify operational conditions and parameters so long as the City's independent monitoring operations indicate compliance with target risk calculations and emission limits for daily VOCs and vinyl chloride.

  - A maximum air flow rate of 6,000 standard cubic feet per minute

  - For at least the first six months of operation, shortening granulated activated carbon adsorption times to 2 hours per day between regeneration cycles to prevent breakthrough saturation of the carbon beds

  - Control of flow quantities by valve adjustments and blower speed adjustments

- Offsite recycling or disposal of reclaimed solvents (no discharge to sewer)

- No use of oil burners

- Preparation of a site-specific drainage and grading plan

The facility shall be landscaped and fenced. A driveway shall lead to parking spaces and a loading area at the rear of the treatment plant.

Construction is expected to occur for about one year. Principal activities will include site preparation, foundation emplacement, building and equipment installation, vent drilling, and trenching for pipelines. The surface of the project site has been previously treated with a non-toxic, non-flammable, clear or green soil sealer for dust control. Any area where the seal is broken shall be resealed. In addition, the project shall adhere to the following procedures for controlling construction-related air impacts.

- Use equipment that produces low particulate and nitrogen oxide emissions.
- Apply non-toxic soil stabilizers according to manufacturers' specification to all inactive construction areas (previously graded areas inactive for ten days or more)
- Replace ground cover in disturbed areas as quickly as possible
- Enclose, cover, water twice daily or apply non-toxic soil binders according to manufacturers' specifications, to exposed piles (i.e., gravel, sand, dirt) with 5% or greater silt content
- Water active sites at least twice daily
- Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 mph
- All trucks hauling dirt, sand, soil or other loose materials are to be covered or should maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer) in accordance with the requirements of CVC Section 23114
- Sweep streets at the end of the day if visible soil material is carried onto adjacent public paved roads (recommend water sweepers with reclaimed water)
- Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site for each trip

- Apply water three times daily, or non-toxic soils stabilizers according to manufacturers' specifications, to all unpaved parking or staging areas or unpaved road surfaces
- Traffic speeds on all unpaved roads to be reduced to 15 miles per hour or less

PROJECT EMISSIONS

Before examining individual impact areas, it is important to put in perspective the relative size of emissions that this project will be allowed to emit. As described under Project Description, real-time monitoring will ensure that the maximum level of 9.8 pounds of VOCs will not be exceeded.

The following operations will result in the emissions of about 9.8 pounds per day of VOCs:

- an average sized dry cleaner
- a medium sized gas station
- applying about 2 gallons of adhesive
- applying about 3 gallons of enamel paint
- applying about 8 gallons of latex paint
- using about 1 gallon of cleaning solvent or paint thinner
- an automotive paint shop
- operating five leaf blowers for eight hours

Another way of putting this project into perspective is to compare it with other known sources of VOC emissions in Burbank. As shown in Appendix G, 383 pounds per day of VOCs were emitted in Burbank in 1992 according to a source, Toxics Release Inventory (TRI) data, which does not provide a comprehensive list of all VOC emissions. (As shown above, many more sources are too small to be controlled by SCAQMD or tabulated.) As another point of comparison, a list of emissions permitted by SCAQMD for Burbank (Appendix I) indicates that Burbank firms have permits to emit a total of 668 pounds per day of reactive organic gases (ROGs); ROGs are a slightly smaller subset of VOCs. The 9.8 pounds per day to which the Lockheed plant would be limited represents 0.0146 of this total amount of permitted emissions. Bear in mind that there are reasons to believe that not all permits are on this list; in addition, this list does not include all the non-permitted sources such as small equipment, vehicles, and leaf blowers.

ENVIRONMENTAL IMPACT EVALUATION

The City of Burbank held three scoping meetings and received eight letters in response to its Expanded Notice of Preparation. Based on these inputs and the results of the Initial Study, the following impacts were identified on which to focus the EIR:

- Geologic hazards (liquefaction)
- Water (site drainage and accidental spillage)
- Health Risk Assessment (during normal operation)
- Health Risk Hazards (in the event of upset)

Geologic hazards

Liquefaction occurs when water-saturated soils become unstable during an earthquake. Liquefaction would be a potentially significant impact if perched local water levels (near-surface water) occurred at the site. However, soil studies identified in this Focused EIR indicate that the groundwater at the site is too deep to present a liquefaction hazard. These site-specific studies were conducted in 1993 and 1994 to investigate the occurrence of perched water. During these studies, perched water was not found at the site. Therefore, liquefaction hazard at the site would be low and is not a significant impact. No mitigation is therefore required.

Water

The current Site Layout Plan is not detailed enough to demonstrate that storm water runoff from proposed grading and redistribution of existing stockpiled soil onsite would be sufficiently controlled to prevent offsite sediment transport. A mitigation measure requires a grading plan capable of demonstrating that there will be no offsite transport; with the imposition of that mitigation measure, no significant impact is expected.

No significant impacts are expected with regard to accidental spillage of liquid pollutants and transport of contaminated soil to the City storm drain system (previous site cleanup requirements have resolved this potential problem).

Health Risk

As described at length in the Project Description Section, Lockheed's project has maximum limits on emissions:

- Total VOC emissions are limited to 9.8 pounds per day
- Vinyl chloride emissions are limited to 0.14 pounds per day
- Plant adjustments shall be made, based on testing for PCE, TCE, vinyl chloride and carbon tetrachloride, to ensure that health risks remain under the one per million threshold.

The SCAQMD finds any health risk lower than one per million to be insignificant. Additionally, SCAQMD finds that systems with health risks as great as 10 per million are permittable as long as the system uses the best available control technology for toxics (T-BACT). SCAQMD found the original VES system proposed by Lockheed in June 1994 to be T-BACT. Since the enhanced system currently proposed has a health risk that is under one per million, a determination of whether the enhanced system is T-BACT is no longer required because SCAQMD has determined that this level of risk is insignificant. Also, both The Peartree Group, Inc. and Dames & Moore have determined that the proposed system represents the best available technology.

In addition to the chronic risks summarized above, the EIR addresses the issue of acute risks, particularly during stagnant air conditions. The EIR concludes that, even under low air flow conditions, pollutants will be adequately dispersed such that their concentrations will not pose a significant acute public health risk.

Upset Condition Risks

The proposed project would not present flammability or chemical reactivity and compatibility hazards in the event of an upset condition. Automated fire sprinklers shall be installed inside the vapor-phase carbon filters. Toxicity hazards would be a risk. A worst-case release was analyzed for toxicity hazards (a simulated accident in which maximum soil vapor flow rate of 6,000 standard cubic feet per minute occurs for one hour before shutdown of facility is achieved). The release

was modeled and maximum downwind concentrations were compared to established acute level of concern values. No exceedances were found. Therefore, no significant impacts to public health from upset conditions are expected.

MITIGATION MEASURES

As described previously in the Overview of the Proposed Project, Lockheed has committed to design features and environmental protection measures which reduce all but potential site drainage impacts to less than significant. However, as discussed above, mitigation measures related to site drainage must be imposed to reduce the significance of potential impact.

As mitigation for drainage control impacts, the final drainage and grading plan shall include:

- Grading the site to prevent storm water runoff from flowing offsite over the parkway
- Redesign of all existing swales, catch basins, and outlet structures to prevent storm water runoff from flowing offsite over the parkway
- Design of erosion control measures for the entire site, particularly along the south gate near Victory Place
- Pollution prevention and sediment control measures
- The grading and drainage plan shall incorporate drainage plans associated with the redistribution of stockpiled soil.

The grading plan shall conform to the City of Burbank Public Works Department's standards and shall be implemented by Lockheed. These measures will reduce the potentially significant impacts and result in a net benefit to local drainage conditions onsite and offsite.

CUMULATIVE IMPACTS

The excess cancer risk from ambient air in the City of Burbank is currently greater than 1,300 in one million. The proposed project in combination with other proposed projects and projected land use development in the City would contribute to this risk. However, the proposed Lockheed VES itself would represent a negligible contribution to cumulative public health risk.

There are six other existing, proposed or potential VES systems within two miles of the project site. However, two of these systems are substantially different than the proposed Lockheed system because they are designed to clean the soil of hydrocarbons rather than the principal contaminants found at Lockheed's Plant B-1 site (PCE, TCE, vinyl chloride and carbon tetrachloride).

- Across the railroad right-of-way from Burbank's Regional Intermodal Transportation Center (RITC) is a property owned by Sanwa Bank which the City wants to acquire as part of its RITC. This site has no PCE, TCE, vinyl chloride or carbon tetrachloride contamination; the clean-up method, which has not yet been finalized, is expected to involve a process which will create such low levels of VOCs that they cannot be detected at the exhaust outlet.

- Similarly, the Aviall Services VES is designed to remove hydrocarbons from the soil. It is expected to emit 0.5 pounds of VOCs per day.

Two of the projects are VESs for other Lockheed facilities, which according to Lockheed are expected to involve 100 percent reinjection of all emissions into the soil thereby resulting in zero emissions to ambient air. One of the remaining facilities is the Weber Aircraft Facility which is expected to emit approximately 0.8 pounds of VOCs per day. The final VES system is at the RITC itself; this system is expected to be terminated in 1996, prior to start-up of the proposed Lockheed system.

The Weber Aircraft and Aviall Services VESs are located about 1 + miles north-northwest of the proposed Lockheed VES. The prevailing wind directions in the area are from the east, southeast, and south. This would blow emissions from these two facilities away from the Lockheed VES. At a distance of 1 mile, emissions from the Lockheed VES would be highly diluted as a result of dispersion through the air. Based on prevailing wind directions and separation distance, it is not expected that emissions from these facilities would be dispersed in a manner such that they would combine with each other to produce contaminant levels which would pose a significant health risk.

The background air quality in Los Angeles County is unhealthy. For the 8.5 years it is in operation, the proposed system will create a slight increase in health risk. However, the City does not consider this slight increase to be a significant cumulative effect for the following reasons:

- The SCAQMD, the regional agency charged with implementing federal and state clean air laws, does not consider this project to have significant impacts.

- The maximum allowable health risk from this project (one in one million) is a negligible fraction of the overall health risk of ambient air (1,300 in one million) and an even smaller fraction of overall background cancer risk (333,330 in one million based on a general background cancer incidence of one in three or 33 percent). Considering the fact that this project has a project life of 8.5 years and is an environmental remediation project ordered by the Regional Water Quality Control Board, the City of Burbank finds this fractional, short-term increase of risk to be not significant.

- The project meets SCAQMD's criteria for determining whether "land projects" are cumulatively significant by generating a reduced amount of emissions over the life of the project and completely eliminating emissions after 8.5 years.

ALTERNATIVES

The No Project alternative would eliminate impacts associated with the proposed project. The site would remain in its current contaminated condition and present a hazard to the regional groundwater. Site cleanup requirements mandated by the Regional Water Quality Control Board would not be satisfied. For these reasons, No Project is not considered to be an acceptable alternative, or an environmentally superior alternative.

Several alternative vapor treatment technologies were examined but eliminated primarily because they are untested, unreliable or produce harmful outputs such as hydrochloric acid gas.

Other soil remediation technologies were evaluated and eliminated as alternatives to the proposed VES. Results are highlighted below:

- Containment: Capping with clay or soil layers, pavement, geomembranes, or multilayer systems; multiple caps would be needed for Lockheed site; not a permanent solution; would inhibit or limit future site development

- Removal and Disposal: Excavate soil and dispose at offsite location; South Coast Air Quality Management District rules and regulations prohibit aeration of soils containing volatile organic compounds; special construction requirements; health and safety concerns for workers
- Soil Washing: Extraction process using water or other solvents to dissolve and mobilize compounds, need injection and extraction wells; fluid control may be difficult for Lockheed soil conditions; relatively new technology
- Chemical Stabilization: Conversion of chemicals to least soluble form; volatile organic compounds difficult to bind chemically to stabilizing agents; process increases volatilization of volatile organic compounds, thereby increasing difficulty of air emissions control
- Biological Technology (Bioventing): Oxygenate soil to increase metabolic activity of indigenous aerobic bacteria for decomposition of organic compounds; not highly effective for chlorinated organic compounds such as occur at Lockheed site; soil permeability conditions at Lockheed site would hinder application of technology.

In development project EIRs, alternative sites for the development must be considered. The proposed project is designed to treat a contamination problem that occurs at a specific location on the site. Therefore, offsite alternatives are not a relevant consideration for the project.

The proposed exhaust stack and vent field have been sited to take into account the location and extent of the contamination, optimization of system operation and maximization of distance between the exhaust stack and sensitive receptors (such as schools and homes). The proposed exhaust stack could be moved to a different location within the 10-acre contaminated area, but there would be no increased engineering advantages and it would place the facility in closer proximity to sensitive receptors. This would result in a slight increase in health risk exposure to receptors. For these reasons, no alternative locations onsite for the proposed exhaust stack are considered to offer environmental or engineering advantages superior to the proposed facility site.

UNAVOIDABLE ADVERSE IMPACTS

The project proposed by Lockheed incorporates the features and operational requirements needed to reduce to a level of insignificance all potential impacts related to geologic hazards, handling of contaminated water, health risks and upset condition risks as well as

cumulative impacts. With the required condition for a site drainage plan, impacts related to water drainage will also be mitigated so that all potential impacts are mitigated to less than significant levels.

1.0 INTRODUCTION

1.1 PURPOSE

Lockheed Martin Corporation (Lockheed) proposes to construct and operate a soil vapor extraction system at their former Plant B-1 site in the City of Burbank (Figure 1-1). The purpose is to remove and treat (remediate) volatile organic compounds (VOCs) present in the soil from previous industrial operations. Cleanup of onsite soil contamination is required for Lockheed to comply with California Regional Water Quality Control Board Cleanup and Abatement Order No. 87-161 (dated December 17, 1987).

Lockheed submitted a Conditional Use Permit application to the City of Burbank with supporting technical materials (all of which are on file with the Community Development Department). Dames & Moore and The Peartree Group, Inc. were retained by the City to review the technical materials. The results of the reviews by these two firms are provided in Appendices E and F. Their findings indicated a need to recalculate public health risk during normal project operation, assess public health risk from upset conditions, and expand discussions of cumulative health risk impacts. The findings provided input for completion of an Initial Study for the proposed project. As shown below in Section 1.3 the need for a revised HRA was superseded by changes in the project description proposed by Lockheed.

An Initial Study for the proposed project was completed on May 25, 1995 (Appendix A). It concluded that the proposed project might result in potentially significant impacts for the following environmental factors/issues:

- Geologic Hazards (liquefaction)
- Water (site drainage; transport of contaminated soil to City storm drain system)
- Air Quality (public health risk during normal operations)
- Hazards (public health risk from upset conditions)
- Cumulative Impacts (public health risk of the proposed project in combination with other proposed projects)

Effects for other environmental factors were found to be not significant (see Appendix A and Section 3.1). The Initial Study was posted at the County for public review on June 5, 1995 and public notice was given pursuant to the Burbank Municipal Code.

Based on the results of the Initial Study, it was determined that the appropriate document for environmental review of the proposed project would be a Focused Environmental Impact Report (EIR). The purpose of the Focused EIR is to evaluate the



0 4.5 9

Scale in Miles

Dames & Moore

Figure 1-1

LOCKHEED PLANT B-1
SOIL VAPOR EXTRACTION SYSTEM
REGIONAL LOCATION MAP

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environmental factors/issues described above in further detail and identify mitigation measures where needed to reduce potentially significant impacts to a level of not significant.

1.2 PUBLIC SCOPING/ENVIRONMENTAL REVIEW PROCESS

On June 1, 1995, the City issued an Expanded Notice of Preparation (NOP) for the Focused EIR. The Expanded NOP included the Initial Study (Appendix A), which incorporated concerns raised at a pre-scoping meeting held on May 15, 1995 in the City Council Chamber. Public commentors included:

- R. C. Czapiewski
- Thomas Yardley
- James Arone
- Jules Kimmett
- Tom Paterson
- Sandy Walker

After issuance of the Expanded NOP, two public scoping meetings were held on June 22, 1995 in the Central Library Auditorium. Public and agency commentors included:

- Roy Sakaida, Regional Water Quality Control Board, Los Angeles Region
- Mike Mills, South Coast Air Quality Management District
- Penny Nakashima, Department of Toxic Substances Control
- James Arone
- Howard Rothenback
- Pamela Van Cortlandt

Several letters were received in response to the Expanded NOP. These included:

- Creative Images (Jeff Strobach)
- Southern California Association of Governments
- June Jacobson
- Regional Water Quality Control Board, Los Angeles Region
- California Department of Transportation
- Burbank Unified School District
- Department of Toxic Substances Control
- Pamela Van Cortlandt

Copies of the letter responses to the Expanded NOP and transcripts from the three public scoping meetings are included in Appendix B. No substantive issues were raised that had not been previously identified in the Initial Study.

The environmental review process will include several steps. The draft Focused EIR will be circulated with a 45-day public review period to allow for comments on the document. During the review period, a hearing will be held by the City of Burbank Planning Board to receive public testimony on the draft Focused EIR. After the review period has ended, responses will be prepared to all written and public testimony comments on the draft Focused EIR. The comments and responses will be used to produce the final Focused EIR.

Responses to commentors will be provided at least 10 days prior to a certification hearing on the final Focused EIR. No action can be taken on approval/disapproval of the proposed project until after certification of the final Focused EIR.

1.3 Changes to Project Description since Initial Study

Following the preparation of the Initial Study and the scoping sessions, Lockheed proposed several changes to the project description. The following is a summary of the most important changes; for a complete discussion, please refer to Chapter 2, Project Description.

- 0.14 pound per day limit of vinyl chloride emissions (based on a monthly average).

- Emissions monitoring during startup (weekly) and operation (monthly for 6 months with reduced frequency thereafter) for, trichloroethylene, vinyl chloride, and carbon tetrachloride; monitoring data shall be used to recalculate health risk (using the 70-year project lifetime per SCAQMD Rule 1401); this HRA will be for information purposes only and shall be included in the monthly report.

- Emissions monitoring during startup (weekly) and operation (monthly for 6 months with reduced frequency thereafter) for PCE, trichloroethylene, vinyl chloride, and carbon tetrachloride; monitoring data shall be used to recalculate health risk (using the 8.5-year project lifetime) and make any necessary plant operation adjustments to ensure that the one-in-one million significance threshold is not exceeded.

- Design capacity for reinjection of up to 70 percent of treated air (commitment by Lockheed for at least 50 percent re-injection)

- Separate alarm at a City facility with personnel on duty 24 hours per day to ensure that Lockheed can be notified to manually shut down the system in the event of a pass through incident where the automatic controllers fail to shut down the system.

- The applicant shall submit an emergency response plan, to the satisfaction of the Fire Chief, which specifies how emergency-response agencies will be deployed in the event that the reclaimed liquid contaminants spill either at the site or in transport.

1.4 ORGANIZATION OF FOCUSED EIR

A brief overview of the organization for the Focused EIR is presented below to facilitate use of this document by the reader. The sections following this Introduction include:

Section 2.0, Project Description, provides a discussion of project facilities, construction characteristics, operational procedures, measures included in project design to protect the environment, and permits/approvals needed for the project.

Section 3.0, Environmental Impact Evaluation, includes an analysis of the issues identified for the proposed project. It presents an evaluation, mitigation measures for significant impacts, and residual impact after application of mitigation measures.

Section 4.0, Cumulative Impact Evaluation, presents an assessment of public health risk effects of the proposed project in combination with other proposed projects and planned land uses.

Section 5.0, Alternatives, evaluates the No Project Alternative, alternative technologies, and alternative locations for the proposed project on the Lockheed property.

Section 6.0, Unavoidable Adverse Impacts, summarizes any significant residual impacts.

Section 7.0, Persons and Organizations Consulted, lists the Focused EIR preparers and persons contacted to obtain information to produce this document.

Section 8.0, References, lists documents and other sources used to prepare the Focused EIR.

Appendices include the Initial Study, Notice of Preparation and Response Letters, Revised Health Risk Assessment, Health Risk Hazards Analysis, Dames & Moore and The Peartree Group, Inc. reviews of Lockheed submittals, Comparison of VOC/ROG Emissions for the City of Burbank and Lockheed, a letter from the SCAQMD, and 1993 Emissions Permitted by SCAQMD for Burbank Facilities.

2.0 PROJECT DESCRIPTION

2.1 PROJECT OVERVIEW AND OBJECTIVES

Lockheed proposes to construct a vapor extraction system (VES) at the site of their former Plant B-1 facility in Burbank, California. The site previously was occupied by an aircraft parts fabrication and sub-assembly plant as well as the former Lockheed headquarters. Onsite structures contained a total of approximately 1.7 million square feet of interior space. All structures have been demolished. Within the aircraft parts fabrication and sub-assembly plant, operations included tooling, parts shaping and machining and deburring. In addition, cleaning and painting occurred which involved the use of oils, solvents, and paints. Soil beneath only 10 acres of the 87.4-acre Plant B-1 site is known to be contaminated with these industrial materials. Compounds found in the soil include perchloroethylene (PCE), trichloroethylene (TCE), vinyl chloride and carbon tetrachloride.

Lockheed was ordered to clean up the contaminated soil at the Plant B-1 site by the California Regional Water Quality Control Board (RWQCB), Los Angeles Region through Cleanup and Abatement Order No. 87-161 (dated December 17, 1987). This Order was issued pursuant to Section 13304 of the California Water Code.

The objective of the proposed VES is to restore the 10 acres of affected soil on the site to a condition satisfactory to the RWQCB such that further remedial action and monitoring would no longer be necessary. Key elements of this objective that must be met include:

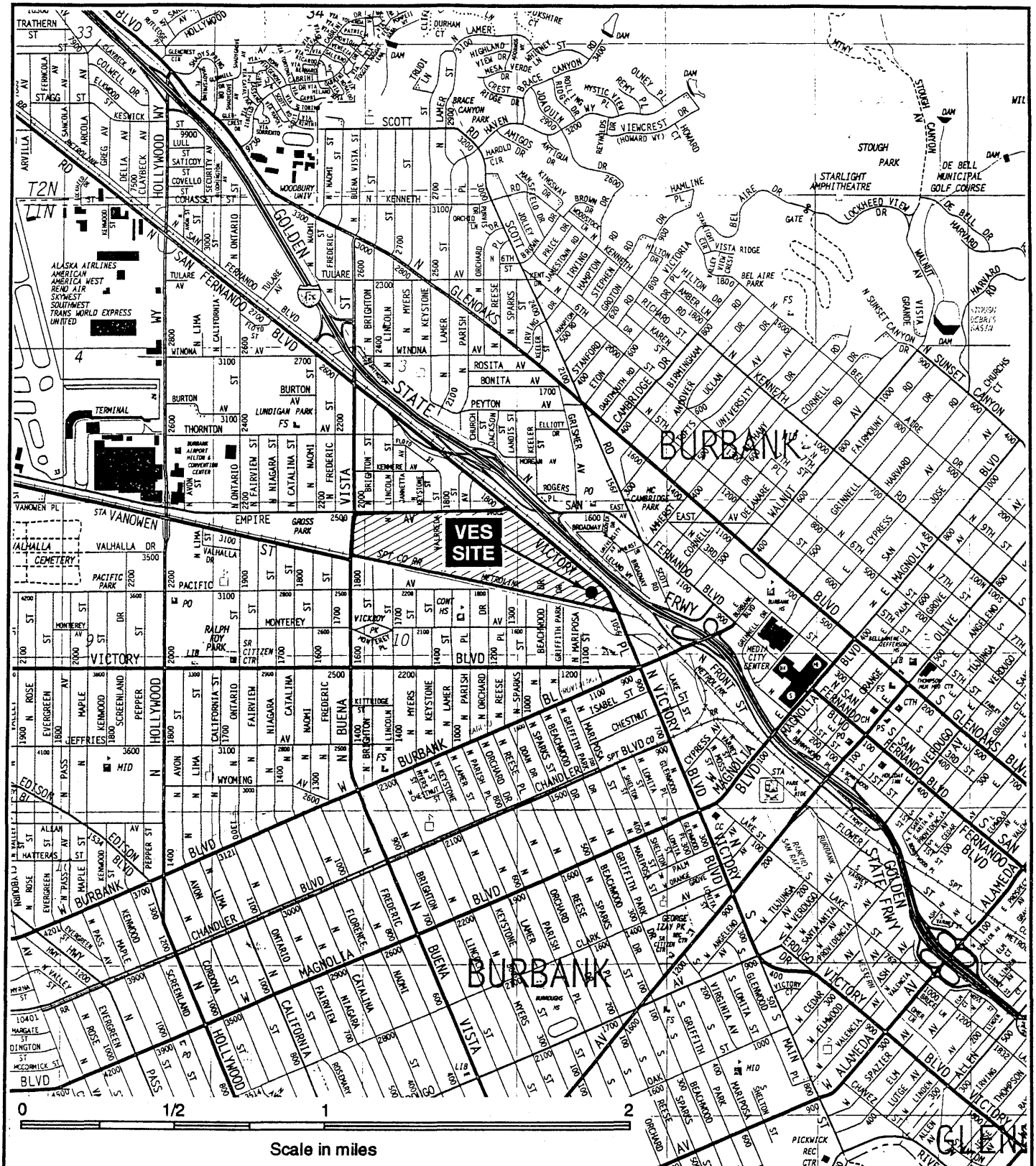
- Eliminate migration of soil contaminants to the groundwater aquifer
- Restore the site such that it is available for productive future use
- Use the best available treatment technology that has an established record of successful performance (i.e., not experimental technology).

The life of the project is expected by Lockheed to be 8.5 years based on the time estimated to clean up the soil to the satisfaction of the RWQCB.

2.2 LOCATION

2.2.1 Site Location

The proposed project is located on 10 acres of the Plant B-1 site at 1705 Victory Place, Burbank, California (Figure 2-1). The entire Plant B-1 site consists of a total of 87.4 acres of vacant land bounded by Buena Vista Street to the west, Empire Avenue to the north, Victory Place to the east, and the Southern Pacific Railroad to the south. The affected 10 acres are located at the eastern end of the Plant B-1 site along Victory



Plant B-1 Site

Dames & Moore

Figure 2-1

LOCKHEED PLANT B-1
SOIL VAPOR EXTRACTION SYSTEM
SITE LOCATION MAP

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Place. All structures and surface improvements formerly on the Plant B-1 site have been removed. Major underground improvements previously found onsite (including foundations, underground utilities, storm drains) have also been removed.

Surrounding properties currently contain a variety of urban uses. Land use to the south of the proposed project includes the Southern Pacific Railroad line which defines the southern project boundary. South of the railroad line lie single- and multi-family residential land uses. Land uses to the east, west, and north involve a combination of commercial, industrial, residential, and office uses. Three schools are located in the vicinity of the project stack including Monterey Avenue School (within 2,400 feet to the south), Burbank High School (within 3,100 feet to the east), and Providencia School (within 6,300 feet to the west).

2.2.2 Regional Setting

The Plant B-1 site is located in the urbanized San Fernando Valley, which is bordered by the San Gabriel and Santa Susana Mountains to the north, the Verdugo Mountains to the east, the Santa Monica Mountains to the south, and the Simi Hills to the west. The alluvium in the valley is composed of crystalline and sedimentary rock; at the site the alluvium extends to a depth of 1,200 feet below ground surface, and represents material deposited in a coalescing alluvial fan system. Groundwater was encountered in the Building 112 area (near the center of the Plant B-1 site) at about 140 feet below ground surface (ICF Kaiser, 1994b), which is typical of groundwater levels in the San Fernando Valley.

The San Fernando Valley has a semi-arid climate. Winters and springs are generally mild and breezy with daytime temperatures in the 60° to 70°F range. Rainfall occurs primarily between November and April. Summers are typically hot and smoggy with daytime temperatures sometimes reaching 100°F. Falls are warm and windy with daytime temperatures in the 70o to 80°F range; Santa Ana winds occasionally produce gusts of up to 40 miles per hour.

2.3 PROPOSED FACILITIES

Since many of the project features mitigate environmental impacts, they would become conditions placed on approval of the project and are consequently written in the form of conditions of approval.

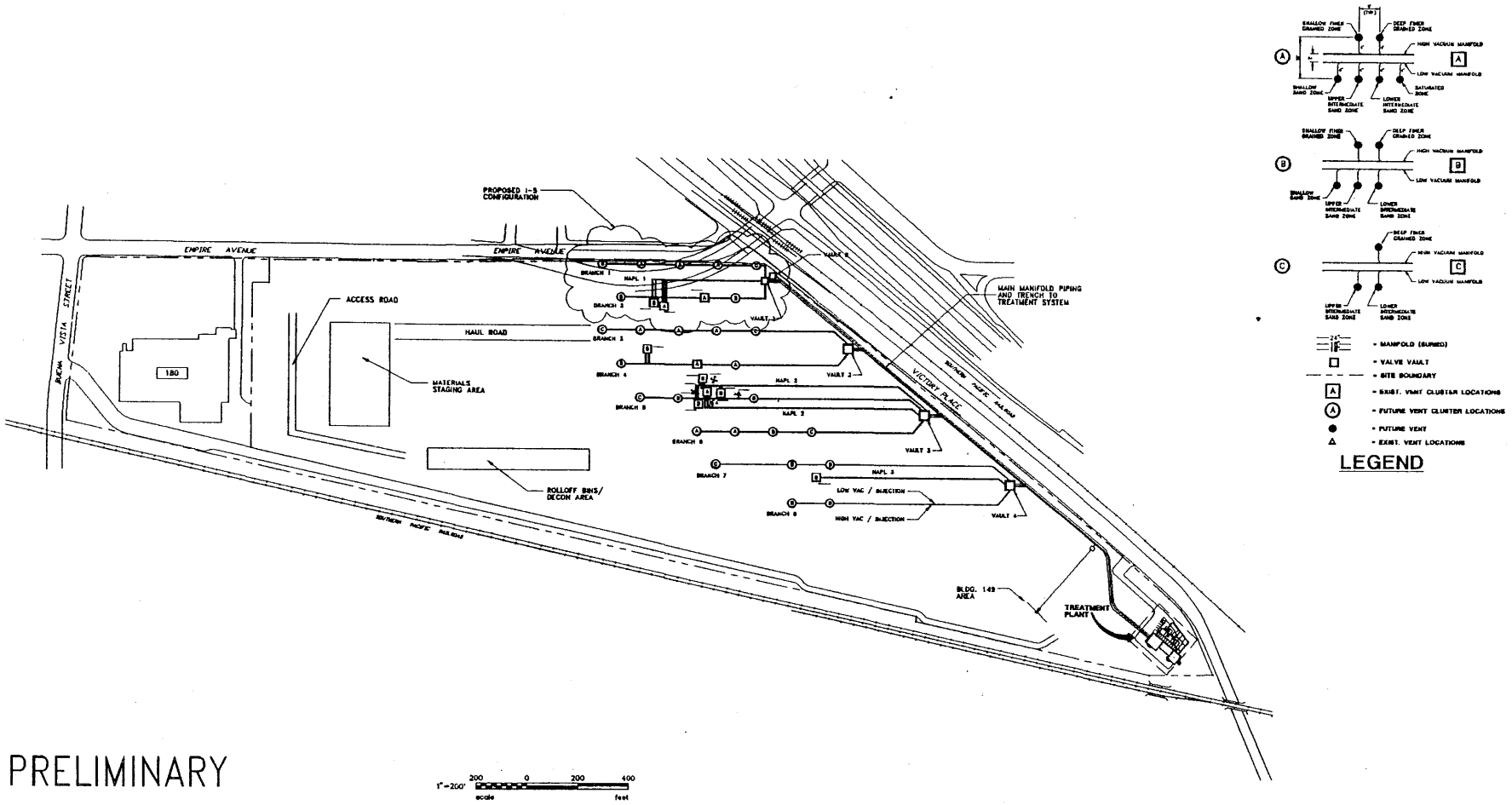
The proposed VES shall consist of four primary elements: (1) a vent field (about 200 soil vapor extraction wells) and piping manifold system to remove contaminants from the soil; (2) a treatment plant which utilizes a granulated activated carbon adsorption system to remove volatile organic compounds (VOCs) from the soil vapor collected by the vent system; (3) a 50-foot exhaust stack; and (4) an air reinjection system capable of reinjecting up to 70 percent of the treated air.

All of the vent fields and manifolds shall be underground. The plant and its support equipment shall be the only visible structures. The building shall appear as a commercial or light industrial type facility. The structure shall consist of 6,000 square feet in small buildings and 9,000 square feet of equipment with screened enclosures. Both shall be made of green and grey, concrete block and steel construction. The one-story structure height shall be 20 feet except for the 50-foot exhaust stack. The exhaust stack shall be 4 feet in diameter at ground level, tapering to 2 feet at the top. The facility shall be landscaped and fenced. An access driveway shall lead to five parking spaces and a loading area at the rear of the structure.

The vent field shall consist of clusters of soil vents (vertically installed perforated pipes) placed underground into the 10 acres of contaminated soils (Figure 2-2). Each vent cluster shall include three to six vents. Soil vents shall be connected to a common set of collection pipelines (manifolds) which also shall be placed underground. Collection pipelines carry the vapors to the soil vapor filtration plant. PCE and TCE are the predominant organic compounds to be removed from the soil. In addition, small quantities of other chemicals including vinyl chloride would be removed from the soil.

The soil vapor filtration plant shall receive the soil vapor collected by the soil vent system. The soil vapor shall be passed through filters and extraction blowers, then through a common heat exchanger to cool flows. It shall then be filtered through a granulated activated carbon adsorption system to remove almost all of the VOCs. The treated air (effluent) shall be introduced back into the soil or discharged through a 50-foot exhaust stack. Exhaust air can also be recycled through the blower and granulated activated carbon adsorption system when soil vapor concentrations are high or to maintain proper pressures for operating equipment.

Lockheed shall reinject treated soil vapor to the maximum extent practical with a target minimum of 50 percent during steady operations, contingent on adherence to all other regulatory concerns. The system shall be designed and constructed with a capacity for 70 percent reinjection. Based on three-dimensional vapor transport modeling and the physical properties of the subsurface soil at the Plant B-1 site, 100 percent reinjection cannot be achieved. The air reinjection system would consist of blowers at the treatment plant, a main injection line leading to the vent field, and automated valving to control the injection into each branch of the vent field being used for reinjection. The capacity of the injection system shall be designed to be 4,200 cubic feet per minute (cfm), or 70 percent of the capacity of the VES. The injection system shall be capable of drawing air from either the effluent side of the treatment unit or from the atmosphere; however, in steady operations any reinjection air shall be treated soil vapor. Lockheed intends to operate the reinjection system so as to maintain the maximum percentage feasible of treated reinjection air.



PRELIMINARY

Dames & Moore

Figure 2-2

LOCKHEED PLANT B-1
SOIL VAPOR EXTRACTION SYSTEM
VENT LOCATION SITE PLAN

Source: Lockheed Environmental Systems & Technologies Company

2.4 CONSTRUCTION

2.4.1 General

Construction activities will occur for approximately one year. The vent field and the treatment plant facility construction will begin simultaneously. The manifold piping collection system, which connects the vent field to the treatment plant, will begin after the completion of the vent field. The collection system construction will end about the same time as the treatment facility construction.

The size of the workforce would vary during construction with a maximum of 60 and an expected average of 40. The trades involved with construction will be grading, concrete, steel fabrication, block work, piping, plumbing, heating, ventilation, and air conditioning (HVAC), electrical, and electronic controls. The major equipment to be used during construction will include scrapers, dozers, backhoes, cranes and drill rigs. Power will be provided by a 1000 kva transformer recently installed on Victory Place at the construction site. It connects to the 4,160 volt existing service along Victory Place. Water will be drawn from the existing water service also along Victory Place. Water trucks and soil sealants shall be used for dust control. Solid waste (e.g., trash, construction debris) disposal during the construction activities shall be provided by a private service.

The site entrance during construction shall be along Victory Place near the building pad for the VES. A fence set-back has already been provided to prevent street congestion; a traffic light has also been installed. A secondary entrance shall be at Empire and Keystone.

2.4.2 Construction Activities

During the startup of construction and for the first three months, the work at the site will consist of drill rigs installing the vent field and site preparation for the treatment plant facility. At the beginning of the third month, the installation of the manifolds will begin and last for six months. Manifold construction will use scrapers to install 20-inch pipes at a depth of 10 feet. About the third to fourth month, the facility foundations will be placed and the concrete block structure will begin. The construction of the facility will run concurrent with the placement of the manifolds and also end after a six- to eight-month duration. This will include the installation of the carbon adsorption units, blowers, boilers, tanks and other equipment for the VES. The surface of the site has been treated with a non-toxic, non-flammable, clear or green soil sealer for dust control. Any area where the seal is broken shall be resealed. The trenching, to a depth of 10 feet, needed to install the vent pipes shall occur in clean fill soil. When well boring occurs in areas not occupied by clean fill dirt, the dirt from the borings shall be placed in covered drums and tested for contaminants. If the tests indicate contamination, the drums shall be transported to an appropriate landfill for disposal.

To minimize air-related impacts during construction, the project shall be required to adhere to the following requirements:

- Use equipment that produces low particulates and nitrogen oxides emissions.

- Apply non-toxic soil stabilizers according to manufacturers' specification to all inactive construction areas (previously graded areas inactive for ten days or more)
- Replace ground cover in disturbed areas as quickly as possible
- Enclose, cover, water twice daily or apply non-toxic soil binders according to manufacturers' specifications, to exposed piles (i.e., gravel, sand dirt) with 5% or greater silt content
- Water active sites at least twice daily
- Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour
- All trucks hauling dirt, sand, soil or other loose materials are to be covered or should maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer) in accordance with the requirements of CVC Section 23114
- Sweep streets at the end of the day if visible soil material is carried onto adjacent public paved roads (recommend water sweepers with reclaimed water)
- Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip
- Apply water three times daily, or non-toxic soils stabilizers according to manufacturers' specifications, to all unpaved parking or staging areas or unpaved road surfaces
- Traffic speeds on all unpaved roads to be reduced to 15 miles per hour or less

In addition, no trenching shall be done in those portions of the site where stockpiled soil from previous excavations is to be spread and then covered with clean imported soil.

2.5 OPERATION

2.5.1 Process Flow Description

The treatment plant shall process air at a rate between 2,000 and 6,000 standard cubic feet per minute (SCFM) for removal of VOCs. It shall be an automatically controlled process unattended by an onsite operator except for routine periodic inspection, adjustment, and maintenance. An operational workforce of one or two

people shall oversee operations of the VES. VOC laden air shall be extracted from the vent field through two independent soil vapor extraction systems designated as low vacuum and high vacuum. Vapors, consisting of air containing primarily PCE and TCE and much lesser quantities of other VOCs, in each of the two systems shall be drawn through a coalescing filter with a variable speed positive displacement rotary lobe blower. Capacities of the low vacuum blower and high vacuum blowers shall be 3,600 and 2,400 SCFM respectively. Each blower shall have an on-line spare. The two soil vapor extraction systems shall be joined together following blower discharge, cooled to approximately 100^{0}F and processed in a granulated activated carbon adsorption unit before being discharged through the plant stack or reinjected into the well field. When an activated carbon bed is saturated with VOCs it shall be automatically taken offline and the effluent shall be immediately routed to the second activated carbon bed. A simplified process flow diagram for the system is shown on Figure 2-3.

The amount of VOC vapors emitted from the stack shall be minimized by using operational controls. Operational controls to be used are as follows:

- Controlling flow quantities by valve adjustments and blower speed adjustments.

- Shortening GAC operation times to 2 hours between regeneration cycles to prevent breakthrough saturation of the carbon beds.

- Diverting the effluent vapor flow to the stack through a carbon polishing unit if the mass concentration of the stack discharge flow is too high. This carbon polishing unit shall not be regenerated onsite. It shall be replaced when saturated.

- Reinjecting a portion (up to 70 percent) of the gas stream back to the well field. At least 50 percent of the treated effluent shall be reinjected to the soil thereby reducing stack VOC discharge concentrations.

Processed air shall be monitored for VOCs using a redundant flame ionization detector before exiting the plant. In the event the total VOCs exceed the set point levels (to be established during startup for project operations), the effluent air shall be routed automatically through a 12,500 pound, nonregenerative GAC polishing unit to ensure permit compliance. If the effluent continues to approach permit limits, vent field extraction rates shall be automatically reduced. Exceeding the set point with the polishing unit on line and with the soil gas withdrawal rate having been reduced shall cause the plant to automatically shut down. At each of these set points, the programmable logic controllers shall alarm the operator and/or autodial a notification.

The saturated activated carbon bed shall be regenerated by heating and stripping with 15 psig steam. VOC-laden steam shall be condensed in a water cooled condenser.

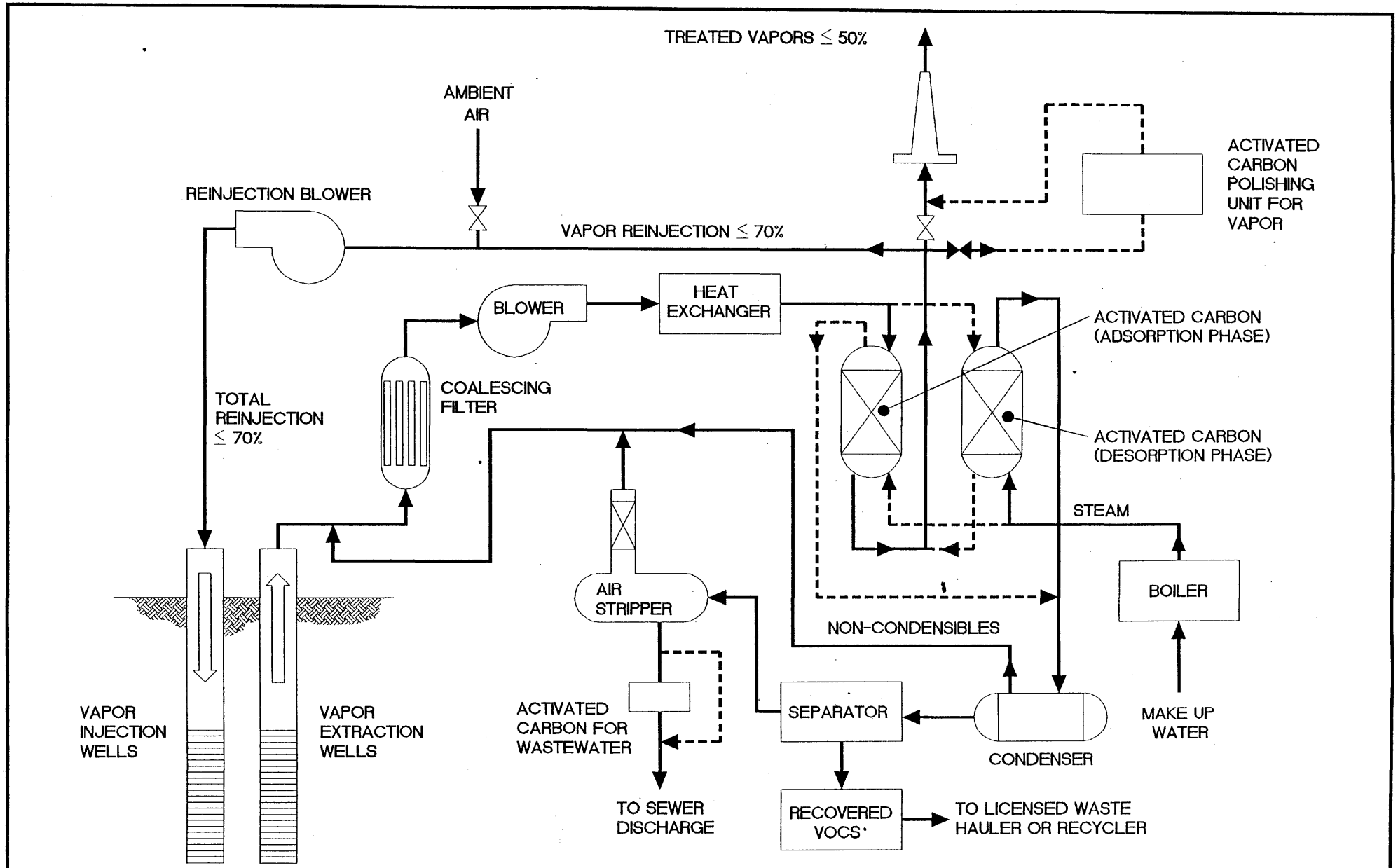


Figure 2-3

Dames & Moore

LOCKHEED PLANT B-1
SOIL VAPOR EXTRACTION SYSTEM
CONCEPTUAL PROCESS FLOW DIAGRAM

Source: Lockheed Environmental Systems & Technologies Company

The two-phase liquid condensate shall flow to a separator where the two phases separate into a heavy liquid VOC layer of approximately 1.5 specific gravity and a lighter water phase. The VOC liquid shall be pumped to temporary storage from which it would be trucked offsite. The VOC saturated water shall be processed through an air stripping column to remove VOCs. Off gas from the air stripper shall be routed to the vapor phase activated carbon filter for treatment. Water from the stripper shall be passed through an activated carbon polishing bed. Water from the polishing bed shall flow to a water neutralization unit where the pH shall be adjusted to between 6.5 and 8. Following pH adjustment, the water shall be analyzed for VOCs and, if within specification, discharged to the sewer. Water not meeting specification shall be pumped to a 10,000 gallon tank for temporary storage before being trucked offsite.

Steam for regeneration shall be produced in one of two boilers. Cooling water shall be produced in a cooling tower. Blowdown from the boiler shall be routed to the neutralization unit. Cooling tower blowdown shall flow to the sewer. Instrument air at 80 psig shall be produced by compressing and drying.

As with any process or mechanical system, a startup period is required for bringing the entire system on-line. Each component (e.g., boilers, cooling towers, pumps, air conditioning equipment and control equipment) must be started, tested and adjusted by the contractor and manufacturer's representatives for maximum efficiency. The entire system shall then need to be tuned to bring it to operational effectiveness. This period shall be for 90 days because of the complexity of the system. Full emissions monitoring shall occur during this startup period to ensure that the system has been properly tuned to avoid emission exceedances. Any temporary emissions exceedances associated with testing and adjusting equipment shall be corrected, documented, and reported.

2.5.2 Other Characteristics

Utility needs will include water, gas, electricity, sewer, and telephones. Boiler feedwater will be the process water used for steam regeneration of the carbon filters. Non-contact cooling water will be used for condensers and heat exchangers. Combined water use will be approximately 7,500 gallons per day in the plant process and 7,000 gallons per day for landscape irrigation. About 370 therms per day of natural gas will be supplied for the boilers; oil burners shall not be used for system operations. Electricity will be used throughout the plant at a rate of about 12,500 kilowatt hours per day. The sewer will be used for domestic wastewater, and for discharge of treated wastewater. Telephones are standard equipment, and will be used for regular business phones, a fax, and the autodialer to the on-call plant operator.

Process wastewater planned to be discharged to the sewer and the average design flows are: process wastewater from the air stripper resulting from steam regeneration of the activated carbon filters would be discharged at about 2,200 gallons/day; boiler

blowdown water at about 250 gallons/day; cooling tower blowdown at about 5,000 gallons/day; washdown water from building drains at about 10 gallons/day; and domestic wastewater at about 40 gallons/day. In addition, reclaimed PCE and TCE solvents will be produced, but shall not be discharged to the sewer. The reclaimed solvents shall be stored in the solvent holding tank and removed from the site by a licensed waste hauler or recycler in compliance with regulations.

2.6 TERMINATION AND ABANDONMENT

When the soil cleanup level goals are met, the VES shall be shut down and decommissioned pursuant to applicable regulations in effect at that time. The two major events that occur on the final shutdown shall be the sealing of the vapor wellfield system by pressure grouting and the dismantling and removal of the VES plant from the site. Termination and abandonment conditions shall be in conformance with requirements approved by the RWQCB.

2.6.1 Well Field Abandonment

Once it has been determined by the RWQCB that the VES has accomplished its VOC cleanup goal, the vapor extraction wells shall be sealed shut with pressure grouting. The pressure grouting shall be accomplished through the valve vaults. A specified cement bentonite slurry shall be pumped through the branch manifolds and down into the extraction and injection wells, sealing the well screens and filling the pipes which shall be abandoned in place. This shall be done in accordance with applicable regulatory requirements.

2.6.2 Dismantling and Removal of the VES Plant

When the VES has accomplished its intended goal, the vapor filtration plant shall be dismantled and removed from the site. All equipment shall be removed and the buildings and structures shall be demolished. All demolition debris shall be removed from the site so that the site shall be readily usable by future owners. As part of the demolition, valve vaults shall be eliminated and open pipes shall be sealed by grouting and/or other suitable method.

2.7 ENVIRONMENTAL PROTECTION FEATURES

2.7.1 Emissions Control/Shutdown Procedure

The VES shall be controlled and monitored by programmable logic controllers contained within the treatment plant. The controllers shall monitor and record data and manage automated system shut downs in the case of system component malfunctions, or in the event that emissions approach the 9.8 pounds per day average limit of VOCs. The controllers shall monitor the VES through a system of temperature, pressure and/or

flow sensors throughout the treatment plant. The controllers shall automatically alter the facility configuration and throughput to assure the 9.8 pounds per day average VOC limit is not exceeded.

During startup, and at any time a major change is made in the plant feed stream, the carbon cycle time shall be closely monitored and adjusted to maintain the emissions rate of less than 9.8 pounds per day average as determined by the stack flow rate and measured effluent concentrations. Emissions shall start out at a set point and be adjusted upward according to VES efficiency determined during the startup period. If the daily emission rate is found to be approaching the set point limit, the polishing unit shall be automatically placed on line.

If the effluent again approaches the set point, the field extraction rate shall be reduced. If the set point is then reached, the facility shall be automatically shut down. All of these automatic changes shall be recorded for system analysis and adjustment. The controllers are enhanced with an autodial message system for 24 hour monitoring and response.

The operations monitoring system shall have an alarm system at a City facility with personnel on duty 24 hours per day. The alarm would notify City personnel of a condition in which emissions in excess of 9.8 pounds per day of VOC occurred. Lockheed shall also supply a second signal to a City facility with 24-hour personnel which indicates that the facility has been shut down. Lockheed shall provide personnel on duty 24 hours per day to ensure that manual shut down of the plant can be achieved within one hour of the breakthrough in the event that the automatic shut down feature fails. Should the system have to be shut down manually, Lockheed shall notify the City of such shut down within one hour of the exceedance.

The applicant shall submit an emergency response plan, to the satisfaction of the Fire Chief, which specifies how emergency-response agencies will be deployed in the event that the reclaimed liquid contaminants spill either at the site or in transport.

2.7.2 Emissions Monitoring

Emissions from the VES shall be monitored to ensure that system operation are consistent with the assumptions used in the health risk assessment. The soil to be treated by the VES has been thoroughly characterized using soil gas analysis and soil borings. Based on this investigation, emissions from the VES are predicted to be composed primarily of PCE and TCE. The balance of the emissions should consist of small quantities of other chemicals including vinyl chloride and carbon tetrachloride.

In order to ensure that operation of this system does not result in any significant health effects, conditions shall be imposed limiting emissions of all VOCs including PCE and TCE to less than 9.8 lb/day (daily average for 1-month periods).

VOC concentrations following treatment shall be measured on a continuous basis using a continuous emission monitor (CEM). Emissions in units of pounds per day shall be calculated from these concentration readings and an estimate of flow out the stack. The CEM shall be established and utilized as follows:

- Lockheed shall pay for the City to hire an independent testing laboratory to test samples weekly within the first 30 days of operation and calibrate the monitor accordingly.

- Once a month, Lockheed shall send to the City's independent testing laboratory a written report indicating VOC emissions for each day that month. The City's independent testing laboratory shall compare the Lockheed data with its own independent monthly sample and send a written report to the City each month which states whether or not the system that month has operated within the limit of 9.8 pounds of VOCs per day.

In addition to controlling the total VOC emissions from the plant, Lockheed shall also determine the concentrations of perchloroethylene, trichloroethylene, vinyl chloride, and carbon tetrachloride in the emissions from the VES. These chemicals shall be used as indicators of a potential change in excess cancer risk should there be a change (decrease or increase) in the concentration level of individual chemicals in the mix of chemicals. The objective is to ensure that unexpected changes in the concentrations of these chemicals in the emissions do not represent an unacceptable cancer risk to the public.

These data shall be used to ensure that emissions from the VES remain within the following limits.

- Vinyl chloride concentrations shall be limited to 0.14 lb/day as a monthly average.

- The measured concentrations of trichloroethylene, vinyl chloride, and carbon tetrachloride along with design concentrations of other listed South Coast Air Quality Management District (SCAQMD) Rule 1401 chemicals shall be used to calculate the excess cancer risk and ensure that it remains below one in one million assuming that emissions remain at this level for a full seventy years.

- The measured concentrations of perchloroethylene, trichloroethylene, vinyl chloride, and carbon tetrachloride shall be used to calculate the excess cancer risk and ensure that it remains below one in one million assuming that emissions remain at this level for the entire life of the project, that is 8.5 years.

The following procedure for testing, adjusting and reporting shall be used.

- During the first three months of operation, the City's independent testing laboratory, funded by Lockheed, shall sample emissions once per week for the four contaminants. The independent laboratory shall use these samples to perform the two health risk assessments (HRAs) described above. If the health risk threshold is not exceeded in the first two years or for any consecutive two year period, this frequency shall be decreased to once per year. If the health risk threshold of one per million, based on a monthly average, is not exceeded for either HRA during the first three months, or during any consecutive three month period thereafter, the sampling frequency shall be reduced to the rate of once per month for the next six months. If the health risk threshold is not exceeded in this six month period, sampling frequency shall be decreased to once per quarter.

- Using these samples, the City's independent testing laboratory, funded by Lockheed, shall perform the two HRAs as described above to determine whether the one per million risk threshold has been exceeded. For the purpose of this requirement, these HRAs shall be a spread sheet calculation that computes risks for monitored chemicals. This information shall be included in the independent laboratory's monthly report to the City.

In the event that the excess cancer risk calculated by either approach exceeds one in one million based on the analysis of any one monthly or quarterly sample, the sampling frequency shall be increased to at least one sample per week for at least one month. The monthly average emission rate of the four contaminants shall be calculated from four consecutive weekly samples, one of which shall be the sample which triggered the increase in sampling frequency.

- The 70 year HRA (in accordance with SCAQMD Rule 1401) will be conducted for informational purposes.

- When the monthly average emission rate results in a calculated risk over the project life in excess of one per million, plant operations shall be adjusted to ensure that the monthly average emission rate for the next month is far enough below the threshold to entirely compensate for the exceedance in the prior month. In other words, the average emission rate for the two months together shall not exceed the one per million risk threshold. The monthly written report from the City's independent laboratory shall state whether or not these adjustments, if needed, have achieved this requirement.

- If the operational adjustments cause the expected project life to be extended, the health risk assessments shall use the extended project life rather than the 8.5 years currently expected.

- If the vinyl chloride limit of 0.14 pounds per day is exceeded in any month, the emissions in future months must be reduced so that the monthly average for a three month period which includes the month of violation meets the emission limit.

- If the reports from the City's independent laboratory indicate a consistent pattern of failure to achieve these project requirements, the City shall take appropriate enforcement action based on violations of conditions of approval of the CUP.

- The system shall also include the following features:

  - Programmable logic controllers that can automatically alter or shutdown facility operations in the event of problems.

  - The operations monitoring system shall have an alarm system at a City facility with personnel on duty 24 hours per day. The alarm would notify City personnel of a condition in which emissions in excess of 9.8 pounds VOC occurred. Lockheed shall also supply a second signal to a City facility with 24 hour personnel which indicates that the facility has been shut down. Lockheed shall provide personnel on duty 24 hours per day to ensure that manual shut down of the plant can be achieved within one hour of the breakthrough in the event that the automatic shut down feature fails. Should the system have to be shut down manually, Lockheed shall notify the City of such shut down within one hour of the exceedance.

  - The applicant shall submit an emergency response plan, to the satisfaction of the Fire Chief, which specifies how emergency-response agencies will be deployed in the event that the reclaimed liquid contaminants spill either at the site or in transport.

  - The applicant can modify operational conditions and parameters so long as the City's independent monitoring operations indicate compliance with target risk calculations and emission limits for daily VOCs and vinyl chloride.

  - A maximum air flow rate of 6,000 standard cubic feet per minute

- For at least the first six months of operation, shortening granulated activated carbon adsorption times to 2 hours per day between regeneration cycles to prevent breakthrough saturation of the carbon beds

- Control of flow quantities by valve adjustments and blower speed adjustments

The facility shall be landscaped and fenced. A driveway shall lead to parking spaces and a loading area at the rear of the treatment plant.

2.8 PERMITS AND APPROVALS

The proposed VES will require a Conditional Use Permit from the City of Burbank. Although the Plant B-1 site is zoned for Industrial Use by the City, the proposed 50-foot exhaust stack, like all structures over 35 feet, requires a Conditional Use Permit.

The SCAQMD requires issuance of Permits to Construct and Operate for certain equipment (boilers, etc.) within the soil vapor filtration plant. Emission offsets will be required because the proposed project would result in an increase in emissions of VOCs. Lockheed is providing a minimum of 12 pounds of VOCs emission reduction credits generated as a result of the shutdown of the Burbank operation on the Plant B-1 site to offset the 9.8 pounds per day generated by the VES pursuant to SCAQMD regulations.

Other permits and approvals required are as follows:

- Building permit from the City for the proposed 6,000-square-foot building, including a 50-foot stack
- Grading permit from the City for the proposed building and onsite drainage control
- City Industrial Waste Discharge Permit
- City Development Review approval
- Review and approval from the California Regional Water Quality Control Board
- Review by California Department of Toxic Substances Control

3.0 ENVIRONMENTAL IMPACT EVALUATION

3.1 EFFECTS FOUND NOT SIGNIFICANT

As a result of completing the Initial Study (Appendix A), it was determined that most effects of the proposed project would not be significant. Specifically, the impact of the proposed project on the following environmental factors was deemed not significant:

- Land Use and Planning
- Population and Housing
- Transportation/Circulation
- Biological Resources
- Energy/Mineral Resources
- Noise
- Public Services
- Utilities and Service Systems
- Aesthetics
- Cultural Resources
- Recreation

Explanations for the above determinations are included in the Initial Study (Appendix A).

Among the responses to the Notice of Preparation (Appendix B), two concerns were expressed that do not involve significant effects. These are: (1) presence of heavy metals in soils; and (2) emissions from excavation of soil. Reasons for determining that these concerns would not involve significant effects are provided below.

Lockheed was required to investigate, excavate, and remove soils with high levels of contamination (including heavy metals) in response to Cleanup and Abatement Order No. 87-161 (dated December 17, 1987). The near-surface soil contamination was reduced to acceptable levels based on the removal. Excavated areas were backfilled with clean soil [Regional Water Quality Control Board, Los Angeles Region (RWQCB) 1995b]. Therefore, the proposed project is not expected to encounter soils that are highly contaminated with heavy metals.

The trenching necessary to lay the venting system will, consequently, be done in clean fill dirt. The borings for the wells will go lower than ten feet and may encounter contaminated soil. All soil borings from the well holes will be placed in covered drums and tested for contaminants. If the tests indicate contamination, the drums will be transported to an appropriate landfill. If the testing indicates no contamination, the soil can be used as fill on site.

Soil excavation will primarily be associated with shallow trenches that will be dug for installation of vent field pipelines. The existing soil sealant on the site would prevent exposure of soils to dust generation except at specific trench locations. Trenching shall occur sequentially rather than all at once, which would minimize the areas of exposed soil.

As noted in the Project History, the proposed VES project is separate from the first phase of the ordered clean-up, which involved soil excavations. In that project, contaminated soil was taken to appropriate landfills for disposal. Other soils were either clean or not sufficiently contaminated to be considered as regulated materials. The RWQCB has authorized Lockheed to spread this non-regulated soil (in a portion of the site which will not be used for the VES project), and cover this soil with clean soil. Since the concentration of contaminants in this soil is low, this process is not subject to SCAQMD rules and regulations.

No trenching shall be done in those portions of the site where stockpiled soil from previous excavations is to be spread and then covered with clean imported soil. Water trucks shall be present at those locations during excavation and pipeline installation for dust suppression. As noted above, highly contaminated soils have already been excavated and removed from the sites. For these reasons and as concluded in the Initial Study, trenching for pipeline installation is not expected to result in emissions (particularly PM 10) that would pose a significant risk to the public.

As quantified confirmation for the above conclusion from the Initial Study, construction emissions of PM 10 were calculated for comparison to South Coast Air Quality Management District (SCAQMD) CEQA significance thresholds. PM 10 emissions from movement of soil, particularly during trenching, were identified as the principal concern. Calculations included the following sources: earth moving (grading, trenching, stockpiling), employee vehicles, construction equipment, trucks, and paved and unpaved road travel. Emission factors were obtained from the SCAQMD CEQA Air Quality Handbook. A 50 percent dust control efficiency was assumed based on project description features such as chemical dust suppressants, water trucks, wheel washers, and vehicle speed limits. A conservative assumption was made that simultaneous use of all vehicles and equipment would occur in the same quarter. Results of the calculations, as shown below, indicate that PM 10 emissions during construction would not have a significant adverse impact.

	LBS PER DAY	TONS/QUARTER
Proposed VES	111	3.59
CEQA Threshold	150	6.75

3.2 GEOLOGIC HAZARDS

The only potentially significant impact identified for the proposed project related to geologic considerations was liquefaction hazard. This issue is evaluated below.

3.2.1 Evaluation

Soil conditions at the Plant B-1 and VES site consist of sandy soils to depths of greater than 100 feet. Based on available geotechnical information, the upper 40 to 50 feet consists of loose to medium dense gravelly sands with interbedded sandy silts and clayey silt layers. Below a depth of approximately 50 feet, the soils are dense with a generally higher gravel content. Cobbles are also present (Dames & Moore, 1977, 1985, 1995; United States Geological Survey, 1985). Locally within the Plant B-1 site, various amounts of fill have been placed and compacted to 95 percent relative compaction (RWQCB, 1995). The fill has been associated with environmental cleanup of the Plant B-1 site.

Groundwater is anticipated at depths of greater than 100 feet in the Plant B-1 site area. Monitoring wells at the Plant B-1 site have encountered groundwater at depths of approximately 120 to 145 feet (RWQCB, 1987, 1995). Other geotechnical investigations in the area did not report water-bearing zones within the top 40 feet (Dames & Moore, 1985, 1995). According to United States Geological Survey (1985), based on 1962 data from the California Water Rights Board, reported water levels were at depths of approximately 110 feet. Specific studies conducted in 1 approximately 110 feet. 992 at Plant B-1 (Tetra Tech, 1993) indicated the presence of a perched water zone at depths of 45 to 60 feet in limited areas of the site. Apparently, the source of this perched water was a 250,000-gallon, underground fire water tank and associated fire hydrant pipelines. The water tank and associated pipelines were removed during site substructure demolition and according to subsequent studies by ICF Kaiser in 1993 and 1994, perched water was not found at the Plant B-1 site (ICF Kaiser, 1994). Based on regional as well as site-specific data, it is reasonable to assume that groundwater and perched water do not exist within the upper 50 feet at the Plant B-1 site and that considering possible Plant B-1 site redevelopment, any future perched water will probably be deeper than 45 feet and in limited areal extent in portions of the site.

Liquefaction potential is considered overall to be low at the Plant B-1 site; therefore, liquefaction risk is not considered significant. Liquefaction occurs during seismic events in saturated, loose granular soils; this phenomenon is of concern only within the soils to a depth of 50 feet. As such, for liquefaction potential to exist: (1) the water table should be within the top 50 feet; and (2) soils within the upper 50 feet must be granular and in a loose state. In the case of the proposed project, although

the soils within the top 50 feet are loose to medium dense, the present water table is at a depth of greater than 50 feet. Accordingly, liquefaction potential does not exist. The possibility of any future perched water levels developing in the upper 50 feet is low; therefore, liquefaction potential due to perched water is considered to be low.

The liquefaction potential is further minimized in portions of the Plant B-1 site where the upper 25 feet have been recompacted to a relative compaction of 95 percent.

3.2.2 Mitigation Measures

None required.

3.2.3 Residual Impacts

No significant residual impacts are expected.

3.3 WATER

The initial study identified two potentially significant impacts related to water: (1) damage to offsite properties as a result of inadequate drainage control on the Plant B-1 site; and (2) transport of contaminated soil to the City's storm drain system. These issues are evaluated below.

3.3.1 Evaluation

Stockpiled Soil

Demolition of existing structures and regrading of the Plant B-1 site was initiated in 1991 and completed in early 1995 (Montgomery Watson, 1995). High concentration metal- and hydrocarbon-impacted soil encountered during demolition activities was excavated and transported offsite for disposal (Montgomery Watson, 1995). However, approximately 27,000 cubic yards (cy) of soil containing relatively low hydrocarbon concentrations were stored onsite (Montgomery Watson, 1995). The stockpiled soil is underlain by an impervious geomembrane and is covered with welded high-density polyethylene (HDPE) geomembrane to provide containment and erosion control against wind and rain. Sandbags have been placed over the top of the sheeting and along the toe of the pile to keep the HDPE membrane in place.

As discussed earlier, the stockpiled dirt is part of the initial excavation phase, a separate project which preceeded the VES project addressed in this EIR. The discussion which follows is provided to indicate the need for a more detailed grading plan for the project site.

In order to complete grading activities at the Plant B-1 site, Lockheed may distribute the stockpiled soil over a 15-20 acre area on the western portion of the site at a thickness ranging from 2 inches to 4.5 feet, and then place an additional minimum of 2 feet of clean imported soil on top of the soil (Johnsen, 1995). This area is not within the portion of the site planned for construction and trenching activities associated with the proposed VES.

The results of a fate and transport modeling simulation conducted on the stockpiled soil for various contaminants indicated that the low level of contaminants detected in the stockpiled soil would not pose a threat to the groundwater quality beneath the Plant B-1 site. RWQCB, which serves as the regulatory agency for the site cleanup activities, has concurred with the results of the fate and transport modeling report prepared by Montgomery Watson. RWQCB's letter to Lockheed dated April 18, 1995, also mandated the following three conditions for utilizing the stockpiled soil as backfill:

- In the event that high concentrations of contaminants are encountered in the stockpiled soils during the backfilling operation, those soils should be segregated and disposed of properly;

- Soil with metal concentrations that exceed the California Administrative Code Title 22 TTLC and STLC values should not be used as backfill material; and

- The concentrations of hydrocarbon-based compounds should not exceed the soil screening levels set in the Board's Interim Guidance for Remediation of Petroleum Impacted Sites (January 1995).

Plant B-1 Site Drainage

The Plant B-1 site is currently graded to direct sheet flow runoff easterly across the site into either: (1) an asphalt lined swale approximately 10 feet wide and 2 feet deep, or (2) directly into one of two unlined catch basins. The lined swale directs runoff into one of the unlined catch basins located in the southeastern one-third of the Plant B-1 site; the other catch basin is located in the eastern one-third of the site. The catch basins each contain a riser pipe outlet structure which discharges through a piped drainage system into the City of Burbank storm drain in Victory Place. The elevated pad located in the easternmost corner of the Plant B-1 site, which is to be the future location of the proposed VES, drains overland offsite into an existing drop box located adjacent to the sidewalk.

The City of Burbank Department of Public Works (CBDPW) expressed concerns with the existing condition. During the heavy rains of the winter of 1994-95, the CBDPW

was concerned that sediment from the Plant B-1 site was being transported by storm water runoff into the City storm drain system and potentially settling in the Victory Place underpass. Since storm water is pumped out of the Victory Place underpass, sediment build-up could potentially plug the pumps and cause the underpass to flood. In an effort to prevent sediment transport offsite Lockheed placed sandbags and hay bales along the southeastern perimeter (south gate) of the Plant B-1 site to reduce sediment transport offsite. This was an interim sediment control measure. Another concern expressed by the CBDPW was that storm water runoff was flowing offsite over the City parkway (sidewalk and curb) into the street and gutter. The CBDPW standards for storm water control specify that no storm water runoff be permitted to flow offsite over the parkway. Runoff is to be directed offsite either under the sidewalk into the street gutter, or through underground pipes which outlet into the City storm drain system.

In addition to water erosion, the CBDPW is concerned with wind erosion of soils at the Plant B-1 site. To protect the Plant B-1 site against wind erosion, Lockheed treated the surface of the site with a non-toxic, non-flammable, and environmentally safe soil sealer. The soil sealant forms a crust on the ground surface and greatly reduces wind erosion of the ground surface. One of the soil sealant applications included green dye so that its presence would be visible to assist in its maintenance.

Previous Plant B-1 Site Excavation

The RWQCB has indicated that excavation related to previous demolition activities proceeded in areas where there was visible soil staining and where boring investigations indicated impacted soil (RWQCB, 1995c). The depth of the excavations were on the order of 25 feet deep (RWQCB, 1995c). Lockheed personnel have indicated that surface and near surface contaminants, to an average depth of 10 feet across about one-half of the eastern portion of the Plant B-1 site, have been removed and clean fill placed over the site (Lockheed, 1995).

Drainage Control Impacts

The CBDPW identified the following concerns in the Site Layout Plan (drawing number 01-10-0101) provided in the Soil Vapor Extraction System drawings dated February 28, 1995 during their review:

- The plan fails to indicate prevention of drainage flow over street parkway. The site elevation grades shown on the plan indicate that drainage will flow over the parkway.

- No specific evidence of pollutant control (i.e., containment provisions) is provided. With the site elevations shown on the plan, pollutants outside the building would flow to the street.

In conversations with CBDPW personnel to discuss their concerns with the project, most of their comments pertained to conditions necessary to prevent existing Plant B-1 site deficiencies from being carried forward with the proposed project. The CBDPW's main concern was that a maintenance program be implemented by Lockheed to prevent soil from being eroded by wind or rain, and a maintenance program for upkeep of the outlet structures in the detention ponds (CBDPW, 1995).

The pad for the proposed project is proposed to house three small buildings and shall have a masonry fence along the northern, eastern and southern perimeters. The areas to the west and south of the buildings shall be paved with concrete and asphalt pavement. The northern and eastern slopes of the proposed VES pad shall be landscaped, hydro-seeded, and irrigated. An existing storm water catch basin is located on the western border of the proposed project. The Site Layout Plan indicates that the paved area on the western side of the project is proposed to slope and drain into the catch basin. Runoff from the proposed project would have to travel approximately 150 feet overland from the western edge of the building before discharging through the catch basin's outlet structure. This distance should allow for adequate time to identify, contain, and cleanup any accidental spillage of liquids which might be considered pollutants.

The paving and landscaping would reduce the area of exposed sediment thereby greatly reducing the quantity of sediment available for transport by storm water offsite. Additionally, the onsite landscaping along the slopes would serve as a buffer zone to impede transport of potential pollutants located outside the building offsite onto the City parkway or street.

The contours shown on the Site Layout Plan are not well defined with respect to existing versus proposed grade. Therefore, it is not clear that the plan as proposed would adequately resolve the issue of offsite sediment transport by storm water runoff. Continued existence of this problem would represent a potentially significant impact to adjacent offsite properties.

Contaminated Soil Transport

There is little to no likelihood of contaminated soil being transported offsite into the storm drain system with storm water runoff due to the following:

- Highly contaminated surface soil to an average depth of 10 feet on the Plant B-1 site has been removed and replaced with clean fill.

- The stockpiled soil containing low levels of contaminants is covered and not susceptible to wind or rain erosion.
- Stockpiled soil, if used as backfill, will be placed in accordance with the RWQCB's conditions for reuse and covered with a minimum of 2 feet of clean soil.

Additionally, the RWQCB has stated that near-surface soil contamination was removed to acceptable levels and that these areas have been backfilled with clean soil. Untreated soil containing pollutants is not expected to drain into the City storm drain system (RWQCB, 1995). Therefore, no adverse impacts related to transport of contaminated soil to the City storm drain system are expected.

3.3.2 Mitigation Measures

A comprehensive stormwater runoff prevention and grading plan for the entire Plant B-1 site, commissioned by Lockheed to address the CBDPW's concerns, is currently under design. The grading plan is being developed to incorporate site drainage and grading for a 50-year storm event. As mitigation, the drainage and grading plan shall include:

- Grading the site to prevent storm water runoff from flowing offsite over the parkway
- Redesign of all existing swales, catch basins, and outlet structures to prevent storm water runoff from flowing offsite over the parkway
- Design of erosion control measures for the entire site, particularly along the south gate near Victory Place
- Pollution prevention and sediment control measures
- The grading and drainage plan shall incorporate drainage plans associated with the redistribution of stockpiled soil.

The grading plan shall conform to the CBDPW's standards and shall be implemented by Lockheed.

3.3.3 Residual Impacts

The mitigation measures described above would resolve the concerns identified for the preliminary drainage plan. Therefore, no significant residual impacts are expected after implementation of the mitigation measures and there would be a net benefit to local drainage conditions onsite and offsite.

3.4 HEALTH RISK ASSESSMENT

The initial study prepared in May, 1995, indicated health risk was identified as a potentially significant air quality impact; other air quality impacts were determined to be not significant (see Appendix A). The following discussions have been abstracted from the revised health risk assessment presented in Appendix C. The appendix is a revision and update by Dames & Moore to materials provided by Lockheed to the South Coast Air Quality Management District (SCAQMD).

3.4.1 Evaluation

3.4.1.1 Background

The SCAQMD monitors ambient concentrations of air toxics in the South Coast Air Basin. Based on the SCAQMD monitoring efforts, the SCAQMD estimates that the excess (above the national baseline of expected cancer risk posed to all people by factors such as diet, heredity, and lifestyle: 333,000 in one million) public health risk of cancer in Burbank from ambient air is approximately 1,300 in one million (SCAQMD, 1994).

3.4.1.2 Proposed Project

Soils at the 10-acre project site are contaminated with industrial materials. The primary contaminants are perchloroethylene (PCE) and trichloroethylene (TCE). The soil contamination at the site, if it were to reach groundwater, would affect an important regional groundwater supply and represents a health risk to the surrounding public.

The proposed VES would emit air toxics that could have potential health effects (cancer, chronic non-cancer, and acute non-cancer effects). SCAQMD considers an effect to be insignificant if the health risk is less than one in one million. SCAQMD also considers a risk factor of up to 10 per million to be insignificant if the system uses best available control technology for toxics (T-BACT). SCAQMD has determined that the proposed Lockheed VES uses T-BACT.

The SCAQMD Rule 1401 human health risk assessment process employs a variety of parameters that can contribute to conservatism (i.e., may cause health risks to be overestimated). These parameters include the following:

- *Project Duration* -- Rule 1401 analysis uses an assumption of project lifetime in which the emissions are expected to occur for a period of 70 years; in fact this VES is expected to have a project life of 8.5 years.

- *Land Use Assumptions* -- The cancer risk threshold is based on the most exposed individual, or "potential maximally exposed individual," who is assumed to be exposed continually for a 70-year lifetime (if the exposure occurs in a residential setting) or is assumed to be exposed for 8 to 9 hours a day, 50 weeks a year for 46 years (in commercial and industrial locations).

- *Cancer potencies* -- Cancer risk potencies of inhaled carcinogens are expressed in terms of unit risk factors that are derived from animal data, human epidemiological studies, and other data sources which typically employ conservative safety factors to address uncertainties in toxicological studies.

Of the above parameters, the project duration and land use assumptions represent the most obvious conservatisms in the risk assessment process since most projects (e.g., a VES) are not expected to emit pollutants for a period of 70 years and few residents would be expected to be exposed to such emissions for a 70-year period.

The SCAQMD Rule 1401 human health risk assessment approach also includes some factors that may contribute to an underestimation of excess cancer risk posed by an emissions source. These factors include the following:

- Rule 1401 omits pollutants that are treated as carcinogens by the US EPA but not by the SCAQMD, such as perchloroethylene, (PCE). However, the project description for this project requires that sampling and analysis occur for PCE.

- Rule 1401 has no framework for considering synergistic effects of various pollutants.

Cancer health risk using the SCAQMD Rule 1401 method was calculated for maximum residential and occupational (onsite and offsite workers) exposure. Results indicated the following maximum individual excess cancer risk for the range of VES control efficiency:

- Maximum Residential - 0.69 to 0.93 in one million
- Maximum Onsite Worker - 0.23 to 0.31 in one million
- Maximum Offsite Worker - 0.24 to 0.32 in one million.

These results reflect the use of the following conservative assumptions:

- Rule 1401 uses "worst-case" emissions of carcinogens that are unaffected by the increase in control treatment efficiency affecting

emissions of trichloroethylene and perchloroethylene (except vinyl chloride, which under the revised HRA is limited to 0.14 lbs./day in the "high efficiency" condition).
In fact, emissions of carcinogens are reduced below these levels by control technology efficiency.

- Rule 1401 assumes that emissions would take place over a period of 70 years, when the actual project life of the VES is expected by Lockheed to be 8.5 years

- Rule 1401 assumes that emissions of carcinogenic substances would be emitted at the stated rates for the lifetime of the project, when they are actually expected to decline after the first year or two.

- The analysis results assume only 50 percent air reinjection is achieved when Lockheed actually intends to operate the reinjection system so as to maintain the maximum percentage feasible of treated reinjected air.

An additional health risk assessment was completed to address the expected operating life of the proposed VES (8.5 years) and all toxic compounds, as identified in the Proposition 65 list of chemicals, detected in soils beneath the Plant B-1 site. Proposition 65 contains a more comprehensive list of chemicals than are contained on the SCAQMD Rule 1401 list (e.g., PCE is on the Proposition 65 but not the Rule 1401 list). The results of the assessment indicated that the maximum individual excess cancer risk for residential and worker receptors would be 0.08 and 0.046 in one million, respectively. These are substantially below the SCAQMD Rule 1401 threshold of one in one million. The impact would be adverse but not significant.

Hazard indices were calculated for the range of control efficiency associated with the proposed VES to assess chronic and acute non-cancer health risks. All results (Appendix C, Tables 6 and 7) were below the threshold of 1.0. Therefore, chronic and acute non-cancer health risks would be adverse but not significant impacts.

Stagnant Air Analysis

In its report of May 2, 1995, the Peartree Group was concerned about the effect of the VES system emissions on future development on the B-1 site during extended periods of stagnant air. Peartree also used the presence of smog as an indication of prolonged stagnant air conditions and suggested that potential impacts should be analyzed, particularly from the standpoint of future occupants, such as shop owners, on the Plant B-1 site spending up to 12 hours per day near the stack during prolonged stagnant periods.

The analysis suggested by Peartree is provided below in the section entitled "Potential Acute Health Risk In Low Air Flow Conditions". However, before providing this calculation, the following considerations are offered to assist in understanding that analysis and to put that analysis into perspective.

1. The Emission Plume Will Disperse Even In Conditions Of Extremely Low Air Flow

   The original question of stagnant air impacts may stem from an impression that the emission plume from the top of the stack needs air movement to disperse the emissions. In order for emissions to drift downward, more than ten percent of the plume would have to be composed of molecules that are heavier than air. In the case of the proposed project, only a trace amount of the plume will be composed of heavier-than-air molecules. Consequently, under the hypothetical assumption of no wind movement at all, the project plume would remain buoyant, meaning that it would disperse rather than falling to the bottom of the stack.

2. It Is Not Anticipated That The Entire Emission Content Will Consist of PCE, As Hypothetically Assumed In The Following Analysis

   The Peartree comments, submitted prior to Lockheed's amended project description, suggests analysis of a worst-case condition in which the entire 9.8 pounds per day of emissions consist of PCE. After these comments were made, Lockheed amended its project description to require regularly scheduled monitoring of stack emissions for PCE; after each stack sample, a cancer health risk assessment (CHRA) will be performed on PCE using the 8.5 year anticipated project life; if this HRA produces a cancer risk greater than one per million, the VES operations would have to be altered to bring the risk under one per million. While this requirement does not guarantee that PCE will not constitute the entire 9.8 pounds of emissions, it does ensure that PCE will not pose a significant cancer risk and further reduces the likelihood of a heavy predominance of PCE. In fact, it is anticipated that PCE will constitute about 38 percent of average daily emissions.

Potential Acute Health Risk Under Stagnant Conditions

The acute hazard index of 0.0017 was predicted to occur at a wind speed of 1.0 m/s. Winds with speeds less than 1.0 m/s are designated as calm and are not normally considered in estimating ground level concentrations since dispersion models such as those used in the health risk assessment are not accurate under these

conditions. These models assume that concentrations are inversely proportional to wind speed, hence predicted concentrations approach infinity as the wind speed approaches zero. At sufficiently low wind speeds, the model assumptions break down since these +models can predict ground level concentrations that are higher than the concentration measured in the stack.

Concern was also raised that during calm periods, contaminants would diffuse in all directions including straight down towards the base of the stack and that this might result in concentrations greater than those predicted by the model. This problem can be addressed by considering a situation in which emissions are diffusing away from the stack equally in all directions.

A dispersion model can be used to determine the concentrations within a single plume at a distance of 15 meters from the stack. Such a plume was modeled assuming a wind speed of 1.0 m/s or 2.2 miles per hour. As the contaminants travel away from the stack, the plume will spread outward such that it resembles a cone whose apex is located at the release point. Based on model results, by the time the plume has traveled 15 meters away from the stack, contaminants will occupy an area roughly 7 meters in diameter. The average concentration within the plume at a distance of 15 meters from the release point at an emission rate of 1 g/s will be less than 10,000 ug/m^3. Since this analysis considers extremely low wind speeds, this concentration can be corrected to one that reflects a wind speed of 0.01 m/s by again assuming that they are inversely proportional to wind speed. Under these conditions, the average dispersion coefficient across the plume at a distance of 15 meters can be estimated at 1,000,000 $(ug/m^3)/)g/s)$.

Since emissions from the stack are assumed to be traveling in all directions, their dispersion can be approximated by a series of plumes such as that described above that together occupy a sphere with a radius of 15 meters, centered at the release point. Such a sphere would have a surface area of 2827 m^2 and could contain as many as 18 plumes. Assuming that the system emits 9.8 lb/day (0.051g/s) of perchloroethylene, the emission into each plume will be 0.00283 g/s (0.051/18). The average concentration of perchloroethylene at a distance of fifteen meters from the stack (including straight down) can be calculated as:

$$0.00283 \text{ g/s} \times 1{,}000{,}000 \ (ug/m^3)/(g/s) = 2830 \ ug/m^3$$

At this concentration, the hazard index would be 0.41, less than one half of the level considered significant.

Peartree discusses the need to compare projected concentrations with various guidelines. Since these guidelines are expressed in micrograms per liter (ug/l), the result from the analysis above must be divided by 1,000 to 2.83 ug/l.

The Occupational Safety and Health Agency (OSHA) standard for workers exposed eight hours per day is 170 ug/l. Consequently, the projected concentration of PCE using the hypothetical condition described above, (2.83 ug/l), would be 0.017 of the OSHA standard; stated differently, the OSHA standard would be 60 times higher than the projected PCE emission under hypothetical low-flow air movement conditions.

Since OSHA standards assume that workers are not sensitive receptors, like asthmatics, the projected PCE concentrations should also be compared with another standard known as reference exposure level (REL). The REL standard is lower than the OSHA standard to account for sensitive receptors and longer, non-occupational exposure periods. The REL for PCE is 6.8 ug/l, which is still 2.4 times greater than the PCE concentration of 2.83 ug/l projected for low air flow conditions.

Finally, Peartree also mentions the ATSDR's minimum risk level of 4 ug/l for acute exposure which assumes 24-hour exposures and incorporates a safety factor of ten to account for variations in human susceptibility. Again, this threshold, with a safety factor of ten, is greater than the 2.83 ug/l projection.

Because these risk thresholds are all higher than the projection resulting from the analysis of hypothetical low-air-flow conditions, the potential health impacts during stagnant air conditions are considered insignificant.

Microorganisms

A concern has been raised by agencies and the public about the possibility of fungi and other microorganisms posing a health risk as pollutants in emissions from the proposed VES. In general, exposures to fungi, bacteria, and other microbes through this pathway could conceivably result in respiratory infections or immunotoxic effects. The potential for such health risks to be posed by the VES, however, is greatly reduced by the following considerations:

- Exposure to microorganisms through the air pathway has been associated with activities at landfills, where the high-organic content of decaying household and other wastes readily supports the existence of microorganisms. No such compost sources are known to exist at the Lockheed B-1 site, and native microorganism populations are expected to be orders of magnitude less concentrated at the Lockheed site than at most municipal landfills.

- Microorganisms rely on the availability of moisture and organic materials to survive and reproduce. Operation of the 6,000 SCFM-VES represents a high air flow that is expected to desiccate (dry out) any microorganisms

that are introduced into the VES, which in turn renders them non-viable. This would also prevent clogging of the system.

- Exposure to microorganisms through the air pathway is considered to be insignificant compared to other pathways associated with infection from microorganisms.

The potential for such health risks to be posed by the VES is therefore considered to be negligible for the above reasons.

3.4.2 Mitigation Measures

No mitigation measures are required due to the features proposed by Lockheed in the Project Description, including:

- Design capacity for reinjection of up to 70 percent of treated air (commitment by Lockheed for at least 50 percent reinjection with up to 70 percent where feasible).

- Emissions monitoring during startup (weekly) and operation (monthly for 6 months with reduced frequency thereafter) for perchloroethylene, trichloroethylene, vinyl chloride, and carbon tetrachloride; monitoring data shall be used to recalculate health risk (using the 8.5-year project lifetime) to ensure that the one-in-one million significance threshold is not exceeded.

- Continuous automated emissions monitoring for volatile organic compounds

- Vinyl chloride limited to 0.14 pounds per day

- Required modeling for Rule 1401-regulated compounds (vinyl chloride, TCE and carbon tetrachloride) to ensure that the risk factor assuming a 70-year project lifetime does not exceed one per million

- Emissions limit of 9.8 pounds of VOCs per day

- Programmable logic controllers that can automatically alter or shutdown facility operation in the event of problems

- A carbon polishing unit to treat soil vapors if the mass concentration of the stack discharge flow is too high

- Independent emissions monitoring

- A 50-foot exhaust stack
- A maximum air flow rate of 6,000 standard cubic feet per minute
- For at least the first six months, shortening granulated activated carbon adsorption times to 2 hours per day between regeneration cycles to prevent breakthrough saturation of the carbon beds
- Control of flow quantities by valve adjustments and blower speed adjustments

3.4.3 Residual Impacts

Due to the safety features incorporated in the project description, no significant impacts are expected.

3.5 HEALTH RISK HAZARDS

The Initial Study prepared in May identified upset conditions (accidents) resulting in health risk exposure as a potentially significant impact. A detailed evaluation of this concern is provided in Appendix D. The following discussions abstract information from the appendix.

3.5.1 Evaluation

3.5.1.1 Upset Scenarios

Chemical hazards during upset conditions include flammability, reactivity, and toxicity. A discussion of each of the hazards posed by upset conditions is described below.

Flammability Hazards

In the case of gases or vapors that form flammable mixtures with air, oxygen, or other oxidizers, there is a minimum concentration below which propagation of a flame cannot occur. There, likewise, is a maximum concentration above which propagation of flame cannot occur. These boundary concentrations are known as the "lower and upper flammable or explosive limits" and are typically expressed as percent by volume of the material in air. A mixture of chemicals below the lower flammable limit is too "lean" to burn, while a mixture of chemicals in air above the upper flammable limit is

too "rich" to burn. All concentrations of a gas or vapor in air that exist between their flammable limits are ignitable.

Trichloroethylene is useful as a flammability hazard indicator because it represents the substance with the highest influent concentration into the VES for which there is a published lower explosivity limit. The influent concentration of trichloroethylene in the VES equates to approximately 391 parts per million. The influent concentration of trichloroethylene would have to be increased by a factor of 205 to approach the lowest concentration of trichloroethylene in air that can support ignition. Because airborne concentrations of the remainder of substances in the VES are on the order of fractions of parts per million, and because it is believed to be unlikely that influent trichloroethylene concentrations would increase by a factor of over 200, it is not anticipated that soil vapors feeding into the VES or being emitted from the VES would pose flammability hazards.

Chemical Reactivity and Compatibility Hazards

The potential for chemical incompatibilities is posed by mixing acetone and chloroform and acetone with methyl chloroform (1,1,1-trichloroethane) in an alkaline environment. Many of the chemicals that would be treated by the proposed VES are incompatible with metals and oxygenated compounds under certain conditions. Because routine operation of the VES would not involve alkaline conditions or the potential for interaction with metals or oxygenated compounds, it is believed that the risk of upset conditions posed by chemical incompatibilities is highly unlikely.

Toxicity Hazards

Upset conditions may result in exposure to high-concentrations of contaminants that occur over a relatively short time period. For the proposed VES, toxicity hazards pose a potential concern as an upset scenario because of the nature of the chemicals to be treated. As explained in the Project Description, Lockheed will submit an Emergency Response Plan, to the satisfaction of the Fire Chief, which demonstrates how emergency response agencies would be deployed in the event that the recovered liquid contaminants spill, either on site or in transit.

Agencies have established levels of concern for emergency situations at which it is believed populations must take protective action to avoid unacceptable exposures. Exposure criteria relevant to the proposed VES include:

- The Emergency Response Planning Guidelines (ERPG)-1 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing any

effects other than mild transient adverse health effects or perceiving a clearly objectionable odor.

- The ERPG-3 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

- An Emergency Exposure Guidance Level (EEGL) is defined as the concentration of a substance in air judged by the Department of Defense to be acceptable for the performance of specific tasks by military personnel during emergency conditions lasting from one to 24 hours. Exposure to an EEGL is not considered to be safe, but is considered to be acceptable when the exposure occurs in the context of preventing greater risks, such as fires or explosions. Exposures at the EEGLs may produce transient central nervous system effects or irritation of the eyes or respiratory system, but are not considered to be serious enough to prevent proper responses to emergency conditions.

3.5.1.2 Analysis

For the purpose of this hazards analysis, the credible "worst case" release was based on a scenario in which the "breakthrough" of the activated carbon system might occur in the VES, and the system continued to release contaminants at the design flow rate of 6000 SCFM for one hour before being shut down. The flow rate of 6000 SCFM was based on the rate established for the first half-year of system operation, and the continued operation of the VES after breakthrough of the activated carbon system assumes that alarm systems fail to shut down the VES automatically. Input concentrations and flow rates were used in the Emergency Prediction Information Code mode to estimate maximum downwind concentrations posed by the release of contaminants under the prescribed worst case scenario.

The worst-case assumption of un-treated emissions for one hour is based on the back up system to the automatic shut-down feature. As described in the Project Description,
the operations monitoring system shall have an alarm system at a City facility with personnel on duty 24 hours per day. The alarm would notify City personnel of a condition in which emissions in excess of 9.8 pounds VOC occurred. Lockheed shall also supply a second signal to a City facility with 24 hour personnel which indicates

that the facility has been shut down. Lockheed shall provide personnel on duty 24 hours per day to ensure that manual shut down of the plant can be achieved within one hour of the breakthrough in the event that the automatic shut down feature fails. Should the system have to be shut down manually, Lockheed shall notify the City of such shut down within one hour of the exceedance.

Maximum downwind concentrations for each contaminant are presented in Tables 3-1 and 3-2 for comparison to their respective level of concern values. The results of air modeling of chemical releases for each of the VES substances under worst-case conditions indicate that no level of concern is exceeded for any VES chemical. Therefore, no significant impacts to public health are expected.

3.5.2 MITIGATION MEASURES

No mitigation measures are recommended.

3.5.3 RESIDUAL IMPACTS

No significant residual impacts would occur for health risk hazards.

TABLE 3-1

Impacts of One-Hour Releases of Chemicals with ERPG or EEGL Values

Chemical	ERPG-1	ERPG-3	60-minute EEGL	Maximum Downwind Concentration (One-Hour Release)
Acetone	NA	NA	8,500 ppm	0.013 ppm
Benzene	25 ppm	1000	1000 ppm	0.049 ppm
Carbon tetrachloride	20 ppm	750	NA	< 0.001 ppm
Chlorobenzene	1 ppm	25 ppm	NA	< 0.001 ppm
Chloroform	NA	NA	100 ppm	0.001 ppm
Chlorotrifluoroethyle	20 ppm	300	NA	< 0.001 ppm
1,1-Dichloroethene	NA	NA	10 ppm (24 hr)	0.002 ppm
Methylene chloride	200 ppm	4000 ppm	NA	< 0.001 ppm
Styrene	50 ppm	1000 ppm	NA	0.037 ppm
Toluene	50 ppm	1000 ppm	NA	< 0.001 ppm
Xylenes	NA	NA	200 ppm	< 0.001 ppm

TABLE 3-2

Impacts of One-Hour Releases of Chemicals with Occupational Exposure Limit Bases

Chemical	Exposure Criteria	Maximum Downwind Concentration (One-Hour Release)
Bromodichloromethane	0.45 ppm	0.0015 ppm
Bromoform	1.5 ppm	0.001 ppm
Bromomethane	200 ppm	0.0027 ppm
2-Butanone	300 ppm	0.0088 ppm
Chloroethane	3000 ppm	< 0.001 ppm
Dibromochloromethane	0.8 ppm	< 0.001 ppm
1,2-Dichloroethane	100 ppm	< 0.001 ppm
1,1-Dichloroethane	400 ppm	< 0.001 ppm
1,2-Dichloroethene (Total)	400 ppm	0.019 ppm
1,2-Dichloropropane	200 ppm	< 0.001 ppm
cis-1,3-Dichloropropene	3 ppm	0.0023 ppm
Ethyl benzene	200 ppm	< 0.001 ppm
Freon-11	1000 ppm	0.0024 ppm
Freon-113	1250 ppm	< 0.001 ppm
Freon-12	5000 ppm	< 0.001 ppm
2-Hexanone	500 ppm	0.0025 ppm
4-Methyl-2-pentanone	300 ppm	0.0063 ppm
Perchloroethylene	200 ppm	61 ppm
1,1,2,2-Tetrachloroethane	15 ppm	0.0038 ppm
1,1,2-Trichloroethane	50 ppm	< 0.001 ppm
1,1,1-Trichloroethane	450 ppm	0.0018 ppm
Trichloroethylene	200 ppm	4.0 ppm
Vinyl chloride	15 ppm	0.0073 ppm

4.0 CUMULATIVE IMPACT EVALUATION

CEQA requires identification and analysis of cumulative impacts. Cumulative impacts are those impacts that when evaluated for individual projects are not considered significant, but when considered together with other projects are considerable. The following evaluation is focused on public health risk associated with the proposed project in combination with other past, present, and reasonably foreseeable projects (Note: Effects of past and present projects are part of existing environmental conditions).

4.1 CUMULATIVE PROJECTS

4.1.1 Proposed Projects and Land Use Projections in Burbank

Projects that are proposed but not yet constructed were identified by the City of Burbank Planning Department (Table 4-1). All of these projects lie within a 2-mile radius of the Lockheed Plant B-1 site and are located in the City of Burbank (Figure 4-1). A 2-mile radius was used because this is twice the distance over which potential emissions from the Lockheed B-1 VES would be highly diluted as a result of dispersion through air and not be expected to combine with emissions from other proposed projects beyond this distance to produce synergistic contaminant levels that would pose a significant health risk. The numbered locations on Figure 4-1 coincide with the project number for the proposed projects listed in Table 4-1. The proposed projects include a wide range of development types including apartments, single-family residences, commercial/small businesses, retail stores, restaurants, and storage facilities. Potential sources of health risk from most of the proposed projects are generally not known at this time because specific plans have not been developed (these proposed projects are undergoing zoning requirement review and are preliminary in nature); where known, the sources are indicated in Table 4-1. A supplemental list of anticipated development projects is included in Table 4-2. The numbered locations on Figure 4-2 coincide with the project number for the proposed projects listed in Table 4-2.

A summary of land use projections developed by the City of Burbank is also included (Table 4-3) to describe the anticipated trends and changes in land use patterns within the City. The table shows base year land use types in thousands of square feet for the year 1990 and the additional (or lesser) amount anticipated for the years 2000 and 2010. The projections for the year 2010 extend several years beyond the anticipated 8.5-year operational life of the proposed VES.

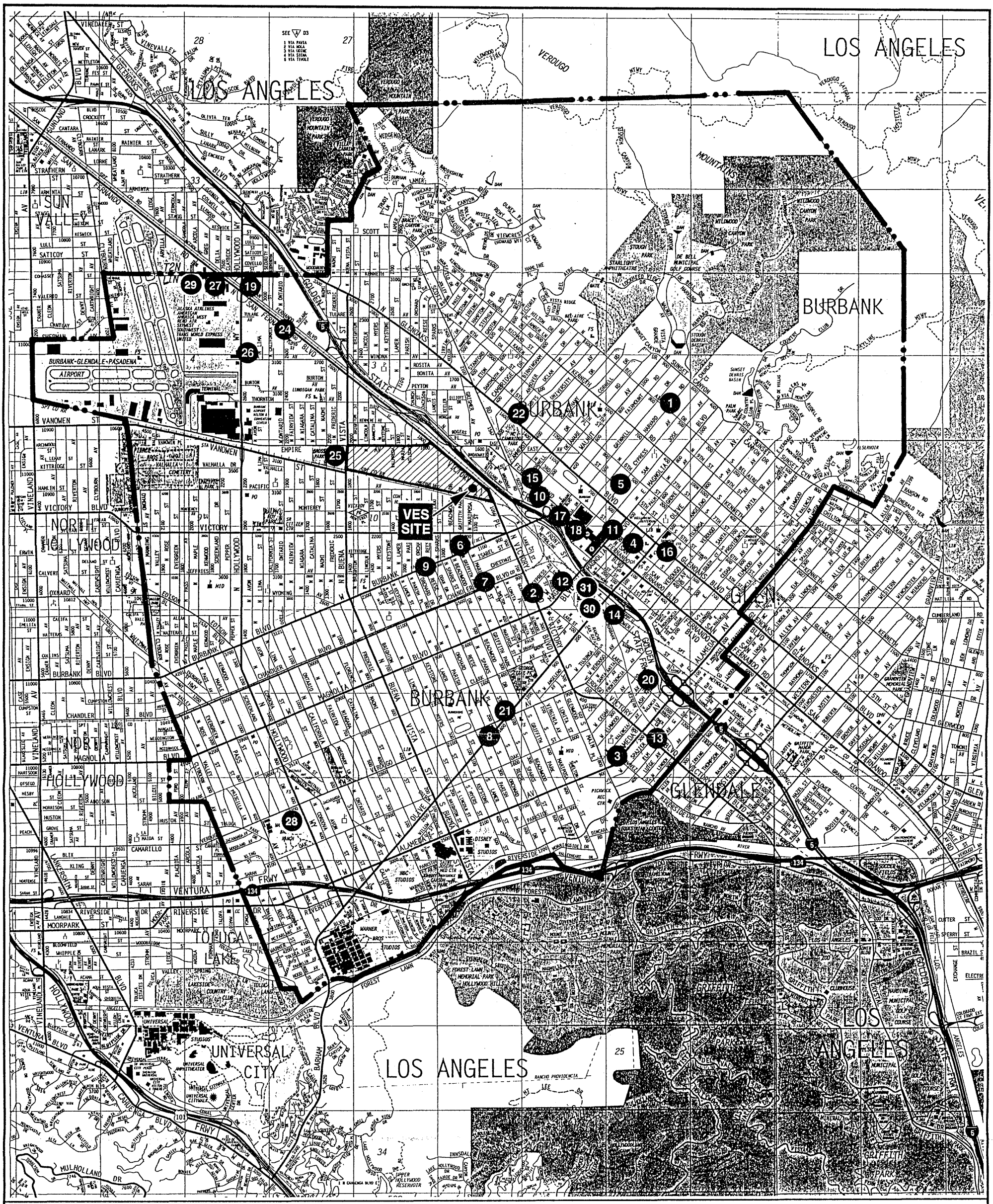


Figure 4-1

CUMULATIVE PROJECT LOCATIONS

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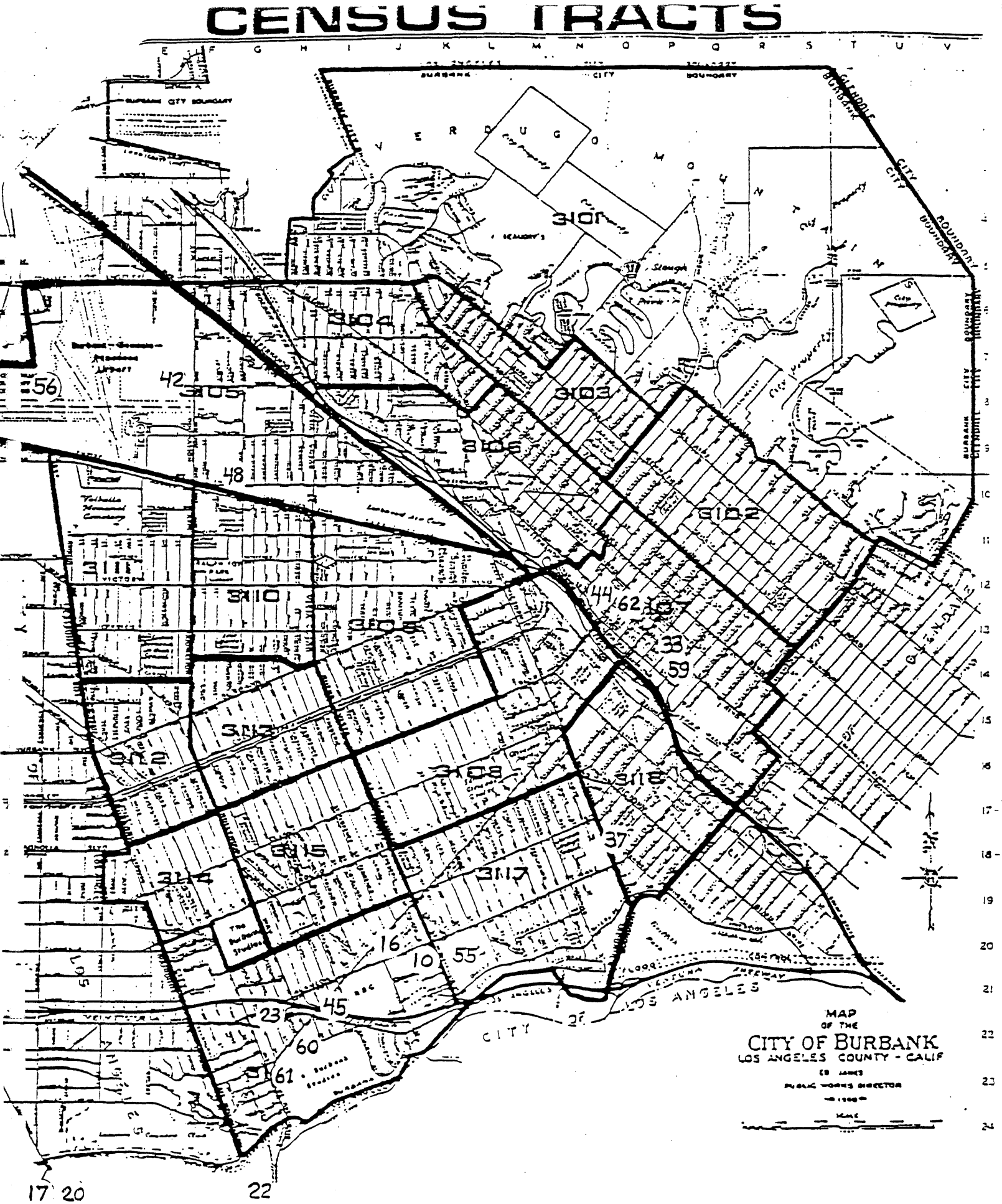


Figure 4-2
Supplemental Cumulative Project Locations

4.1.2 Other Vapor Extraction Systems in Burbank

There are six other similar vapor extraction systems proposed or in operation within the City of Burbank within a two mile radius that the City is aware of. In addition, although not a Vapor Extraction System, the Burbank Operating Unit Water Treatment project, near Hollywood Way and Victory, ordered by the United States Environmental Protection Agency includes a granulated activated carbon treatment unit for the removal of VOCs which will emit small quantities of VOCs. The City of Burbank case numbers were not available for these projects because City permits/approvals were not required or because these projects are still in the initial pre-planning stage. Each proposed VES is discussed individually below (Douglas Wood & Associates, 1995).

Weber Aircraft proposes to build a VES with a flow rate through the proposed system listed at a maximum of 500 cubic feet per minute (cfm). This would result in the generation of approximately 0.8 pound of reactive organic gases (ROG) per day. Toxic emissions from the facility would include PCE and TCE. A Permit to Construct was issued but no VES has been constructed. The applicant has submitted a second application to renew the project because the Permit to Construct has expired.

Lockheed Building 175/180 is under consideration for installation of a VES to remove VOCs similar to those found at the eastern end of the Lockheed Plant B-1 site. This temporary trailer-mounted system would operate at less than 300 cfm for a period of approximately nine to twelve months; however, no pollutant emissions would be discharged to the atmosphere from this facility because of a 100 percent reinjection of the treated effluent into the soil according to Lockheed.

Lockheed Plant B-6 Site is under consideration for installation of a VES to remove VOCs similar to those found at the Lockheed Plant B-1 and Lockheed Building 175/180 sites. This system would operate at less than 1000 cfm with a 100 percent reinjection of the emissions into the soil according to Lockheed; as such, no pollutant emissions would be discharged to the atmosphere from this facility.

Aviall Services Facility is currently awaiting a Permit to Construct a proposed VES pending approval by the SCAQMD. This facility would be used to extract and treat vapors with vented flows not to exceed 300 cfm. This would result in the generation of approximately 0.5 pound of ROG per day.

Regional Intermodal Transportation Center (RITC). The City's RITC is located on Front Street between Magnolia Boulevard and Olive Avenue. In 1992, a VES system was installed. The clean up of this site is almost complete and the system is scheduled to be removed in 1996. The operation of the Lockheed VES is not expected to coincide with that of the RITC VES; it is mentioned here only as a point of information.

Sanwa Bank Site. The City is considering acquisition of a site between the RITC and the City's Public Service Department yard currently owned by Sanwa Bank. This site may undergo remediation by way of a VES. System design operational characteristics and emission volumes are preliminary; however, the emissions are expected to be negligible.

4.2 CUMULATIVE HEALTH RISK

Impacts on public health caused by existing concentrations of toxic air contaminants have been evaluated at various locations within the South Coast Air Basin. Based on the concentration of toxic air contaminants in Burbank, the existing potential health risk could be as high as 1,300 per million (SCAQMD, 1994), a significant existing cumulative risk. There are many sources of emissions that contribute to the estimated current health risk, such as vehicular combustion and industrial processes. Due to the nature of the geography, population distribution, and meteorology of the Basin, the ambient levels of toxic air contaminants are concentrated by the same lack of dispersion that causes smog and other air pollution problems.

The risk to public health caused by ambient concentrations of toxic air contaminants is an issue faced by most urban regions of the U.S. Increasing attention to this problem has resulted in several state and federal programs to assess the impact of toxic air contaminants in the air and control the sources of these emissions. Future development in the vicinity would be required to implement Best Available Control Technology for Toxics (T-BACT), where applicable, for stationary sources of toxic air contaminants emissions (SCAQMD Rule 1401). Existing sources of toxic air contaminants would also have to implement emission control measures and install control equipment according to local and federal air pollution programs (SCAQMD Rule 1402, and Title III of the Federal Clean Air Act of 1990). The clean fuels program of the Clean Air Act would result in reductions of toxic air contaminants from vehicles powered by the combustion of fossil fuels; a large portion of toxic air contaminants emissions are attributable to mobile sources. Even with the required controls and future efforts to reduce emissions from stationary and mobile sources, the remaining risk to public health would continue to be significant.

Because it is not possible to completely eliminate emissions of toxic air contaminants from many activities or industrial processes, the proposed Lockheed VES and the projects listed in Tables 4-1, 4-2, and 4-3 are expected to individually and cumulatively contribute a minor amount to local significant concentrations of these compounds in the air within the City of Burbank. Although the individual public health risk impact of the proposed Lockheed VES would not be significant, it would represent a negligible contribution to existing and future significant cumulative public health risk.

Six other VES projects with the potential to pose cumulative health risks in conjunction with the Lockheed VES have been identified. Two of the projects are VESs for other Lockheed facilities, which are expected to involve 100 percent reinjection of all emissions into the soil. The other two proposed VES projects are the Weber Aircraft Facility and the Aviall Services Facility. These systems are expected to emit approximately 0.8 and 0.5 pounds of VOCs per day, respectively. The 100 percent reinjection of emissions into the soil is expected to result in negligible emissions of VOCs from the two Lockheed systems, while the emissions from the Weber Aircraft and Aviall Services facilities would be expected to be a fraction of those estimated for the Lockheed B-1 VES. As discussed above, the VES system at the City's Regional Intermodal Transportation Center (RITC) is expected to be termined before the Lockheed system begins operation. The site west of the RITC owned by Sanwa Bank will require soil remediation. (But it has not yet been determined whether that remediation might be by VES and, if so, whether there would be any emissions). The specific Remedial Action Plan is pending Regulatory Agency review and approval. However, a VES will be proposed for this site with emissions at a N/D level.

The Weber Aircraft and Aviall Services facilities VESs are located 1 + mile north-northwest of the proposed Lockheed B-1 VES. The prevailing wind directions in the area are from the east, southeast, and south. It is not expected that emissions from the three facilities would be dispersed in a manner such that they would combine with each other to produce contaminant levels which would pose a significant risk for the following reasons:

- The prevailing wind directions indicate that potential receptors immediately downwind from the Lockheed B-1 VES would not be exposed to the additional VOC emissions from the Weber Aircraft and Aviall VES;

- The 1 + mile distance separating the Lockheed B-1 VES and the other two VES should provide considerable dilution of emissions (as a result of dispersion through air) from the Lockheed B-1 facility in areas where receptors downwind from all three VESs may be exposed to these emissions;

- Emissions of VOCs from the Weber Aircraft and Aviall VESs represent supplemental exposure sources equivalent to about 8 percent and 5 percent, respectively, of the original Lockheed B-1 VES VOCs quantity released from a distance of more than 1 mile upwind from these VES units, indicating that exposures to potential receptors downwind of all three units would be expected to be much lower than exposures to potential receptors located immediately downwind from the Lockheed B-1 VES.

It is expected that emissions from the Weber Aircraft and Aviall VESs would undergo the same SCAQMD Rule 1401 health risk assessment as was performed for the Lockheed B-1 VES prior to receiving permits to operate their facilities.

4.3 CONCLUSION

The proposed VES, as described in the project description of this Draft EIR, would be a negligible contributor to the existing air toxics in the Burbank area. The project, as mitigated, will not reduce the pre-existing, cumulative significant air toxics impact that effects both the citizens of Burbank and the citizens of all of Southern California. SCAQMD's "CEQA Air Quality Handbook" offers three approaches for determining the cumulative significance of a "land use project". Unfortunately, this handbook offers no guidance for evaluating the cumulative significance of a vapor extraction system. Consequently, this analysis determines the significance of the proposed project using three different methodologies.

SCAQMD Practice

When SCAQMD is the Lead Agency on a project, it finds that there are no significant impacts, either individually or cumulatively, if the project is within SCAQMD's project-specific significance thresholds. As discussed throughout this EIR, SCAQMD has found that the impact of a project is not significant if the health risk is less than one in one million.

Proportionate Change

A Lead Agency can decide that a slight increase in impact is not cumulatively significant even when exceedances of significance have been created by other projects. For example, at least one city in Southern California determines that a development project does not cause significant impact to an intersection projected to operate at a significantly-impacted level of service, even without additional traffic associated with the project, if the project traffic represents less than 0.02 of the volume-to-capacity ratio of that intersection.

The background cancer incidence in the United States is 1 in 3 or 333,333 per million; this can also be expressed as 0.333333. The one excess cancer risk per million people potentially exposed to emissions from this project is 0.000001, which is a negligible fraction of the 0.333333 background risk. Since this project is not permanent, (an 8.5 year project life is expected), and since this project is an environmental remediation project ordered by the RWQCB, the City of Burbank finds that this fractional increase in risk is not significant.

Adaptation Of Determination Used For Land Projects

As mentioned above, the SCAQMD's "CEQA Air Quality Handbook" provides three ways for determining the cumulative impact of a "land project". While they were not designed for analyzing a VES system, these methods can still provide some guidance.

- One method offered by SCAQMD states that the vehicle miles traveled per capita should not increase. In other words, this method would not consider permanent increases in emissions to be a significant cumulative impact as long as this permanent increase does not exceed the rate of population growth.

- The second method states that the cumulative impact would be insignificant if the traffic-related project emissions were reduced by an average of one percent per year by the year 2010.

- Finally, the third method calls for achieving the Regulation XV goal of 1.5 occupants per vehicle. In other words, this method allows for permanent increases in emissions as long as benefits occur through increased average occupants per vehicle.

The proposed project compares very well using the goals for any of these three examples of cummulative impact. The impacts will not be permanent since the project life is expected to be 8.5 years. Furthermore, the impacts will decline even during the 8.5 year project life as fewer contaminants are left to remove; (the 9.8 pounds per day is a maximum output - the actual output will be greatly reduced after the first few years of operation). In fact, the project far exceeds the goals of a one percent per year reduction by the year 2010; since it will not be in operation in the year 2010, it will generate zero emissions by that target date.

For these reasons, the City finds that the cumulative impacts of this project are not significant.

TABLE 4-1

CUMULATIVE PROJECTS IN THE AREA

Project No.	City of Burbank Case No.	Location	Brief Description	Possible Health Risk Sources
1	DR 94-3 w/ PD 94-2	1250 Harvard Road	Permit to rebuild existing restaurant after fire damage	
2	DR 94-16 w/ GPA 94-2; ZMA 94-1	415-506 N. Victory	11,224 sq. ft. single tenant retail building; no tenant identified; no permits issued	
3	DR 94-17 w/ CUP 94-24	434 W. Alameda	4500 sq. ft. 2-story credit union with parking lot and landscaping	Central Air
4	DR 94-18	Corner of 3rd and Orange Gr.	Approx. 120,000 sq. ft. headquarters for police/fire department for city	Central Air
5	DR 94-20	551 E. Cypress Ave.	New 7-unit apartment building. Not yet approved, no plans submitted	
6	DR 94-21	1120 N. Griffith Park Dr.	Addition of a multi-family unit to existing single family unit	
7	DR 94-22	710-730 N. Mariposa	11,022 sq. ft. office - warehouse building, no tenant identified, February 1995 deadline for permit	
8	DR 94-25	1701 W. Olive	Enclose existing McDonald's playland; in progress	
9	DR 94-26	900 W. Burbank	1,741 sq. ft. McDonald's; complete	
10	DR 95-1 w/ VAR 94-15	1100 N. San Fernando	Approx. 750 sq. ft. storage building for Hughes Market for soft drinks; permit denied.	
11	DR 95-2 w/ PD 95-1	Corner of Magnolia and 3rd	Mixed use development to include 144 apartments for senior citizens, 62,000 sq. ft. retail center w/ restaurants, and 600 space parking garage	Central Air
12	DR 95-3	446 N. Varney	650 sq. ft. room addition to existing home	None expected
13	DR 95-4	1119 S. Victory	Approx. 5000 sq. ft. of office space (70%) and studio and prop storage (30%) for production company	
14	DR 95-5	225 S. Flower St.	6,232 sq. ft. heavy equipment repair/storage facility	Solvents, petroleum products

Project No.	City of Burbank Case No.	Location	Brief Description	Possible Health Risk Sources
15	DR 95-6	1172 N. San Fernando Blvd.	Enclose existing McDonald's playland; currently on hold; solvents, petroleum products	
16	DR 95-7	201 S. Glenoaks	New Kentucky Fried Chicken restaurant; not approved	
17	DR 95-8	Media City Center 1st & San Fernando Bl.	5000 sq. ft. restaurant, no tenants identified; no plans submitted	
18	DR 95-9	Media City Center 1st & San Fernando Bl.	1500 sq. ft. restaurant, no tenants identified; no plans submitted	
19	DR 95-10 w/ CUP 95-8	3098 N. Avon	Approx. 350 sq. ft. storage building for cellular telephone equipment w/ 77'high monopole for signal relay	
20	DR 95-11	422 E. Elmwood	Four unit apartment to be added to two unit apartment; 3500 sq. ft. total	Solvents, petroleum projects
21	DR 95-12	1400 W. Olive	Approx. 2300 sq. ft. hamburger place w/ 23 parking spaces	
22	DR 95-13	1515 N. Glenoaks	Addition of 1600 sq. ft. tennis center including four new courts and associated facilities to Cambridge Park. A new parking lot will be added.	
23	DR 95-14	1st & San Fernando Bl.	Approx. 2900 sq. ft. IN-N-OUT restaurant; in plan check.	
24	N/A	2820 Ontario St.	Weber Aircraft Vapor Extraction System	Approx. 0.8 pound of ROG per day.
25	N/A	Empire Ave and Buena Vista	Lockheed Building 175/180, Vapor Extraction System w/100% reinjection of all emissions into the soil.	
26	N/A	2801 N. Hollywood Way	Lockheed Plant B-6 site Vapor Extraction System w/100% reinjection of all emissions into the soil	
27	N/A	311 Kenwood Street	Aviall Services Facility Vapor Extraction System	Approx. 0.5 pound of ROG per day

Project No.	City of Burbank Case No.	Location	Brief Description	Possible Health Risk Sources
28	PD 94-7 PD 94-8	Olive Ave. at Hollywood Way (Main Lot) Hollywood Way at Oak St.	20-yr. Master Plan for 3.3 million sq. ft. expansion of Warner Bros. Main Lot & Ranch	
29	PD 89-7	Empire at Ontario	650,000 sq. ft. office complex with incidental retail	
30		Front St. between Olive & Magnolia	Small VES scheduled for termination 1996	
31	N/A	Olive Ave. at Flower St.	Future development of parking lot/ shuttle terminal may require VES	

Source: City of Burbank, Community Development Department, 1995.

Table 4-2
Supplemental List of Cumulative Development Projects

September 1, 1994

MAP NO.	DEVELOPER	DEVELOPMENT TYPE	TOTAL SF	STATUS	ADDITIONAL SF TO BE OCCUPIED BETWEEN 5/1/93 AND 1/1/96
10	St. Joseph North	Med. Offices	178,000	Construction	178,000
16	Foto-Kem	Offices/Tech. Space	61,000	Anticipated	61,000
17	Taft Entermt. Center	Offices	278,200	Proposed	278,200
18	3280 Cahuenga	Offices	16,000	Proposed	16,000
19	3301 Barham	Offices	22,000	Proposed	22,000
20	Cahuenga Plaza	Retail	10,000	Proposed	10,000
		Offices	8,000		8,000
21	10380 Ventura Blvd.	Offices	58,500	Proposed	58,500
22	MCA Development	Offices	430,000	Anticipated	0
23	Beth Anderson Office	Offices	38,128	Proposed	38,128
33	Holiday Inn Towers 3, 4	Hotel	390 rooms	Proposed	172 rooms
37	SE Elmwood/Main	Offices	58,000	Proposed	58,000
42	Airport Terminal Reloc.		500,000	Proposed	0
44	Media City Center	Retail	801,844	Built	801,844
		Furniture (Ikea) Store	239,995	Built	239,995
		Restaurant	11,000	Built	11,000
		Restaurant	14,000	~~Proposed~~ Built	14,000
		~~Office~~	~~350,000~~	~~Proposed~~	~~350,000~~
		Add'l Retail	95,000	~~Proposed~~ Built	95,000
45	NBC Plaza/Cushman	Office	688,000	Proposed	688,000
		Retail	15,000	Proposed	15,000
		Restaurant	5,000	Proposed	5,000
48	Empire Ave. Dev. Site (Bldg. 85)	R & D Off.	650,000	Anticipated	650,000
		Child Care	5,000	Anticipated	5,000
55	Disney Studio Master Plan	Phase I			
		Stages/shops	381,600	Proposed	0
		Employee center	297,389	Proposed	0
		Prod. bldg.	225,000	Proposed	0
		Creative arts I	255,000	Proposed	0
		Creative arts II	204,000	Proposed	0
		Central plant	13,000	Proposed	0
		Phase II			
		Admin. bldg.	316,406	Proposed	0
		Hyperion bldg.	253,125	Proposed	0
		Tech. bldg.	105,469	Proposed	0
		Subtotal	2,050,989		
		Less on-site demolition	241,319		
		Total net increase	1,809,670	Proposed	1,809,670
		Of the above completed or under construction (net of demolition)			273,000

LIST OF CUMULATIVE PROJECTS
September 1, 1994

MAP NO.	DEVELOPER	DEVELOPMENT TYPE	TOTAL SF	STATUS	ADDITIONAL SF TO BE OCCUPIED BETWEEN 5/1/93 AND 1/1/96
56	Martin Aviation	Replacement of exist. hangar & terminal			
		New hangar & terminal	412,000	Proposed	
		Exist. hangar & terminal	312,000		
		Net increase	100,000	Proposed	100,000
59	Verdugo Twr. Sr Hsg.	Residential	121 du	Construction	121 du
60	Warner Bros. Bridge Bldg.	Office	275,000	Built	275,000
61	Warner Bros. Screening Theater	Theater	500 seats	Construction	500 seats
62	City Center Mixed Use Project (Pic-N-Sav)	Sr. housing	177 du	Anticipated	174 du
		Retail	42,000	Anticipated	62,000
		Public parking	300	Anticipated	300

TABLE 4-3

LAND USE PROJECTIONS

Building Type	1990	2000		2010	
	Existing	New	Total	New	Total
DWELLING UNITS					
Single Family Units	18,436	114	18,550	113	18,669
Mulit Family Units	22,780	3,886	26,666	3,887	30,553
TOTAL	**41,216**	**4,000**	**45,216**	**4,000**	**49,216**
OTHER BUILDINGS (THOUSANDS OF SQUARE FEET)					
General Office	12,960	5,428	18,388	5,429	23,817
Retail Wholesale	3,208	1,960	5,168	1,956	7,124
Retail Service	2,244	1,474	3,718	1,466	5,184
Manufacturing	11,090	-1,595	9,495	-1,599	7,896
Warehouse	1,701	345	1,356	-347	1,009
Mediacl	309	0	309	0	309
Government	303	0	303	0	303
Studio	492	99	591	98	689
Entertainment	37	0	37	0	37
Church	314	0	314	0	314
School	1,567	-11	1,556	-12	1,544
Convalescent/Retirement Home	436	0	436	0	436
TOTAL	**34,661**	**7,000**	**41,661**	**7,000**	**48,661**

5.0 ALTERNATIVES

5.1 NO PROJECT

Under the No Project alternative, the proposed VES would not be built and the project site would remain in its current contaminated condition. As a consequence, the potential adverse and beneficial impacts of the proposed project would not occur. Furthermore, the site would remain unavailable for new uses on the property that may benefit the local community of Burbank.

Soils at the project site are contaminated with gaseous chemicals. These pose a significant risk to the regional groundwater if they are not removed from the soil and treated to an acceptable level. The contaminants would continue to migrate downward through the soil and pollute an important source of drinking water. Failure to remediate the site would also not satisfy requirements mandated by the RWQCB Cleanup and Abatement Order No. 87-161.

For the reasons described above, No Project is not considered an acceptable alternative or an environmentally superior alternative.

5.2 ALTERNATIVE VAPOR TREATMENT TECHNOLOGIES

According to the ICF Kaiser's May 13, 1994 Remediation Feasibility Study (FS) (Pages ES-1 and 2-1), PCE and TCE were the primary constituents considered in selecting the vapor treatment system. This assumption was verified by the baseline vapor sampling results, which show PCE and TCE are the predominant VOCs in the soil vapors with only trace amounts of vinyl chloride in a few vapor samples. Vinyl chloride was believed to be generated from anaerobic biodegradation of PCE and TCE in deeper zones. Vinyl chloride production can be avoided by maintaining the subsurface under aerobic conditions, which can be achieved with use of soil vapor extraction (SVE) in conjunction with air injection. The following vapor treatment alternatives to the proposed VES were evaluated by Dames & Moore:

- Catalytic Oxidation
- Thermal Oxidation
- High Temperature Plasma Vapor Destruction System ("Chemical Reverser")
- AWD Sorbathene Vapor Treatment System
- Synthetic Resin (Purus Air Treatment System)
- Thermal Technology/Enhanced VES

The results of the evaluation are briefly summarized in the following sections.

dissolved into elemental forms. When cooled, these elemental forms recombine to form benign compounds. Chemical Reverser, manufactured by Concentric Machines in Germany, can be used to destruct halogenated solvents to form carbon dioxide and inorganic salts. The temperatures in the converter core of Chemical Reverser, heated by natural gas or propane, are controlled at 2000° to 3000°C. The hot gases leaving the Chemical Reverser are immediately quenched with an alkaline wash liquid that brings them to temperatures below 100°C within a few milliseconds in an effort to avoid production of dioxines and furanes. The brine solution created by neutralization is continuously removed from the quenching unit.

To obtain the first hand information, Dames & Moore interviewed Mr. Michael Zettner who is the inventor of the patented Chemical Reverser. According to Mr. Zettner (1995), the Chemical Reverser, generally operated at 3,000°C, can easily destruct all the chlorinated hydrocarbons, including PCE and TCE to form benign compounds. The system can handle up to 2,000 pounds of chlorinated hydrocarbons per day.

Although the system offers a high destruction efficiency (99.99 percent) in treating halogenated solvent laden vapors, it is still in a pilot scale stage. Due to the lack of large-scale operating data and track records, this technology is therefore not recommended as a substitute for the proposed VES.

5.2.4 AWD Sorbathene Vapor Treatment System

The AWD SORBATHENE Vapor Treatment System is a solvent recovery system. It uses a pressure swing adsorption and desorption process to remove the solvents from the vapor streams. As the VOC-laden vapor stream passes through the granular activated carbon bed, the VOCs are adsorbed onto a high surface-area media granular activated carbon, leaving the clean air vented to the atmosphere.

Adsorption is an exothermic reaction which is monitored in a SORBATHENE unit using multiple thermalcouples installed along the length of each adsorber bed. These thermalcouples monitor the movement of the heat wave released during adsorption and serve as a means of monitoring the adsorbing capacity and adjusting the regeneration cycle time.

The spent adsorber is regenerated by means of vacuum. The solvents are volatilized by vacuum and then routed to a shell and tube heat exchanger where they are condensed and then recovered.

The results of AWD SORBATHENE Vapor Treatment pilot test conducted by ICF Kaiser for Lockheed in March 1994 at the project site showed that greater than 99 percent recovery of VOCs can be achieved. This technology is comparable to the preferred alternative; however, for a 6,000 SCFM unit, it would require 800 to 1,000

horsepower to run the unit, which is very energy intensive. Therefore, this technology was eliminated from consideration as a substitute for the proposed VES.

5.2.5 Synthetic Resin (Purus Air Treatment System)

The Purus Air Treatment System is an onsite, regenerable adsorbent system that removes and recovers VOCs, including halogenated hydrocarbons (e.g., PCE, TCE). The Purus Air Treatment System is a solvent recovery system using synthetic resin beds for adsorption and nitrogen desorption for regeneration of spent resin. The synthetic resin's adsorption capacity is not very sensitive to relative humidity of the vapor stream. Another advantage for this resin is that it can be regenerated a couple of hundred times before replacement, which would cut down the spent adsorbent disposal costs. The recovered solvents can be reused or recycled.

In the Purus' resin adsorption process, the VOCs in the vapor streams are first adsorbed onto the synthetic resin, desorbed using heat and vacuum with nitrogen gas as a carrier, condensed into a liquid, and transferred to a solvent storage tank for recycling — all in a continuous, computer controlled operation. The Purus air treatment system can recover a variety of VOCs, even compounds such as ketones and alcohols, which normally will not adsorb onto granular activated carbon.

A Purus vapor treatment pilot test was conducted by ICF Kaiser for Lockheed in March 1994. The goal of the pilot test was to verify whether the Purus system performance would meet the varying conditions of operation present at the project site. The pilot test results showed that: (1) the Purus system was able to handle various concentrations and vapor flow rates; (2) the synthetic resin's capacity was about 13 pounds VOCs adsorbed per pound of resin used; (3) changes in humidity of the influent vapor stream did not impact the resin's performance; and (4) greater than 99 percent VOC removal could be achieved.

Although Purus Air Treatment System shows a high adsorption efficiency, its capital and operations and maintenance costs are significantly higher than the proposed steam regenerated granular activated carbon. Additionally, granular activated carbon is a reliable, field proven technology. It has widely been used in the industrial and environmental fields. On the contrary, Purus is an innovative system but unproven in a large scale. From a procurement and maintenance standpoint, it lacks other vendors, except Purus itself, available to provide qualified operations and maintenance services.

Although synthetic resin offers better adsorption efficiency for vinyl chloride than granular activated carbon, it's very difficult to condense vinyl chloride. As a result, the vinyl chloride vapor has to be bled out of the condenser for treatment with chemical oxidation using bromine-impregnated carbon or thermal oxidation using a catalytic oxidizer equipped with a scrubber. Vinyl chloride treatment with bromine-impregnated

carbon has not been field tested on a large scale and is cost prohibitive; treatment with a catalytic oxidizer is difficult and labor intensive.

Based on the above considerations, the Purus Air Treatment System was eliminated from consideration as a substitute for the proposed VES.

5.2.6 Thermal Technology/Enhanced VES

Soil vapor extraction uses a pressure gradient to volatize and move VOCs from the soil to extraction vents for collection. Thermally enhanced VESs increase the vapor pressure of the VOCs in the treatment zone thereby increasing the effectiveness of the VES. Three technologies that can be used to increase vapor pressure include hot air injection, steam injection, and radio frequency transmission. Design considerations for these technologies would be more complex than those for a conventional VES. In addition, PCE and TCE are volatile at normal soil temperatures and do not require enhancement for treatment by conventional SVE. When semivolatile compounds are not a major concern, such as is the case for the Lockheed site, there are no significant advantages to thermally enhanced SVE. Therefore, thermally enhanced VES technology was eliminated from consideration as a substitute for the proposed VES.

5.3 ALTERNATIVE SITES

In development project EIRs, alternative sites for the development must be considered. The proposed project is designed to treat a contamination problem that occurs at a specific location on the site. Therefore, offsite alternatives are not a relevant consideration for the project.

The proposed exhaust stack and vent field have been sited to take into account the location and extent of the contamination problem, optimization of system operation, maximization of distance between the exhaust stack and sensitive receptors (such as schools and homes). The proposed exhaust stack could be moved to a different location within the 10-acre contaminated area, but there would be no increased engineering advantages and it would place the facility in closer proximity to sensitive receptors. This would result in a slight increase in health risk exposure to receptors. For these reasons, no alternative locations onsite for the proposed exhaust stack are considered to offer environmental or engineering advantages superior to the proposed facility site.

5.4 OTHER SOIL REMEDIATION TECHNOLOGIES

5.4.1 Containment

Under this alternative, the affected soil would be isolated permanently using a physical

barrier. Containment options include capping with clay or soil layers, pavement, geomembranes, and multilayer systems. Capping would not provide a permanent solution for VOCs in the soil. The volatile and mobile VOCs would continue to diffuse through the soil and migrate under the influence of pressure and temperature gradients in the soil. Capping is generally poorly suited to sites like the Plant B-1 site with chemicals dispersed over a wide area. It would not be practicable to construct one cap over the entire site, so construction of multiple caps would need to be evaluated. Containment is therefore not preferred because it does not provide a permanent solution for the VOCs in the soil and it may inhibit or limit future site redevelopment.

5.4.2 Removal and Disposal

In the removal and disposal alternative, contaminated soil would be removed using conventional (backhoe, hydraulic excavator) and more specialized (large-diameter flight or bucket auger) excavation methods. These methods would be effective in removing contaminated soil. South Coast Air Quality Management District rules and regulations would likely restrict the use of this remedy because of limitations on air emissions from excavated soils containing VOCs (i.e. prohibit aeration of soils containing VOCs). Heavy construction equipment would also generate air emissions. Excavation with a backhoe or hydraulic excavator would be more difficult to implement and may require that excavations be benched, sloped and shored. Excavations with augering tools must be backfilled following completion of each bore to provide a stable working area for the auger rig. Health and safety concerns for workers during excavation would be high due to potential worker exposure to the affected soil and the use of heavy equipment. For these reasons, removal and disposal is not a preferred alternative.

5.4.3 Soil Washing

Soil washing is an extraction process using water or other solvents to dissolve and mobilize the chemical constituents. This requires the use of infiltration galleries and/or injection vents to apply the solvent, and extraction trenches and/or extraction wells to recover the spent solvent. Soil washing as an in situ remedial method is relatively new. The technology is available from a small number of vendors using proprietary designs for equipment processing and solvents. The flow of fluids may be difficult to control in the varying stratifications of fine- and coarse-grained soils beneath the Plant B-1 site. The use of in situ application of washing solutions for soil at the Plant B-1 site would likely be difficult to permit with the Los Angeles Regional Water Quality Control Board. Based on the above considerations, soil washing is not a preferred alternative.

5.4.4 Chemical Stabilization

Chemical stabilization is intended to convert chemicals into their least soluble, or most immobile form. It is not the preferred treatment method for VOCs if they are the only chemicals in the remediation zone because most organic compounds will not bind chemically to the stabilizing agents. Heavy organic compounds can be trapped into a low-permeability bulk matrix using alternative agents; however, because of their volatility, VOCs will continue to migrate under the influence of pressure and temperature gradients within the soil. The process of mixing the stabilizing agents in the soil, and temperature increases from the agent heat of reaction, also increase the volatilization of the VOCs, making control of air emissions difficult. Therefore, this technology was eliminated from consideration as a substitute for the proposed VES.

5.4.5 Biological Technology - Bioventing

Bioventing uses either vacuum extraction or air injection to oxygenate the contaminated soil, thus increasing the metabolic activity of indigenous aerobic bacteria; this results in increased decomposition of organic compounds in the soil. Bioventing is not effective for treatment of chlorinated organic compounds unless a primary metabolic substrate, such as an easily biodegradable hydrocarbon, is available to sustain the microorganisms. PCE and TCE, the primary VOCs at the Plant B-1 site, would resist biodegradation under aerobic conditions unless more easily degradable organic compounds were available. In addition, this technology would be difficult to operate successfully because variations in soil permeability make it difficult to maintain aerobic conditions throughout the remediation zone. Therefore, bioventing was eliminated from consideration as a substitute for the proposed VES.

6.0 UNAVOIDABLE ADVERSE IMPACTS

The project proposed by Lockheed incorporates the features and operational requirements needed to reduce to a level of insignificance all potential impacts related to geologic hazards, handling of contaminated water, health risks and upset condition risks as well as cumulative impacts. With the required condition for a site drainage plan, impacts related to water drainage will also be mitigated so that all potential impacts are mitigated to less than significant levels.

7.0 PERSONS AND ORGANIZATIONS CONSULTED

The following persons were involved in the preparation of this Focused Environmental Impact Report:

- **DAMES & MOORE, INC.**
  Les Senger, Ph.D., Associate, Project Manager
  Ijaz Jamall, Ph.D. and DABT, Officer, Senior Toxicologist
  Jim Kang, Ph.D., Officer, Senior Chemical Engineer
  Craig Armstrong, M.P.H., Senior Health Risk Analyst
  Houman Makarechi, Senior Geotechnical Engineer
  Jon Palsgaard, Senior Design Engineer
  Farid Motamed, Project Geotechnical Engineer
  Lynn Diaz, Project Design Engineer
  Brian Leatherman, Staff Environmental Scientist
  Lita Navarro, Word Processing Coordinator

The following individuals and agencies were contacted by Dames & Moore, Inc. to obtain information for preparation of this document:

- **City of Burbank**
  Rick Pruetz, Community Development Department (CDD) Chief Assistant Community Development Director/City Planner
  Bill Jacobs. CDD, Assistant Planner
  Arlynne Camrie, CDD, Associate Planner
  Bob Burdette, CDD, Associate Planner
  Paul Krueger,CDD, Assistant Planner
  Dawn Smith, CDD, Management Intern
  Gary Yamada, CDD, Zoning Administrator
  Matthew Blinstrub, CDD, Assistant Planner
  Greg Herrmann, CDD, Assistant Planner
  Barbara Lazar, CDD, Senior Planner
  Jeannie Coughenour, CDD, Senior Secretary
  John Cheng, Assistant Community Development Director/Building Official
  Chuck Gustafson, Surveying Civil Engineer, Department of Public Works
  Devin Burns, Hazardous Materials Specialist, Fire Department

- **California Regional Water Quality Control Board, Los Angeles Region**

  Alex Carlos, Associate Engineering Geologist

- **California Department of Toxic Substances Control**

  Penny Nakashima, Hazardous Substances Scientist

- **South Coast Air Quality Management District**

  Steve Smith, Program Supervisor
  Kate Crespi-Chun, Air Quality Specialist
  William Milner, Air Quality Engineer II

- **Freilich, Kaufman, Fox & Sohagi**

  Benjamin Kaufman, Esq.

- **The Peartree Group, Inc.**

  Craig Volland, Q.E.D.

- **Lockheed Martin Corporation**

  Ron Helgerson, Program Manager
  Carol Yuge, Manager, Regulatory Affairs
  John Johnsen, Regulatory Compliance Specialist

- **LORAX Environmental, Inc.**

  John Pinsonnault, Environmental Scientist

8.0 REFERENCES

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APPENDIX A

INITIAL STUDY

California Environmental Quality Act

Initial Study

(as required by Sec. 15063 of the Public Resources Code)

To be completed by the lead agency

1. Project Title: Development Review No. 94-12 and Conditional Use Permit No. 94-13

2. Lead Agency Name and Address: City of Burbank
275 East Olive Ave.
Burbank, CA, 91501

3. Contact Person and Phone Number: Rick Pruetz, City Planner (818) 953-9586
William Jacobs, Asst. Planner (818) 953-8628

4. Project Location: 1705 Victory Place

5. Project Sponsor's Name and Address: Lockheed Martin Corp.
Burbank Program Office
2550 North Hollywood Way, Suite 506
(818) 847-6927

6. General Plan Designation: Gen. Mfg. 7. Zoning: M-2

8. Description of Project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support or off-site features necessary for its implementation. Attach additional sheets if necessary.)

Carbon absorption facility for the treatment of vapors from soil vapor extraction vents. Project involves construction of 6,000 sf building, including a 50 foot high emissions stack, and underground vent field piping system on vacant property.

9. Surrounding Land Uses and Setting: (Briefly describe the project's surroundings.)

RR tracks and freeway to the north and east; Vacant to west; Residential and strip commercial to south.

10. Other public agencies whose approval is required: (e.g., permits, financing approval, or participation agreement.)

State of California Regional Water Quality Control Board (RWQCB)- Los Angeles Region
State of California Dept. of Toxics Substances Control (DTSC)
South Coast Air Quality Management District (AQMD)

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Land Use and Planning	☐ Transportation/Circulation	☐ Public Services
☐ Population and Housing	☐ Biological Resources	☐ Utilities & Service Systems
x Geological Problems	☐ Energy/Mineral Resources	☐ Aesthetics
☐ Water	x Hazards	☐ Cultural Resources
x Air Quality	☐ Noise	☐ Recreation

x Mandatory Findings of Significance

DETERMINATION:
(To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

x I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a significant effect(s) on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets, if the effect is a "potentially significant impact" or "potentially significant unless mitigated." and ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed adequately in an earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project.



Signature

5/25/95
Date

Rick Pruetz, City Planner
Printed Name

City of Burbank
For

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect is significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, and EIR is required.

4) "Potentially Significant Unless Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). Earlier analyses are discussed in Section XVII at the end of the checklist.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g. general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated. See the sample question below. A source list should be attached, and other sources used or individuals contacts should be cited in the discussion.

7) This is only a suggested form, and lead agencies are free to use different ones.

SAMPLE QUESTION:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the proposal result in potential impacts involving:				
Landslides or mudslides? (1, 6)	☐	☐	☐	x

(Attached source list explains that 1 is the general plan, and 6 is a USGS topographic map. This answer would probably not need further explanation.)

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
I. LAND USE AND PLANNING. Would the proposal:				
a) Conflict with general plan designation or zoning? (2)	☐	x	☐	☐
b) Conflict with applicable environmental plans or policies adopted by agencies with jurisdiction over the project? (4,5,6)	☐	☐	☐	x
c) Be incompatible with existing land use in the vicinity? (2)	☐	x	☐	☐
d) Affect agricultural resources or operations (e.g. impacts to soils or farmlands, or impacts from incompatible land uses)? (2)	☐	☐	☐	x
e) Disrupt or divide the physical arrangement of an established community (including a low-income or minority community)? (2)	☐	☐	☐	x
II. POPULATION AND HOUSING. Would the proposal:				
a) Cumulatively exceed official, regional or local population projections? (2)	☐	☐	☐	x
b) Induce substantial growth in an area either directly or indirectly (e.g. through projects in an undeveloped area or extension of major infrastructure)? (2)	☐	☐	☐	x
c) Displace existing housing, especially affordable housing? (2)	☐	☐	☐	x
III. GEOLOGIC PROBLEMS. Would the proposal result in or expose people to potential impacts involving:				
a) Fault rupture? (2, 22)	☐	☐	☐	x
b) Seismic ground shaking? (2, 22)	☐	☐	☐	x
c) Seismic ground failure, including liquefaction? (2, 22)	x	☐	☐	☐
d) Seiche, tsunami, or volcanic hazard? (2, 22)	☐	☐	☐	x
e) Landslides or mudflows? (2, 22)	☐	☐	☐	x
f) Erosion, changes in topography or unstable soil conditions from excavation, grading or fill? (2)	☐	☐	x	☐
g) Subsidence of the land? (2)	☐	☐	☐	x

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
h) Expansive soils? (2)	☐	☐	☐	x
i) Unique geologic or physical features? (2, 22)	☐	☐	☐	x
IV. WATER. Would the proposal result in:				
a) Changes in the absorption rates, drainage patterns, or the rate and amount of surface runoff? (7, 20)	☐	x	☐	☐
b) Exposure of people or property to water related hazards such as flooding? (2)	☐	☐	☐	x
c) Discharge into surface waters or other alteration of surface water quality (e.g. temperature, dissolved oxygen or turbidity)? (7, 20)	☐	x	☐	☐
d) Changes in the amount of surface water in any water body? (1, 7, 20)	☐	☐	☐	x
e) Changes in currents, or the course or direction of water movements? (1, 7, 20)	☐	☐	☐	x
f) Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of aquifer by cuts or excavations or through substantial loss of groundwater recharge capability? (1, 7, 20)	☐	☐	☐	x
g) Altered direction or rate of flow of groundwater? (1, 7, 20)	☐	☐	☐	x
h) Impacts to groundwater quality? (1, 7, 12, 20)	☐	☐	☐	x
i) Substantial reduction in the amount of groundwater otherwise available for public supplies? (14)	☐	☐	☐	x
V. AIR QUALITY. Would the proposal:				
a) Violate any air quality standard or contribute to an existing or projected air quality violation? (8-12)	x	☐	☐	☐
b) Expose sensitive receptors to pollutants? (8-12)	x	☐	☐	☐
c) Alter air movement, moisture, or temperature, or cause any change in climate? (8-12)	☐	☐	☐	x
d) Create objectionable odors? (8-12)	☐	☐	x	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
VI. TRANSPORTATION/CIRCULATION. Would the proposal:				
a) Increased vehicle trips or traffic congestion? (1, 2, 3, 7)	☐	☐	☐	x
b) Hazards to safety from design features (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)? (1, 2, 3, 7)	☐	☐	☐	x
c) Inadequate emergency access or access to nearby uses? (1, 2, 3, 7)	☐	☐	☐	x
d) Insufficient parking capacity on-site or bicyclists? (1, 2, 3, 7)	☐	☐	☐	x
e) Hazards or barriers for pedestrians or bicyclists? (1, 2, 3, 7)	☐	☐	☐	x
f) Conflicts with adopted policies supporting alternative transportation (e.g. bus turnouts, bicycle racks)? (5)	☐	☐	☐	x
g) Rail, waterborne or air traffic impacts? (1, 2)	☐	☐	☐	x
VII. BIOLOGICAL RESOURCES. Would the proposal result in impacts to:				
a) Endangered, threatened or rare species or their habitats (including but not limited to plants, fish insects, animals, and birds)? (1, 2)	☐	☐	☐	x
b) Locally designated species (e.g. heritage trees)? (1,2)	☐	☐	☐	x
c) Locally designated natural communities (e.g. oak forest, coastal habitat, etc)? (1, 2)	☐	☐	☐	x
d) Wetland habitat (e.g. march, riparian and vernal pool)? (1, 2)	☐	☐	☐	x
e) Wildlife dispersal or migration corridors? (1, 2)	☐	☐	☐	x
VIII. ENERGY AND MINERAL RESOURCE. Would the proposal:				
a) Conflict with adopted energy conservation plans? (1, 2)	☐	☐	☐	x
b) Use non-renewable resources in a wasteful and inefficient manner? (1, 2)	☐	☐	x	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Result in the loss of availability of a known mineral resource that would be of future value to the region and the residents of the State? (1, 2)	☐	☐	☐	x
IX. HAZARDS. Would the proposal involve:				
a) A risk of accidental explosion or release of hazardous substances (including, but not limited to: oil, pesticides, chemicals or radiation)? (8-12)	x	☐	☐	☐
b) Possible interference with an emergency response plan or emergency evacuation plan? (2)	☐	☐	☐	x
c) The creation of any health hazard or potential health hazard? (8-12)	x	☐	☐	☐
d) Exposure of people to existing sources of potential health hazards? (14)	☐	x	☐	☐
e) Increased fire hazard in areas with flammable brush, grass, or trees? (1, 2)	☐	☐	☐	x
X. NOISE. Would the proposal result in:				
a) Increases in existing noise levels? (11, 15)	☐	☐	x	☐
b) Exposure of people to severe noise levels? (11, 15)	☐	☐	x	☐
XI. PUBLIC SERVICES. Would the proposal have an effect upon, or result in a need for new or altered government services in any of the following areas:				
a) Fire protection? (14)	☐	☐	x	☐
b) Police protection? (18)	☐	☐	☐	x
c) Schools? (2)	☐	☐	☐	x
d) Maintenance of public facilities, including roads? (7)	☐	☐	☐	x
e) Other governmental services? (7, 16)	☐	☐	x	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
XII. UTILITIES AND SERVICE SYSTEMS. Would the proposal result in a need for new systems or supplies, or substantial alterations to the following utilities:				
a) Power or natural gas? (7, 16)	☐	☐	x	☐
b) Communications systems? (14)	☐	☐	☐	x
c) Local or regional water treatment or distribution facilities? (7, 14)	☐	☐	x	☐
d) Sewer or septic tanks? (7)	☐	x	☐	☐
e) Storm water drainage? (7)	☐	☐	x	☐
f) Solid waste disposal? (7)	☐	x	☐	☐
g) Local or regional water supplies? (14, 16)	☐	☐	x	☐
XIII. AESTHETICS. Would the proposal:				
a) Affect a scenic vista or scenic highway? (1)	☐	☐	☐	x
b) Have a demonstrable negative aesthetic effect? (19)	☐	☐	x	☐
c) Create light or glare? (19)	☐	☐	x	☐
XIV. CULTURAL RESOURCES. Would the proposal:				
a) Disturb paleontological resources? (2)	☐	☐	☐	x
b) Disturb archaeological resources? (2)	☐	☐	☐	x
c) Affect historical resources? (2)	☐	☐	☐	x
d) Have the potential to cause a physical change which would affect unique ethnic cultural values? (2)	☐	☐	☐	x
e) Restrict existing religious or sacred uses within the potential impact area? (2)	☐	☐	☐	x
XV. RECREATION. Would the proposal:				
a) Increase the demand for neighborhood or regional parks or other recreational facilities? (2, 17)	☐	☐	x	☐
b) Affect existing recreational opportunities? (2, 17)	☐	☐	☐	x

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI. MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plan or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? (2)	x	☐	☐	☐
b) Does the project have the potential to achieve short-term, to the disadvantage or long-term, environmental goals? (8-12)	☐	☐	☐	x
c) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.) (21)	x	☐	☐	☐
d) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? (8-12)	x	☐	☐	☐

XVII. EARLIER ANALYSES.

Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, one or more effects have been adequately analyzed in an earlier EIR or Negative Declaration. Section 15063(c)(3)(D). In this case a discussion should identify the following on attached sheets:

a) Earlier analyses used. Identify earlier analyses and state where they are available for review.

b) Impacts adequately addressed. Identify which effects from the above checklist were within the scope of an adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures before on the earlier analysis.

c) Mitigation measures. For effects that are "Less than Significant with Mitigation Incorporated," describe the mitigation measures which were incorporated or refined from the earlier documents and the extent to which they address site-specific conditions for the project.

BJ\vesvis0524

Addendum to Initial Study

Conditional Use Permit 94-13/Development Review 94-12
1705 Victory Place

The following contains discussion of all responses in the Evaluation of Environmental Impacts Section, and is guided by Section 15064 and Appendix G to the State CEQA Guidelines.

I. Land Use and Planning

The proposed project is a 6,000 square foot industrial building (1), which is consistent with the City General Plan Land Use Designation of General Manufacturing, and the City's Zoning Code Designation of M-2 Industrial. (2,3) Since the proposed stack is over 35 feet in height, a conditional use permit (CUP) is required by code. The purpose of a CUP requirement is to allow the City to evaluate whether the proposed discretionary use is compatible with the proposed location. (Govt Code Section 65901(a)). The CUP requirement, and conditions placed on the CUP, mitigate the potentially significant land use and planning impacts of the proposed project.

The proposed industrial building, as conditioned by the City, does not appear to be incompatible with existing land uses in the vicinity, however, its operation may have impacts on air quality, as discussed in Section V. The project is required to be reviewed by the RWQCB and is required to be reviewed by AQMD. The project poses no conflict with applicable polices adopted by these agencies. (4,5,6)

II. Population and Housing

The proposed project will only have one to two employees per shift. (1). Therefore, the project will not affect the location, distribution, density or growth rate of the population in the area, nor will the proposed project will not affect existing housing or impact available rental or affordable housing in the City. (2)

III. Geological Problems

The project is not of a size or scale that would cause significant changes in topography, ground surface relief features, siltation or the deposition of erosion of a body of water or water course. Further, no unique geologic or physical features have been observed on the site or in the surrounding area and none are known to exist. The project will not expose people or property to geologic hazards such as earthquakes, landslides, mudslides, or similar hazards; and no active faults cross the property. The Alquist-Priolo Special Study Zone Act of 1972 created special study zones of active faults and fault zones in California in to mitigate hazards resulting from seismic damage. No such zones have been identified in the City of Burbank (2, 22). Therefore, no impacts on these issues are anticipated to occur. "A moderate to high" risk" of liquefaction exists in the area (2, 22), which could have the potential to create health risks if the facility is damaged, unless adequate mitigation measures are identified and required (2). The Building Department will require a soil study for this project to mitigate impacts of geologic hazards, and will enforce the recommendations outlined in the study.

The proposed project will cause soil displacement, compaction and over-covering as a result of grading and excavation activities. These impacts are not considered significant given the size and scale of the proposed project. Wind erosion of the soil during the grading and excavation phases of the project is expected to occur. This impact is not considered significant, but to mitigate any potential impacts to a level of non-significance, the applicant shall use a water truck to control fugitive dust.

IV. Water

The entire Lockheed B-1 site has been cleared of structures since 1990, and Lockheed is currently in the process of demolishing substructures and backfilling areas where both above-ground and subterranean structures existed, thereby clearing the site to a finished level grade. The process also involves redirecting site drainage to off-site facilities. Lockheed has accomplished this to a certain extent, however, the Public Works Department still has concerns over site drainage along Victory Place, where the proposed project is located, and Empire Ave., and does not feel that the current project plans adequately address this concern. Compliance with code requirements concerning drainage will mitigate potential impacts regarding drainage concerns (7).

There is also the potential for untreated soil containing pollutants could drain into the City storm drain system. Therefore, to mitigate drainage impacts of the proposed project, the applicant shall be required to submit detailed topographic information, a drainage plan, and a containment plan for contaminated soil for review and approval by the Public Works Director and Building Official (7, 20).

No changes to the amount or direction of surface waters are expected as a result of this project, because the drainage concerns noted above shall be addressed and resolved (7, 20). The project will not affect the quantity of groundwater, but rather is intended to prevent its degradation. Because the project involves a cleanup of the soil, the impacts of the project on water quality are anticipated to be beneficial. The project is not anticipated to reduce water quality or expose people or property to flood hazards.

V. Air Quality

The project is proposed to extract and clean up soil toxins from the project site, and it is estimated by the applicant to be in operation for approximately 8.5 years. As a result of this process, potentially harmful levels of toxins are anticipated to be released into the air. Approximately 10 pounds of Volatile Organic Compounds and 9.8 pounds of Reactive Organic Gasses (a subset of VOC's that are precursors to smog) are estimated by the applicant to be released per day (8,9,10). Re-injection of up to 70 percent of the carcinogens treated through the GAC system will minimize health risks. However, the proposed system does not appear to adequately treat Vinyl Chloride, which will require separate monitoring, as outlined by the consultant reports (11).

The City's consultants have undertaken an extensive investigation of the potential health risks and proposed technology associated with the project (8-12). According to the City's consultants, a potentially significant impact exists in that the project may violate an air quality standard, specifically AQMD Rule 1401. According to Dames and

Moore (11), the revised health risk assessment (HRA), prepared by the applicant (8, Table 4), underestimates the amount of Vinyl Chloride (VC), a known carcinogen, that will be emitted into the atmosphere in the "high efficiency" condition (See attached chart). While the HRA concluded that the added health risk from the project was .93 in one million, according to Dames and Moore, "use of the correct emissions rate of .00108 g/s to calculate excess cancer risk under these conditions would yield a 1.21×10^{-6} (1.21 in one million) excess cancer risk for the MEIR (Maximally Exposed Individual Resident). SCAQMD, for example, uses the following threshold of significance: "Carcinogenic or toxic air contaminants identified in rule 1401 are emitted from the project that exceed the maximum individual cancer risk of one in a million, or one in 10 million if the project is constructed with the best available control technology for toxics (T-BACT)." (23, pg. 13-1). Both Dames and Moore (11) and The Peartree Group (12) have questioned whether the project meets the T-BACT requirement, both because it provides for a maximum reinjection of 50 percent effluent gasses (both consultants recommended reinjection of up to 70 percent) and because, as noted by Dames and Moore, "The proposed Vapor Extraction System has no impact on the most carcinogenic pollutant in contaminated soil at Lockheed's B-1 plant and actually produces an <u>increase</u> in emissions of most carcinogens under conditions considered to be 'high efficiency.'" (11, 3/6/95 letter, pg. 2)

The AQMD also notes two other standards for significance, in addition to the one per million risk noted above. The project is also considered significant if VOC emissions exceed 55 lbs/day. (23, pg. 6-2). The project falls below this threshold and is therefore not considered significant in this regard (8-12). However, the AQMD considers to be significant "any project that could emit an air contaminant that is not currently regulated by district rule, but that is on the federal or state air toxics list." (23 pg 10-3). The project will routinely emit quantities of PCE, a VOC not regulated by AQMD Rule 1401.

The Peartree Group has questioned the use of "simplified assumptions" (23, pg 10-4) made in the HRA (8) regarding use of the ISCST2 air model, and the use of 1981 Burbank meteorological data for modelling periods of stagnant air conditions, representing the worst case in the model. (12). The Peartree Group recommends analysis of five years of meteorological data (12, pg. 1) or five periods of known calm in order to ascertain whether acute exposure dose would occur for on-site workers/guests during stagnant conditions.

As this last comment illustrates, the project has a potentially significant impact in that it may expose sensitive receptors to pollutants. The project would be located within 1/4 mile of existing residences. (1, 3/95 project application, Figure 1). Residences within 1/4 mile of a source of toxic air contaminants are considered sensitive receptors by SCAQMD (23, pg. 5-2 to 5-9).

In terms of operational reliability of the proposed system, there is a potential for buildup of organic materials, such as fungus, that would restrict flow through the venting system or potentially be released to the air from the system (24). A monitoring program for the project would need to address this issue and mitigate potential impacts.

The project has the potential to "backslide," or recommence the anaerobic generation of Vinyl Chloride when the system is shut down for any reason. In addition, shutting down the system would prolong the operational life of the project beyond the 8.5 years currently anticipated by Lockheed (11, 12). The Peartree Group and Dames and Moore have recommended operational flexibility in terms of permitted emissions for the first few months of operation in order to fine tune system operation.

Emissions from equipment and fugitive dust during project construction may cause substantial short-term deterioration in air quality in the immediate vicinity of the site. To mitigate the potential air quality impacts the developer needs to observe the following conditions:

a. The developer shall use equipment that produces low particulate and nitrogen oxides emissions.

b. The developer shall cease use of equipment during second and third state smog alerts as issued by the SCAQMD.

c. The developer shall use a water truck during grading and excavation phases.

d. The developer shall cease grading and water truck use during periods of high winds.

The proposed project is not of a size or scale that will alter air movement, climate or temperature. Therefore, no impacts on this issue are anticipated. According to Dames and Moore, anticipated odors produced by the project would have an insignificant impact (11, 13).

VI. Transportation/Circulation

The proposed project is anticipated to have one to two employees on site per shift (1), therefore, no significant impacts to traffic or circulation are anticipated (7). There is no parking code requirement for this type of industrial use, therefore, by code, the Planning Board shall consider the parking proposed as part of the Conditional Use Permit. The applicant is proposing five spaces, which should be more than sufficient to accommodate the anticipated on-site personnel for this use. The size and scale of this project are small enough as not to warrant bicycle and pedestrian facilities as required by BMC Section 31-2304 for larger developments.

VII. Biological Resources

No rare, threatened or endangered plants as identified by the California Fish and Game or the U.S. Wildlife Service are apparent on the site, which is located in an industrial area in an urbanized region. No rare, threatened, or endangered animal species are known to exist on the site, and no animals have been observed. Further, the California Department of Fish and Game natural diversity database does not report any endangered, threatened, or rare animal species in the project area. Therefore, no significant impacts with regard to plants or animals are considered to exist as a result of the proposed project.

VIII. Energy/Mineral Resources

The equipment necessary for project construction will consume fossil fuels at an accelerated rate. The increased rate of consumption can be mitigated to some extent by the use of energy efficient equipment that is gasoline powered, when available. No substantial increases in demand on energy sources or interference with natural heating or cooling opportunities are anticipated.

In addition, water will be consumed at an accelerated rate during grading, excavation, and operation. Such consumption is an unavoidable result of the project and is required to reduce fugitive dust. To mitigate such consumption, the developer shall cease all grading and use of a water truck during periods of high winds, as noted in item VII above.

The subject site does not involve land or areas identified by the State Mining and Geology board as containing mineral deposits designated as being of statewide or regional significance. However, it is located in an area classified by the State Board of Mines and Geology as MRZ-2. This classification is given to areas where adequate information exists to indicate that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists. Although the potential for mineral extraction in the project site area may exist, the existing and proposed types of land uses for the project site and the surrounding residential neighborhoods are incompatible with mineral extraction and/or surface mining activities. The City of Burbank recognizes and acknowledges that, by approving a non-mining compatible use for the subject property, it is forfeiting the short-term potential for mineral extraction and/or surface mining but not necessarily the long-term potential for conservation for possible future extraction opportunities.

No actual mineral resources are known to exist on the site. The project site is located in an urbanized area designated for non-mining-compatible land uses and a mining use is not required by any applicable state law or local ordinance. These findings were made subject to, and in compliance with, the Surface Mining and Reclamation Act (SMARA) of 1975, as amended.

IX. Hazards

The developer is required to comply with all City codes regarding excavation, and construction activities. This adherence reduces the possibility of explosions or other hazardous occurrences to an insignificant level.

Since all construction work will take place on private property, no significant impacts on or interference with emergency response or evacuation plan is anticipated to result from the proposed project. Any street excavations or other use or blockage of the public right of way shall conform to the requirements of the Standard Specifications for Public Works Construction and the State of California Traffic Manual or other regulation as required by the Public Works Department at the time of permit approval.

The project site is vacant, and the proposed building to be located on a small portion of the site will provide fire protection as required by the Uniform Building and Fire Codes, thereby minimizing fire hazards. (14) Hazardous materials resulting from

project operation are discussed in Section V (Air Quality) of this Initial Study. With regard to hazardous waste materials not emitted through the SVE stack, hazardous wastes stored and transported from the Site are regulated by the State Department of Toxic Substances Control, whose existing regulation of storage, transport, and disposal mitigates the potential impacts.

The project also has a potentially significant impact on "the creation of any health hazard or potential health hazard." The evidence supporting this finding is set forth in the discussion in Section V (Air Quality) of this Initial Study.

According to the Peartree Group (12, 5/2/95), on site workers and shoppers would be exposed to acute levels of toxics during "stagnation" episodes. An upset (i.e. spill) would more seriously impact on-site workers, visitors, shoppers etc., as well as "sensitive receptors" within 1/4 mile of the project site, than would a stagnant wind condition.

X. Noise

Noise levels will increase in the project vicinity during construction activities. To mitigate any such impacts, the developer shall only be permitted to conduct demolition, grading, and construction activities between the hours of 7 a.m. and 6 p.m. Monday through Friday. To insure that construction personnel are aware of the restricted construction times, the applicant shall install a professionally made sign 2 ft. x 3 ft. in size in a location satisfactory to the City Building Director that states, "NOTICE: THE CITY OF BURBANK LIMITS CONSTRUCTION ACTIVITIES OF THIS PROJECT (GRADING, ACTUAL CONSTRUCTION AND LANDSCAPING) ONLY ON MONDAYS THROUGH FRIDAYS FROM 7 AM TO 6 PM. ANY CONSTRUCTION ACTIVITY OCCURRING AT ANY OTHER TIME MAY BE REPORTED TO THE CITY BUILDING DIVISION AT (818) 953-9541 OR POLICE DEPARTMENT AT (818) 953-8704."

No significant noise impacts are expected during project operation, as evidenced by the acoustic study prepared for this project and verified by Dames and Moore, the City's consultants for this project (11, 15).

XI. Public Services

The project in itself may produce significant increases in the demand for public services. The development is expected to increase use of the sewer collection and treatment system capacity reserved for projected development. The applicant shall pay a sewer facilities charge as established by the Public Works Department to purchase the required capacity right (7). Other potential impacts on public services will be offset by the code required payment of Community Facilities and Transportation Fees (3). Additional fees may be levied to cover the cost to the City for project inspections and monitoring. No impacts are expected on Police Services (18).

XII. Utilities & Service Systems

The project in itself is not expected to produce significant increase in demand for utility service. As stated in item XI above, the applicant shall comply with the recently adopted municipal ordinance related to the development fees for community facilities and transportation impacts. Also, as noted in item XI, the applicant will be required to pay a Sewer Facilities Charge as established by the Public Works Department (7), thereby mitigating impacts to existing sewer system capacity to a level of non-significance. The project is also anticipated to have impacts on water and electric service, however, existing facilities are capable of handling this demand (16). Solid waste requiring disposal will be generated by employees in the project, however, this impact is considered insignificant (7). Storm drain impacts are discussed in item III above.

The potential impact of discharges into the City's sewers will be mitigated because the applicant will need to obtain an industrial pre-treatment permit from the Public Works Department pursuant to BMC Chapter 25. This process requires the installation of on-site pre-treatment of wastewater as necessary to meet all federal, state, and local limits prior to disposal into the City sewer system. The potential impact of the project on solid waste disposal (e.g. spent carbon) will be mitigated to a level of insignificance by application of the City's Source Reduction and Recycling Element and State solid waste (AB 939) and hazardous waste (HWRA) laws. (7)

XIII. Aesthetics

The proposed building itself will not have a significant effect in aesthetics. No obstructions of scenic vistas or views are anticipated, and the building is similar in bulk and scale to existing and development in the surrounding area. The proposed fifty foot high, eighteen inch diameter stack, however, may create a visual impact. Such an impact is not expected to be significant however, given the industrial nature of the area and the existence of a previously approved 200 foot high monopole for KCRA-TV on an adjacent property. In addition, the stack could be painted a color similar to that of the sky, as was approved for the KCRA monopole. Landscaping, including trees, will be planted on the project site as required by code. (3, 19)

The proposed development will create new light and glare. However, this impact is not considered to be significant if the development conforms to the Illuminating Engineering Society Lighting Handbook standards. The building is single-story, therefore it will not cast shadows on surrounding development. the fifty foot high stack however, will cast a narrow shadow. This shadow however, is not anticipated to reduce access to sunlight on adjacent properties.

XIV. Cultural Resources

The proposed project is located on an improved site in a developed area. Since the site is vacant, there are no potential historical buildings. The project is located in a commercial area and there are no known sites or areas in the vicinity associated with ethnic cultural heritage or religious or sacred uses, nor are there any known archeological, or historical resources. (2)

XV. Recreation

The proposed project will have a minimal impact recreational and/or open space facilities (17). As noted in item 11, other potential impacts on public services, including park and recreation services, will be offset by the payment of Community Facilities Fees required by code for new construction.

XVI. Mandatory Findings of Significance

The project is a short term effort to improve long term soil quality, and no long term environmental goals are prevented from being met by this project. (2, 11, 12). The project also has a potentially significant impact on degrading the environment and causing substantial adverse impacts on human beings. The evidence supporting this finding is set forth in Section V (Air Quality) of this Initial Study.

The project has a potentially significant cumulative impact, even if the project impacts were deemed not significant. The City's own experts disagreed to some extent as to whether cumulative impacts are significant when viewed in isolation from the project impacts. The Peartree Group, after review of the applicants revised Cumulative Impact Analysis (21) states that "We are pleased that Lockheed has listed future projects in the area, and agree that these are unlikely to significantly increase the risk to the same receptors affected by the subject project." (12) Dames and Moore, however, concludes that the applicants "final draft report does not adequately address cumulative impacts. (11, pg. 11)

CEQA requires that a cumulative impact analysis demonstrate the collective and incremental impacts of the project when viewed in conjunction with the impacts of past projects, the impacts of other current projects and the impacts of possible future projects. (Section 21083(b) Pub. Resources Code). While the applicant discussed past, present and reasonably foreseeable SVE projects, its discussion of other projects that also emit VOC's is inadequate. The finding of potentially significant impacts mandates preparation of an EIR regardless of cumulative impacts. However, because the applicant has stated that a strong likelihood exists that Lockheed itself will be seeking approvals of similar, albeit smaller SVE projects for other properties in Burbank (21), a cumulative impact analysis will promote the development of uniform, programmatic procedures to process these and other future projects with similar air toxic impacts.

BJ\ves\is0524

Comparison of Vinyl Chloride Emissions Under "High Efficiency" Loading Conditions
Applicant (12/94 HRA) and Dames & Moore (5/8/95 Report)

Chemical	"Low Efficiency" Loading 548 lbs/day			"High Efficiency" Loading 1410 lbs/day		
	Control Efficiency	Emissions (lbs/day)	Emissions (g/s)	Control Efficiency	Emissions (lbs/day)	Emissions (g/s)
Vinyl Chloride (12/94 HRA Table 4)	0.00	0.080	4.22×10^{-4}	0.00	*0.140*	*7.36×10^{-4}*
Vinyl Chloride (Dames & Moore)	0.00	0.080	4.22×10^{-4}	0.00	*0.206*	*1.09×10^{-3}*

- Dames & Moore ratio of "High Efficiency" to "Low Efficiency" Conditions for Vinyl Chloride
  1410/548 = 2.573 (i.e., linear relationship)

- 12/94 HRA (Table 4) ratio of "High Efficiency" to "Low Efficiency" Conditions for all constituents, except Vinyl Chloride
  = 2.570 to 2.577 (i.e., linear relationship)

- 12/94 HRA (Table 4) ratio of "High Efficiency" to "Low Efficiency" Conditions for Vinyl Chloride
  $7.36 \times 10^{-4}/4.22 \times 10^{-4}$ or 0.140/0.080 = 1.744 or 1.750

Bibliography

Lockheed Enhanced Vapor Extraction System Initial Study
Conditional Use Permit 94-13/Development Review 94-12
1705 Victory Place

Materials listed in this bibliography are available for review at the Planning Division Public Counter, the City Manager's Office and the three libraries.

1. Project application package
2. City of Burbank General Plan
3. City of Burbank Zoning Ordinance
4. SCAQMD Permit Application
5. RWQCB 1987 Order of Abatement
6. DTSC Permit Information Letter, February 21, 1995
7. Department Comments- Public Works
8. SCAQMD Rule 1401 Health Risk Assessment- Montgomery-Watson, Revision 1.0, January 1995
9. Project Life Health Risk Assessment- Montgomery-Watson, January 1995
10. Project Non-Cancer Risk Assessment- Montgomery-Watson, February 1995
11. Project Report- Dames and Moore- May 5, 1995
12. Project Report- Peartree Group- March 8, 1995 (with supplements March 24 and May 2)
13. Lockheed additional project information, and responses to City/consultant comments.
14. Department Comments- Public Service
15. Project Noise Study- Marshall Long Acoustics, August 1994
16. Department Comments- Fire

17. Department Comments- Parks and Recreation

18. Department Comments- Police

19. Department Comments- Community Development

20. Department Comments- Building

21. Project Cumulative Impact Analysis- Prepared by Douglas Wood and Associates for Lockheed, April 1995

22. City of Burbank- Seismic Hazards Constraints Map (September 1990)

23. SCAQMD CEQA Handbook- April 1993

24. CDD Department Correspondence, May 17, 1995 concerning growth of organic material.

APPENDIX B

NOTICE OF PREPARATION AND RESPONSE LETTERS

CITY OF BURBANK
275 EAST OLIVE AVENUE, P.O.BOX 6459, BURBANK, CALIFORNIA 91510-6459

DATE: June 1, 1995

TO: Interested Parties

FROM: Rick Pruetz, Chief Asst. Community Development Dir./City Planner

SUBJECT: NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT (EIR) FOR A PROPOSED SOIL VAPOR EXTRACTION SYSTEM ON VACANT PROPERTY AT 1705 VICTORY PLACE, OWNED BY LOCKHEED-MARTIN CORP.

Dear Interested Party:

The City of Burbank, as Lead Agency, is preparing an Environmental Impact Report (EIR) for a Conditional Use Permit and Development Review application by Lockheed Martin Corp for a Soil Vapor Extraction (SVE) system on vacant property at 1705 Victory Place. The City of Burbank will be the Lead Agency for this project and has prepared this Expanded Notice of Preparation (ENOP) pursuant to Section 21080.6 of the State Public Resources Code and Section 15082 of the California Environmental Quality Act Guidelines (State CEQA Guidelines).

The purpose of this ENOP is to inform agencies and the general public that an EIR is being prepared for this project and to invite specific comments on the scope and content of the EIR. The State CEQA Guidelines require a 30 day period within which responses will be accepted. The City needs to know the views of each public agency as to the scope and content of the environmental information which is germane to that agency's statutory responsibilities in connection with the proposed project. Each public agency will need to use the EIR prepared by the City when considering your permit or other approval for this project.

Two public scoping meetings have been scheduled for the proposed project on Thursday, June 22, 1995 An afternoon meeting will be held at 2:30 p.m., and an evening meeting will be held at 6:30 p.m. Both meetings will take place at the Burbank Central Library, 110 N. Glenoaks Blvd.

If you represent a public agency, private firm, or other entity, please indicate a contact person. If you have any questions in this regard, please contact Bill Jacobs, Assistant Planner, at (818) 953-8628. Thank you for providing input to this project.

EXHIBIT A

CITY OF BURBANK
275 EAST OLIVE AVENUE, P.O.BOX 6459, BURBANK, CALIFORNIA 91510-6459

EXPANDED NOTICE OF PREPARATION FOR THE LOCKHEED SOIL VAPOR EXTRACTION SYSTEM ENVIRONMENTAL IMPACT REPORT (EIR)

INTRODUCTION

The applicant, Lockheed Martin Corp. has filed applications for a Conditional Use Permit and Development Review with the City of Burbank for a 6,000 sf Soil Vapor Extraction (SVE) System facility, including a 50 foot high emissions stack. An application has also been filed by Lockheed with the South Coast Air Quality Management District (SCAQMD) to construct and operate this facility. The applicant is proposing this project under an order from the California Regional Water Quality Control Board (RWQCB), Los Angeles Region, to clean up and abate soil contamination form former manufacturing operations on the project site.

Pursuant to Section 21080.6 of the State Public Resources Code and Section 15082 of the California Environmental Quality Act Guidelines (State CEQA Guidelines), the City of Burbank is submitting this Expanded Notice of Preparation (ENOP) to responsible agencies, other key agencies, private organizations, and individuals. The City of Burbank will act as the Lead Agency for this project and will prepare the Environmental Impact Report (EIR).

PROJECT DESCRIPTION

Project Location and Site Conditions

The project site is primarily at the eastern corner of an approximately 100 acre vacant site (Attachment 2). The project will be located at 1705 Victory Place, at the northwest corner of the junction of Victory Place and the Southern Pacific Railroad right of way (Attachment 1).

The site is bounded by railroad tracks and freeway to the north and east, vacant land to the west, and residential and strip commercial to the south.

Proposed Land Use

The project consists of a SVE facility contained within a 6,000 sf one-story building, including a 500 feet high emissions stack at the eastern end of the subject property. The remainder of the vacant property will contain the SVE ventfield as shown in Attachment 2.

COMMUNITY DEVELOPMENT DEPARTMENT

Administration • (818) 953-9774 | Building Division • (818) 953-9541 | Housing & Grants Division • (818) 953-9590 | License & Code Services • (818) 953-9596 | Planning Division • (818) 953-9586 | Redevelopment D... (818) 953-95...

Required Entitlements/Approvals

- a Conditional Use Permit (CUP 94-13) from the City for an emissions stack in excess of 35 feet.
- a Development Review approval (DR-94-12), and a building permit from the City for the proposed 6,000 sf building.
- a grading permit from the City for the proposed building and on-site drainage control
- an Industrial Waste Discharge permit from the City
- a Permit to Construct and Operate from the Air Quality Management District.
- review and approval from the Regional Water Quality Control Board, Los Angeles Region, pursuant to Cleanup and Abatement Order 87-161.
- review by California Department of Toxic Substances Control

PROJECT ALTERNATIVES

As cleanup of the site was required under an order from the Regional Water Quality Control Board, the No Project alternative will not be addressed in detail. The EIR will address alternative technologies proposed for the site, and if feasible, alternative locations for the treatment plant only, focusing exclusively on other properties owned by Lockheed.

CEQA required the evaluation of a reasonable range of alternatives, including the No-Project Alternative. The City of Burbank believes that considering the alternative technologies already considered by Lockheed and the City's consultants (Dames and Moore and The Peartree Group) for the proposed site, as well as the No-Project alternative, would constitute a reasonable range of alternatives. The evaluation of these alternatives will be qualitative, as permitted under CEQA, but will be in sufficient detail to permit sound, well-reasoned decisions by the City and other decision makers.

ENVIRONMENTAL IMPACT REPORT APPROACH

The EIR will focus on the potential health risks of the project in terms of air and water quality, health hazards and risk of upset, including risk of upset as a result of liquefaction. As discussed in the attached initial study, these are the major issues of concern regarding this project, and the remaining issues on the Initial Study checklist are currently considered either non-significant or sufficiently mitigated through existing plans, programs, or ordinances.

POSSIBLE ENVIRONMENTAL EFFECTS

Air Quality

The project is proposed to extract and clean up soil toxins from the project site, and it is estimated by the applicant to be in operation for approximately 8.5 years. As a result of this process, potentially harmful levels of toxins are anticipated to be released into the air. Approximately 10 pounds of Volatile Organic Compounds and 9.8 pounds of Reactive Organic Gasses (a subset of VOC's that are precursors to smog) are estimated by the applicant to be released per day. Many of the emissions of the treatment plant will be carcinogenic. Re-injection of a portion of the emissions treated through the SVE system will reduce health risks. However, the proposed system does not treat Vinyl Chloride, which may require separate monitoring, as outlined by the City's consultant reports. The project has a potentially significant impact in that it may expose sensitive receptors to pollutants. The project would be located within 1/4 mile of existing residences. Residences within 1/4 mile of a source of toxic air contaminants are considered sensitive receptors by SCAQMD. Mitigation measures will be developed to ensue that the health risk posed by the project, measured using the Health Risk Analysis of AQMD Rule 1401, is less than $1x10^{-6}$ (one in one million) excess risk of cancer at the location designated as MEIR (Maximally Exposed Individual Resident).

In terms of operational reliability of the proposed system, there is a potential for buildup of organic materials, such as fungus, that would restrict flow through the venting system or potentially be released to the air from the system. A monitoring program for the project would need to address this issue and mitigate potential impacts. The project has the potential to "backslide," or recommence the anaerobic generation of Vinyl Chloride when the system is shut down for any reason. In addition, shutting down the system would prolong the operational life of the project beyond the 8.5 years currently anticipated by Lockheed. The Peartree Group and Dames and Moore have recommended operational flexibility in terms of permitted emissions for the first few months of operation in order to fine tune system operation.

Geological Issue

A potential "moderate to high" risk" of liquefaction exists in the area, which could create health risks if the facility is damaged, unless adequate mitigation measures are identified and required. The Building Department will require a soil study for this project to mitigate impacts of geologic hazards, and will enforce the recommendations outlined in the study.

Water

To mitigate drainage impacts of the proposed project, detailed topographic information, a drainage plan, and a containment plan for contaminated soil shall be analyzed and mitigation measures required.

Hazards

A study will be performed to determine whether on-site workers and potential shoppers could be exposed to potentially acute levels of toxics during "stagnation" episodes. An upset (i.e. spill) would more seriously impact on-site workers, visitors, shoppers etc., as well as "sensitive receptors" within 1/4 mile of the project site, than would a stagnant wind condition.

Mandatory Findings of Significance

The project is a short term effort to improve long term soil quality, and no long term environmental goals are prevented from being met by this project. The project also has a potentially significant impact on degrading the environment and causing substantial adverse impacts on human beings.

The project has a potentially significant cumulative impact, even if the project impacts were deemed not significant. The City will evaluate the project impacts in conjunction with similar impacts of past, present, and reasonably foreseeable future projects. The City may seek to develop a programmatic approach to address future SVE projects..

PUBLIC NOTICE OF SCOPING MEETING

Two public scoping meetings have been scheduled for the proposed project on Thursday, June 22, 1995 An afternoon meeting will be held at 2:30 p.m., and an evening meeting will be held at 6:30 p.m. Both meetings will take place at the Burbank Central Library, 110 N. Glenoaks Blvd.

LOCATION OF PUBLIC FILES

Documentation relating to this case is available for public inspection at the following locations:

- Burbank City Hall, 275 East Olive Ave.- Planning Division Counter and City Manager's Office
- Burbank Central Library, 110 N. Glenoaks Blvd.
- Buena Vista Branch Library- 401 N. Buena Vista St.
- Northwest Branch Library- 3323 W. Victory Blvd.

SUBMISSION OF COMMENTS

Please return your WRITTEN comments concerning this project to:

City of Burbank
Community Development Department
Planning Division
275 East Olive Ave.
P.O. Box 6459
Burbank, CA 91510-6459
Attn: Bill Jacobs

If you have any questions, please call Bill Jacobs at (818) 953-8628. DUE TO THE TIME LIMITS MANDATED BY STATE LAW, THE DEADLINE TO RETURN YOUR WRITTEN COMMENTS CONCERNING THE ISSUES THAT SHOULD BE ADDRESSED IN THE DRAFT ENVIRONMENTAL IMPACT REPORT IS JULY 3, 1995. Pursuant to state mandate, responses from public agencies must be sent by certified mail or other method that will provide a notice that the record was received (Public Resources Code Sec. 21080.4). A separate public comment period will be held on the draft EIR once it is prepared.

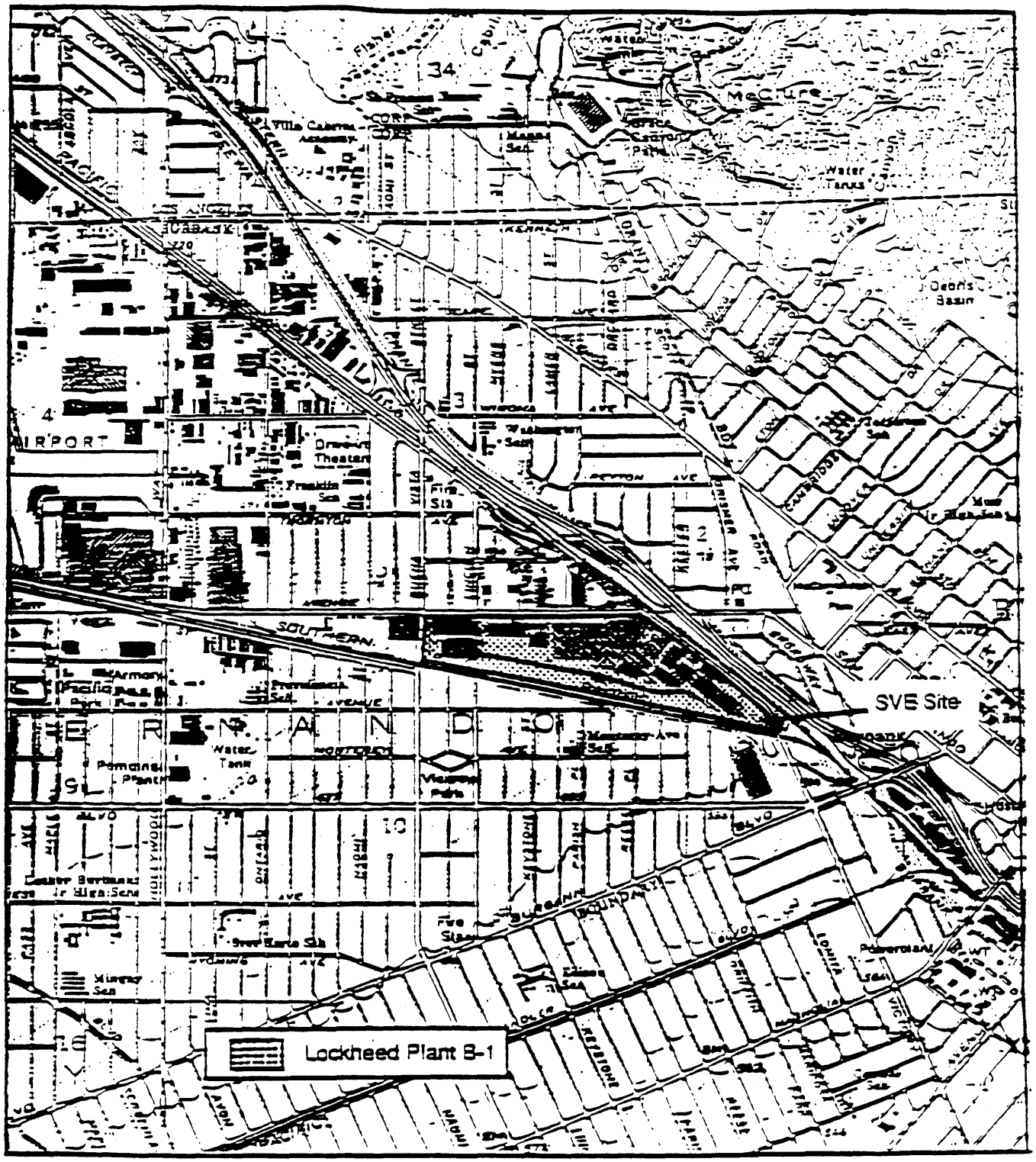
June 1, 1995
Date

Signature

Chief Asst. Comm. Dev. Dir./City Planner
Title

LIST OF ATTACHMENTS

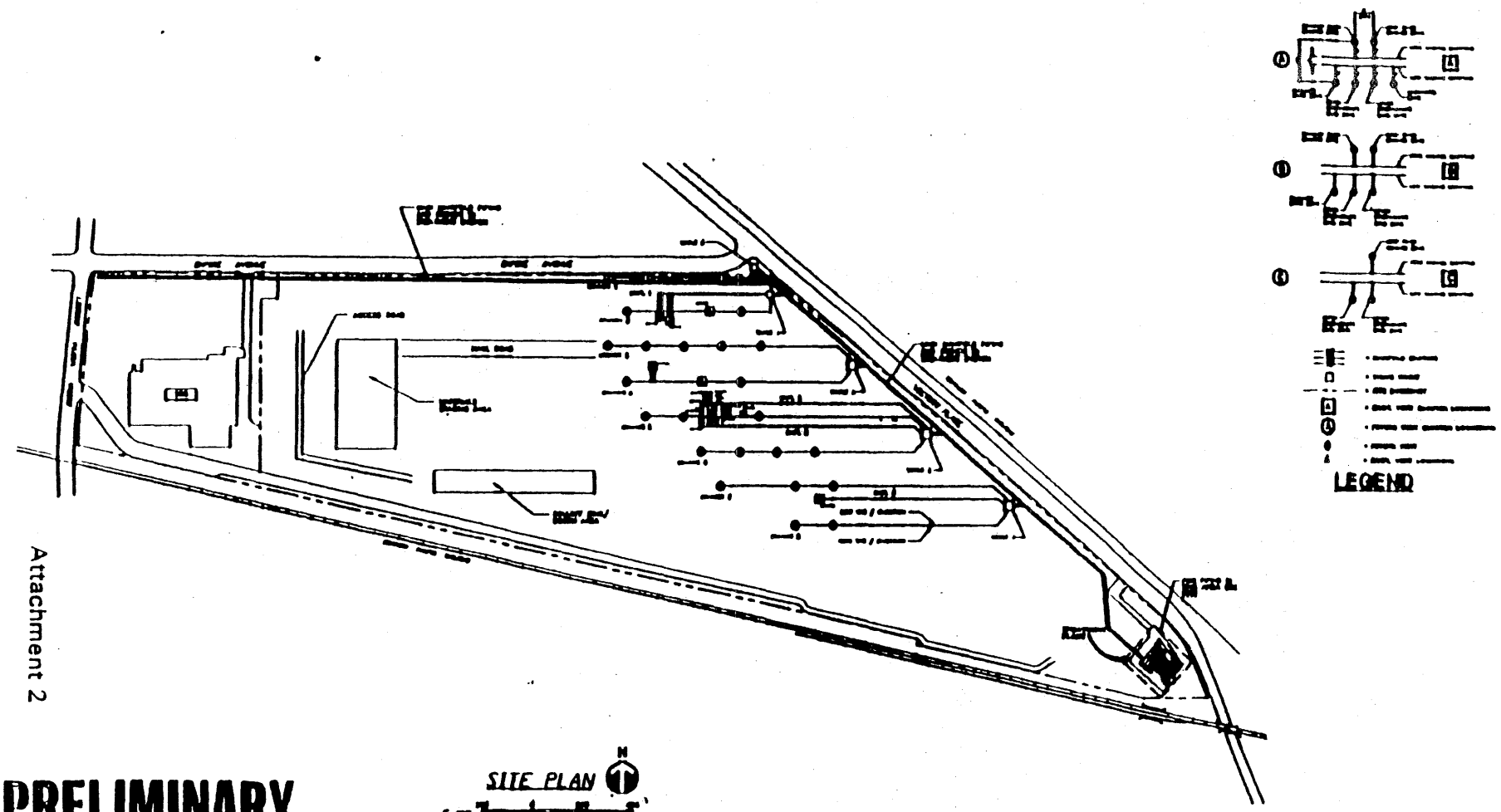
Attachment 1	Project Location
Attachment 2	Ventfield Map
Attachment 3	Initial Study
Attachment 4	Public Agency Distribution of ENOP



Attachment 1

SITE LOCATION MAP
LOCKHEED PLANT B-1
SOIL VAPOR EXTRACTION SYSTEM

Attachment 2



LEGEND

SITE PLAN

PRELIMINARY

Figure 2

Lockheed

SOIL VAPOR EXTRACTION

VENT LOCATION SITE PLAN

Attachment 3

Initial Study

Please see Appendix A of this Focused Environmental Impact Report for a complete version of the Initial Study.

Attachment 4

Public Agency Distribution of ENOP

Alex Carlos
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Pasadena CA 91109

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Western Pacific Region
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Lawndale, CA 90261

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Div. of Clean Water Programs
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Div. of Clean Water Rights
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State of CA Dept of Fish and Game
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Long Beach, CA 90802

Deborah Hermann
State of CA, Dept. of Conservation
801 K. Street, MS-24-02
Sacramento, CA 95814

Southern Pacific Railroad
One Market Plaza
San Francisco, CA 97154
Attn: Environmental Affairs

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State Clearinghouse
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Burbank, CA 91502

Dr. David Aponik
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Burbank, CA 91505

The Honorable James E Rogan
California State Assembly
300 W. Glenoaks Blvd., Ste 202
Glendale, CA 91202

The Honorable Newt Russell
California State Senate
401 No Brand Blvd Suite 424
Glendale CA 91203

The Honorable Michael Antonovitch
L.A. Co. Board Of Supervisors
869 Hall of Administraton
500 West Temple Street
Los Angeles, CA 90012

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RECYCLED PAPER

June 5, 1995

To: Bill Jacobs

From: Benjamin Kaufman

Subject: Burbank-Lockheed

Billing No.: 70140-004

Enclosed Please Find: Letter from Creative Images

- ☑ Please review and call me
- ☑ For your files
- ☐ In accordance with your request
- ☐ Please comment
- ☐ Please sign
- ☐ Please return to me
- ☐ Please telephone me
- ☐ Please review and advise me how to reply
- ☐ Please acknowledge receipt
- ☑ This letter came directly to me. It should be treated as a comment for scoping
- ☐ _____

CREATIVE IMAGES

May 31, 1995

Ben Kaufman
Freilich, Kaufman, Fox & Sohagi
The Wilshire Landmark, Suite 1230
11755 Wilshire Boulevard
Los Angeles, CA 90025-1518

Dear Mr. Kaufman:

As a citizen in Burbank, I have been concerned and following the Lockheed toxicity problem since it came to the forefront in 1994. As a result of a meeting held October 23, 1994, we at CREATIVE IMAGES decided to become more involved and embarked on researching this problem ourselves. Using the Nexis system, we compiled the enclosed report and submitted it to the 1994 city council. Both Jimmy Arone and myself have been in direct contact with George Baggett of the Peartree Group and as a result of our conversations, his advice was to make our concerns known to you directly so that they might be addressed by the EIR.

Both Jimmy Arone and myself are independent clients in the Wasserman, Comden & Cassleman v.s. Lockheed lawsuit. This does however preclude us from speaking publicly regarding the Lockheed problem. Therefore, we wish to communicate our concerns to be addressed in the EIR in this way.

We are very pleased with the fact that an EIR is now in the offing, however there are points that need to be addressed in the EIR. Our report brought up some very interesting information regarding Lockheed's proposed vapor extraction system and also focused on some of the problems not yet addressed. One major issue that must be considered is the potential for heavy metals, i.e. Lead, and the possibility of fugitive emissions that will result from the construction of the enhanced vapor extraction system.

From the Los Angeles Times, July 27, 1989, regarding this very site, "Lockheed data shows the dump as 50% - 60% soil, the rest being debris, metal, chemical waste and moisture. More lead has been found in the dump than any other contaminant, with the most polluted sample being 23% lead - or 230,000 parts of the toxic metal per million parts of soil. The highest level of TCE measured was 23 p.p.m." As you know, an amount of lead that could fit on the head of a pin in the blood stream is enough to cause birth defects, learning disabilities and other physical problems. There are also findings of Cadmium, Chromium and low levels of cyanide along with polychlorinated byphenyls or PCB's.

Advertising / Design / Broadcast Production
1227 North Ontario St. • Burbank, CA 91505-2318 • (818)-845-0079 *fax* (818)-845-0078

We hereby request that you add these concerns to the scope of study regarding the environmental impact report. We urge you to not allow this to go un-noticed. We have come so far, and as we consider the extent of the voluminous problem that Lockheed has left behind, we must leave no stone left un-turned and make sure that every aspect of this long standing problem is considered and cleaned up.

We so much appreciate the efforts of your office and the Burbank City Council in dealing with this issue. We will also be available for any additional research or follow-up that may be of your interest. Please feel free to call me directly should you have any questions regarding this report.

Thank you again for your consideration.

Regards,



Jeff Strobach
President

cc: Bud Ovrom, Burbank City Manager
George Baggett, Peartree Group

CREATIVE IMAGES

Jeff Strobach, President
Nancy McCrary, Staff Writer & Researcher
(818) 845-0079

In direct response to the meeting held October 23, 1994 by the resident's of Burbank, we at Creative Images have offered our research services to the resident's in regards to the proposed Vapor Extraction "Stack" at the Burbank Lockheed site. This data was collected via the Nexis system and due to the volume we have only printed exerts, however, we do have complete copies of all articles sited herein. All dates and sources are listed as well. Please be aware there may be more information out there that did not come to our attention. We in no way declare this a complete report due to the time limitations we had to prepare this for the City Council Meeting on October 25, 1994.

Additionally, we were unable to locate any information on Lockheed's Seattle/Tacoma site where we were informed they already had a "Stack" in operation. You will note however, we did come across the date the site was declared a Superfund.

On final note before we begin I was informed this morning by an un-named source that Lockheed withdrew their request to build the proposed fifty foot stack and are now proposing to build a thirty-five foot stack which will not require a city permit. We feel it is imperative that this community continue in it's efforts to protect our children, ourselves and our property.

Thank you for your concern.

Metal Working News, July 20, 1987

Lockheed's Harbor Island near Seattle has been declared a contaminated area and is included in the Superfund, the federally administered toxic waste clean up program.

Aviation Week, October 10, 1988

39 Lockheed employees from the Burbank site have filed a 50 million dollar lawsuit in exemplary damages and 5 million in punitive damages for each plaintiff. The employees alleged the following; Employees suffered from cancer and various skin problems, such as discoloration and rashes as a result of extended improper exposure to toxic chemical substances. Lockheed was aware that prolonged exposure to certain substances in the facilities would be hazardous to the health of employees but concealed that information from the employees and advised them it was safe to work in close proximity to the materials.

San Jose Business Journal, August 13, 1990

Lockheed's estimated pounds of emission per year at the Sunnyvale site is the second highest in the county at 393,789 pounds per year. The polluting chemicals are listed as; freons, benzene, cellosolve, acetate, chromium, dioxane, formaldehyde, lead, methyl alcohol, methyl chloride, percholoroethane, trichloroethylene, and xylene.

Business Wire, January 14, 1991

State Heath Director, Kenneth W. Kizer, M.D. announced a $275,00 settlement of a hazardous waste lawsuit filed against Lockheed in Sunnyvale, Ca. Kizer said, "Lockheed is a large and technically sophisticated company, experienced in hazardous waste management, however, we are disappointed that this is the second time in just a few years we've had to take strong action against this company. The complaint alleges; Lockheed failed to notify the Department of Health Services before removing a hazardous waste operation from service, stored hazardous waste for more than ninety days without a permit, stored more than 5,000 gallons of hazardous waste for more than ninety days without a permit, and left asbestos waste in unsafe and leaking containers. (In 1987 Lockheed paid DHS 1.3 million for numerous alleged hazardous waste violations at the same facility).

Los Angeles Times, November 10, 1991

With little public debate or congressional review, the Department of Defense is reimbursing big contractors millions of dollars for environmental clean up costs, The Times has learned.

Among the suppliers who benefit are Lockheed Corp., Boeing Co., Northrop Corp., . . . The policy could make the government a key underwriter of the multibillion dollar effort to restore the 1,228 Superfund sites. That's because most big military contractors are liable for clean ups at multiple sites. The ten largest contractors alone have been sited for potential Superfund liability 221 times, according to figures obtained from the EPA.

Under the Superfund program, the EPA identifies the worst toxic waste sites and orders those responsible to clean them. The Superfund law requires that private funds be used whenever possible.

The basis for repaying clean up costs is the federal Acquisition Regulation, compendium of rules covering government contracts. According to the regulation, the government is to reimburse costs that are "reasonable" and "ordinary and necessary to the conduct of the contractor's business". This is being interpreted to include environmental cleanups, which are billed as overhead expenses in current and future contracts.

Critics, however, say the policy amounts to a bailout of wealthy corporations that should clean up after themselves. "First, it's unfair, it's immoral, it's wrong for taxpayers to pick up the bill for military contractors, " said Lenny Siegel of the National Toxics Campaign Fund, an environmental group. "But more important, if Big Daddy ... says: 'Don't worry about your environmental practices; we'll bail you out any time your caught,' then that's not very much incentive for them to clean up their act." Siegel said.

"I'm not sure how many taxpayers are even aware that this is going on," said Kevin Page of the Project on Government Procurement, a private group that monitors U.S Military and environmental spending.

The Associated Press, July 24, 1992

A man who blames his kidney cancer on years of handling a toxic chemical in his work for a defense contractor is suing the compound's maker.

James Baker said he believes his cancer was caused by hydrazine, a carcinogenic component in rocket fuel he handled at the Lockheed Missiles & Space Co. He and another former Lockheed employee, Archie Bashor filed a $75 million federal lawsuit. (Baker's lawyer, Richard Alexander, said Lockheed wasn't sued because California law precludes such lawsuits by workers against employers.

Lockheed said last September that two former employees had died to renal cancer but declined to name them.

* Archie Bashor, Ralph Wilcox and James Baker all died from their disease.

BNA Occupational Safety & Health Daily, August 27, 1992

(Bashor v. Olin Corp., DC Ncalif, No. C-92 20463, filed 7/22/92) Warnings required; Used since the 1940's as a propellant, hydrazine was first suspected of causing cancer, birth defeats, and neurological disorders in the 1960's, but warnings were not required until 1978. Since 1983 California's workplace airborne contaminant standard has required labels and other warnings for hydrazine and its derivatives and since Jan 1, 1989, exposure warnings have been required under Proposition 65.

In a 1990 safety report attached to the complaint, Olin described hydrazine as a highly toxic carcinogen affecting the liver, kidneys, nervous system, blood, reproductive and respiratory systems, skin and eyes and cautioned that inhalation may produce cancer. Olin advised workers to wear gloves, boots, apron and a face shield with safety glasses. A full impermeable suit is recommended if exposure is possible to a large portion of the body.

Lockheed denies that the illness of Baker & Bashor and several others who allegedly contracted renal cancer are a result of exposure to hydrazine. Lockheed spokesman Keith Mordoff told BNA, "They only used hydrazine in very small, laboratory

quantities." Another spokesman Bob Burgess told BNA that the company had conducted medical studies if hydrazine but he declined to explain the nature of those studies.

Chemical Engineering, September 1994

Installing a membrane vapor recovering systems permits 90% to 99% recovery and direct recycling of VCM from the condenser vent. First, process vent gas is compressed to 55 psig, and liquid VCM is condensed from this stream at -10 degrees C. The vent of this condenser is then sent to the membrane unit, which recovers VCM as a concentrated permeate, recycling it to the process. The vent from the membrane unit is then sent to incinerator to destroy the trace amounts of VCM remaining.

Because the driving force for the membrane process already exists in the PV process, the installation requires only membrane modules and appropriate valvin and piping, minimizing installation and operating costs. The first such commercial unit was installed in 1991 and expanded this year, and now recovers over 200 lb/h of VCM. Two others have since followed. In all three cases, each unit paid for itself in less than one year.

Membrane vapor separation also allows polyolefins producers to recover nitrogen and explosive gases involved in their production routes. Most of the polyethylene and polypropylene world wide is made by gas-phases, fluidized-bed processes, which, typically emit less hydrocarbon than older polymerization methods. Even so, explosive hydrocarbons such as hexane are emitted during resin degassing.

To ensure safety, many manufacturers purge the resin with nitrogen, then flare the hydrocarbon vents, but the costs involved are quite high. Membrane separation allows for recovery of both the hydrocarbons and the nitrogen. A membrane vapor separation systems recovers 95-99% of the 2 vol.% of hexane from the nitrogen used in polyolefin degassing, allowing nitrogen to be recirculated back to the resin degassing operation. Compared with flaring, the membrane process offers the compelling economic advantage of recovering nitrogen.

Membrane vapor separation has proven an effective way to remove VOC's from the air. So far, 26 commercial systems have been installed in the U.S. alone. In addition to the VCM and chiller purge recovery units .... another has been installed in a soil vacuum extraction unit, to recover carbon tetrachloride and chloroform.

VOC Recovery: These pollutants can be recaptured;

Acetaldehyde, acetone, acetonitrile, benzene, butane, carbon tetrachloride, CFC-11, CFC-12, CFC-113, chlorine, chloroform, ethylene dicholride, ethylene oxide, HCFC-123, hexane, methanol, methyl bromide, methyl chloride, methyl chloroform, methyl isobutyl ketone, methylene chloride, perfluorocarbons, propylene oxide, styrene, toluene, trichloroethylene, vinylm chloride and xylenes.

CITY OF BURBANK

Aerospace Daily, March 1989

LASC Burbank -- home of Lockheed's Skunk Works secret research facility -- is widely believed to produce the F-117A stealth fighter. Employees working with advanced composite materials at the plant alleged that the materials are toxic, causing injury and in some cases, death. Some 75 employees filed suit three years ago in a California court, and the company has said that about 150 worker have filed workman's compensation claims.

Lori Liberty, who worked for LASC in Burbank for nine years, told a Senate Environment and Public Works subcommittee earlier this month that adequate steps weren't taken to protect her from exposure to toxic chemicals that have made her so ill that she hasn't been able to work for two years. She also claimed that Lockheed used her as a "guinea pig" by strapping various monitors and test equipment on her while she worked with unlabeled chemicals.

Inspectors found some 36 serious violations, one in which there is a "substantial probability that death or serious physical harm could result, and the employer knew or should have known the hazard.

Los Angeles Times, July 1, 1989

The Department of Labor announced Lockheed has agreed to pay $1.5 million dollars in penalties -- the full amount proposed by the federal agency for a total of 440 violations of work place safety rules. This is the highest fine to be paid by a company for health and safety violations in California and the second largest by a company in the 19 year history of the federal Occupational Safety and Health Administration.

The investigation was prompted by workers claims that dozens of Lockheed employees had become ill from exposure to hazardous substances at the plant. OSHA asserted that Lockheed failed to properly mark which chemicals and other materials were dangerous and to adequately warn workers how to safely use them. The agency also alleged that Lockheed kept poor records about which workers became sick or injured at the plant.

In March OSHA announced that it was launching a "wall to wall" investigation of all Lockheed facilities in Burbank, Palmdale and Rye Canyon.

Los Angeles Times, July 27, 1989

Lockheed dumped 300 truck loads of contaminated soil to Kettleman Hills hazardous waste landfill in Kings County from their Burbank site.

Lockheed soil tests found high levels of lead and other paint waste along with construction debris, oils, solvents, cadmium chromium and low levels of cyanide and polychlorinated byphenyls or PCB's (extremely long lived chemicals that have been banned).

Lockheed disclosed the dumps existence to water quality officials in 1985 during an investigation of leaking fuel and chemical tanks at the complex.

Lockheed data shows the dump as 50% - 60% soil, the rest being debris, metal and chemical waste and moisture. More lead has been found in the dump than any other contaminant, with the most polluted soil sample being 23% lead - or 230,000 parts of the toxic metal per million parts of soil. The highest level of TCE measured was 23 p.p.m.

On June 16, 1989 during the disposal of this soil CHP investigators complained to Lockheed that they failed to file complete manifests (paper work needed to legally transport toxic materials via trucks on our highways) the manifest Lockheed filed was not an accurate list of all of the toxic waste chemicals being transported. Lockheed was then required to provide CHP with a corrected list.

On June 30, 1989 AQMD discovered Lockheed lacked the necessary permit needed to excavate the landfill.

Los Angeles Business Journal, April 15, 1993

The Federal General Accounting Office estimated Lockheeds share of the cost in cleaning up the contaminated soil in Burbank at $194 million. Lockheed may seek reimbursement of up to 70% of it's cost from the Pentagon for cleaning up a Superfund project, leaving taxpayers to pay up to half of the total cost in cleaning up the water and the soil at the Burbank site.

The EPA designated the ground water under the Burbank site as a Superfund project in 1987, but federal agencies have just begun an investigation on whether the soil should also be a part of the Superfund site.

The soil and ground water are contaminated with perchlorethylene and trichloroethylene solvents which are used to degrease metals and are suspected to cause cancer.

Ken Philbrick, Lockheed Corporate Real-Estate Director said the vapor extraction will take years and will only partially clean toxins from the soil.

Los Angeles Business Journal, June 14, 1993

In early April people involved in the clean up of toxic waste at the Lockheed site said redevelopment of the land any time in this century looked unlikely. Such development may have to wait for many years until all the contamination is cleaned up, officials and legal experts said.

Burbank Community Development Director, Bob Tague who was quoted in the L.A. Times story said he spent much of June 8th on the telephone explaining the situation to journalist {Wal-Mart backed out of purchasing the Lockheed site} and attempting to quiet the broadcast reports.

SCAG
SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS
818 West Seventh Street,12th Floor • Los Angeles, California 90017-3435 ☐ (213) 236-1800 • FAX (213) 236-1825

June 6, 1995

Mr. Bill Jacobs
City of Burbank Community Development Department
275 East Olive Avenue
P.O. Box 6459
Burbank, CA 91510-6459

RE: SCAG Clearinghouse #: I9500246
Project Title: NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT FOR A PROPOSED SOIL VAPOR EXTRACTION SYSTEM FACILITY

Dear Mr. Jacobs:

We have reviewed the above referenced document and determined that it is not regionally significant per Areawide Clearinghouse criteria. Therefore, the project does not warrant clearinghouse comments at this time. Should there be a change in the scope of the project, we would appreciate the opportunity to review and comment at that time.

A description of the project will be published in the June 15, 1995 Intergovernmental Review Report for public review and comment.

The project title and SCAG Clearinghouse number should be used in all correspondence with SCAG concerning this project. Correspondence should be sent to the attention of the Clearinghouse Coordinator. If you have any questions, please contact Dan Akins at (213) 236-1972.

Sincerely,

Eric H. Roth

ERIC H. ROTH
Manager, Intergovernmental Review

RECEIVED
JUN 9 1995

Stella Mendoza City of Brawley-President, Ed Edelman Los Angeles County-First Vice President, Dick Kelly City of Palmdale-Second Vice President, Gaddi Vasquez Orange County- Past President, • Richard Alarcon City of Los Angeles, Richard Alatorre City of Los Angeles, Robert Bartlett City of Monrovia, George Bass City of Bell, Ron Bates City of Los Alamitos, George Battey, Jr. City of Burbank, Hal Bernson City of Los Angeles, Walter Bowman City of Cypress, Marvin Braude City of Los Angeles, Susan Brooks City of Rancho Palos Verdes, Art Brown City of Buena Park, Yvonne Brathwaite-Burke Los Angeles County, Jim Busby, Jr. City of Victorville, Bob Buster Riverside County, Laura Chick City of Los Angeles, John Cox City of Newport Beach, Cynthia Crothers City of Moreno Valley, Hal Croyts City of Lomita, Richard Dixon City of Lake Forest, Doug Drummond City of Long Beach, Lillian Eaton City of Yucaipa, Joseph Esquivel City of Lakewood, John Ferraro City of Los Angeles, Karyn Foley City of Calabasas, John Flynn Ventura County, Ruth Galanter City of Los Angeles, Sandra Genis City of Costa Mesa, Jackie Goldberg City of Los Angeles, Candace Haggard City of San Clemente, Garland Hardeman City of Inglewood, Mike Hernandez City of Los Angeles, Nate Holden City of Los Angeles, Robert Jamison City of Artesia, Jeff Kellogg City of Long Beach, Abbe Land City of West Hollywood, John Longville City of Rialto, Ron Loveridge City of Riverside, John Melton City of Santa Paula, Barbara Messina City of Alhambra, Judy Mikels City of Simi Valley, David Myers City of Palmdale, Kathryn Nack City of Pasadena, Bev Perry City of Brea, Gwenn Norton-Perry City of Chino Hills, Ron Parks City of Temecula, Irv Pickler City of Anaheim, Michael Plisky City of Oxnard, Beatrice Proo City of Pico Rivera, Larry Rhinehart City of Montclair, Richard Riordan City of Los Angeles, Mark Ridley-Thomas City of Los Angeles, Albert Robles City of South Gate, Sam Sharp Imperial County, Marcine Shaw City of Compton, Rudy Svorinich City of Los Angeles, Tom Sykes City of Walnut, Laurie Tully-Payne City of Highland, Joel Wachs City of Los Angeles, Rita Walters City of Los Angeles, Judy Wright City of Claremont, Zev Yaroslavsky City of Los Angeles •

June 12, 1995

City of Burbank
Community Develop. Dept.

Thank you for opportunity to comment on Smoke Stack Public Notice in Leader on 6/10/95.

Having followed the smoke stack publicity from its first public meeting, I have worried about its presence in Burbank. From all that I heard, it was obvious that other areas need ground cleanup and this particular organization would stand to profit from getting Burbank to approve and install their suggested method.

Please do not allow this stack method in our city. There are surely zero pollutant methods of cleaning soil and Burbank would be looked up to as a city that demanded our citizens and business be protected by searching for such methods. We have waited all this time to clean that soil and since the smoke stack method would take many years of operation, lets wait and insist on a better system.

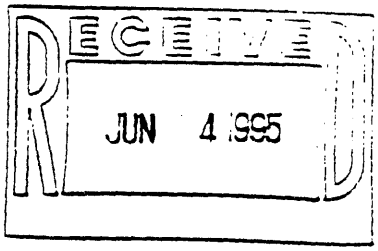
Our City Council has voted monies to be spent on cleaning our water. It is hoped that money will be used for its intended purpose and not used to further the smoke stacks.

Sincerely

June Jacobson

June Jacobson
214 No. Whitnall Hwy.
Burbank, California
91505
818-842-6737

Attn: Bill Jacobs
cc: Burbank City Council



STATE OF CALIFORNIA—ENVIRONMENTAL PROTECTION AGENCY

RECEIVED JUN 2 2 1995

PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION
101 CENTRE PLAZA DRIVE
MONTEREY PARK, CA 91754-2156
(213) 266-7500
FAX: (213) 266-7600

June 14, 1995

The Honorable David Golonski
Mayor of Burbank
275 East Olive Avenue
P. O. Box 6459
Burbank, CA 91510-6459

Dear Mayor Golonski:

We have reviewed the City of Burbank's staff report for the May 23, 1995, City Council/Redevelopment Agency meeting and the final reports from the City of Burbank's consultants (Dames & Moore and The Peartree Group) on the proposed Lockheed Plant B-1 soil vapor extraction system (VES).

Dames & Moore and The Peartree Group concluded that the proposed VES provides the best available and proven technology to remediate the site and that potential risks posed by emissions from the system will be within the acceptable range. Neither Dames & Moore nor The Peartree Group recommended an EIR. We agree with Dames & Moore that monitoring of the emissions should be included to compensate for uncertainties in the estimated emission rates and to ensure that the public's health concerns are met. Lockheed has indicated that they will work with the City to prepare a monitoring plan to address all of the potentially significant impacts identified in the Initial Study.

We are concerned with the potentially significant environmental impacts assumed by City of Burbank's staff as stated in the California Environmental Quality Act (CEQA) Initial Study for the proposed project. We do not believe that the predicted impacts from the proposed VES are significant to justify further delays with this cleanup project.

We concur with Lockheed's initial VES design and that the proposed cleanup technology is appropriate and safe. The measures taken by Lockheed to reduce emissions present further justification for allowing the project to proceed. This soil cleanup program is important because soil contaminants, if not removed, will continue to migrate downward and contaminate an important source of local drinking water. We support this project to restore the beneficial uses of the groundwater for the benefit of the citizens of Burbank and the environment. Specific comments on the Initial Study follow.

I. Land Use and Planning, Sections a and c

The mitigation proposed by Lockheed is required for land to become compatible with land use policy. The land cannot be used in its current state. The proposed project will not adversely impact existing land use in the vicinity, but makes the land usable.

III. Geologic Problems, Section c

The proposed project cannot affect seismic ground failure in the area. The Initial Study states that no unique geologic features have been observed on the site and the surrounding area and none are known to exist and that no impacts on these issues are expected to occur. The City identified the risk of liquefaction in the area, which could potentially result in health risk if the facility is damaged. Lockheed mitigated the risk of liquefaction by compacting the soil to 95% of maximum compaction down to 23 feet below ground surface.

IV. Water, Sections a and c

At present, the site is bare, graded land which could easily be improved with the proposed cleanup program. In addition, Lockheed removed subsurface structures during site demolition. Also, any near-surface soil contamination was removed to acceptable levels. These areas have been backfilled with clean soil. Untreated soil containing pollutants is not expected to drain into the City storm drain system.

IX. Hazards, Sections a, c, and d

The goal of the proposed VES is to mitigate potential health hazards. Accidental explosion should be minimal because there is no extreme pressure or vacuum involvement. Standard use of activated carbon, scrubber system, and a monitoring program, should prevent risk of high VOC concentrations. In addition, secondary containment structures in designated areas of the treatment plant, double-wall solvent recovery tank, and automatic shutoff are included in the design to prevent migration of any spill material and exposure of people to potential health hazards.

While there are differences in opinion between Lockheed and the City's consultants on how vinyl chloride emission rates should be calculated in the risk assessment, this may not matter much since the concentration of vinyl chloride at the site is extremely low. In fact, out of hundreds of soil vapor samples collected and tested, vinyl chloride was detected in less than 20 samples with concentrations not exceeding 255 ug/l, except for one sample with 1058 ug/l of vinyl chloride. Further, the emission rate is a best estimate

derived using models. Actual emission rates based on operational data will provide more accurate data. We believe that uncertainties in the estimated emission rates can be managed by instituting a monitoring program to address public health concerns. In the event emissions exceed the predicted range, the operation can be reduced or the system temporarily shut down.

We do not believe that the predicted impacts from the proposed VES are significant to justify further delays. The modifications made by Lockheed on the proposed project should mitigate the potential impact issues raised by the City. Delaying the project would provide no tangible benefit to the environment, and may pose a further threat because of migration of subsurface contaminants. If the City decides to proceed with an EIR, we urge you to complete the EIR process as quickly as possible so that the cleanup may proceed to protect a valuable water resource. In an earlier letter to former Mayor Wiggins, I requested from the City a timeline for completing the environmental review process. I have not yet received a response to that request. As the lead state agency overseeing the cleanup of Lockheed properties, we want to make sure that the cleanup stays on track.

My staff and I would be pleased to meet with you or your representatives at your convenience to discuss this project. Please do not hesitate to contact me at (213) 266-7510 if you have any questions.

Sincerely,

Robert P. Ghirelli

ROBERT P. GHIRELLI, D.Env.
Executive Officer

c:\Lockheed\8-1\remed\voc\burmayor.3

cc: Honorable Newton Russell, California State Senate
Honorable James Rogan, California State Assembly
Jorge Leon, SWRCB, Office of the Chief Counsel
Hamid Saebfar, CALEPA, DTSC-Region 3
Steve Jones, SCAQMD
David Seter, U.S. EPA, Region IX
Joseph Fletcher, City Attorney, City of Burbank
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Robert Tague, Community Development Dept., City of Burbank
Rick Pruetz, Community Development Dept., City of Burbank
Mel Blevins, ULARA Watermaster
Ron Helgerson, Burbank Program Office, Lockheed Martin Corp.
Carol Yuge, Burbank Program Office, Lockheed Martin Corp.

STATE OF CALIFORNIA PETE WILSON, *Governor*

GOVERNOR'S OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET
SACRAMENTO, CA 95814

RECEIVED JUN 19 1995

DATE: June 15, 1995

TO: Reviewing Agencies

RE: LOCKHEED SOIL VAPOR EXTRACTION SYSTEM
SCH# 95061010

Attached for your comment is the Notice of Preparation for the LOCKHEED SOIL VAPOR EXTRACTION SYSTEM draft Environmental Impact Report (EIR).

Responsible agencies must transmit their concerns and comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of this notice. We encourage commenting agencies to respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

RICK PRUETZ
CITY OF BURBANK
275 EAST OLIVE AVE.
BURBANK, CA 91501

with a copy to the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the review process, call Mark Goss at (916) 445-0613.

Sincerely,

Michael Chiriatti, Jr.
Chief, State Clearinghouse

Attachments

cc: Lead Agency

NOP Distribution List

95061010

SCH# ~~95061010~~

S = sent by lead agency
X = sent by SCH

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[ ] Wayne Hubbard
State Water Resources Control Board
Division of Clean Water Programs
P O. Box 944212
Sacramento, CA 94244-2120
916/227-4308

[X] Phil Zentner
State Water Resources Control Board
Division of Water Quality
P O. Box 944213
Sacramento, CA 94244-2130
916/657-0912

[ ] Mike Falkenstein
State Water Resources Control Board
Division of Water Rights
901 P Street, 3rd Floor
Sacramento, CA 95814
916/657-1377 (8-437)

[X] Dept. of Toxic Substances Control
CEQA Tracking Center
400 P Street, Fourth Floor
P O. Box 806
Sacramento, CA 95812-0806
916/324-3119

Regional Water Quality Control Board

[ ] NORTH COAST REGION (1)
5550 Skylane Blvd. Suite A
Santa Rosa, CA 95403
707/576-2220 (8-590)

[ ] SAN FRANCISCO BAY REGION (2)
2101 Webster Suite 500
Oakland, CA 94612
510/286-1255

[ ] CENTRAL COAST REGION (3)
81 Higuera Street, Suite 200
San Luis Obispo, CA 93401-5427
805/549-3147 (8-629)

[X] LOS ANGELES REGION (4)
101 Centre Plaza Drive
Monterey Park, CA 91754-2156
213/266-7556

[ ] CENTRAL VALLEY REGION (5)
3443 Routier Road, Suite A
Sacramento, CA 95827-3098
916/255-3000

( ) Fresno Branch Office
3614 East Ashlan Avenue
Fresno, CA 93726
209/445-5116 (8-421)

( ) Redding Branch Office
415 Knollcrest Drive
Redding, CA 96002
916/224-4845 (ATS 441)

[ ] LAHONTAN REGION (6)
2092 Lake Tahoe Boulevard
South Lake Tahoe, CA 96150
916/542-5400

( ) Victorville Branch Office
15428 Civic Drive, Suite 100
Victorville, CA 92392-2359
619/241-6583

[ ] COLORADO RIVER BASIN REGION (7)
73720 Fred Waring Drive #100
Palm Desert, CA 92260-2564
619/346-7491

[ ] SANTA ANA REGION (8)
2010 Iowa Avenue, Suite 100
Riverside, CA 92507
714/782-4130 (8-632)

[ ] SAN DIEGO REGION (9)
9771 Clairemont Mesa Blvd., Suite B
San Diego, CA 92124-1331
619/265-5114 (8-636)

[ ] OTHER _____

_____

_____

[ ] OTHER _____

_____

STATE OF CALIFORNIA—BUSINESS AND TRANSPORTATION AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, 120 SO. SPRING ST.
LOS ANGELES, CA 90012-3606
TDD (213) 897-6610

June 21, 1995

IGR/CEQA/NOP
City of Burbank
SOIL VAPOR EXTRACTION
(SVE) SYSTEM
Vic. LA-5-30.46
SCH# 95061010

Mr. Bill Jacobs, Assistant Planner
Community Development Department
City of Burbank
275 East Olive Avenue, P.O. Box 6459
Burbank, CA 91510-6459

Dear Mr. Jacobs:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above-referenced document. The construction of a 6,000 sf Soil Vapor Extraction (SVE) System facility, including a 50 foot high emissions stack. Based on the information received, we find no apparent impact on the State Transportation System at this time.

However, any transport of hazardous waste or heavy construction equipment which requires the use of oversize transport vehicles on State Freeways will require a Caltrans transportation permit. We recommend that large size trucks that are transporting construction materials, equipment or excess excavation materials be limited to off-peak commute periods.

The applicant shall comply with all applicable hazardous waste safety measures when transporting materials from the site.

Thank you for this opportunity to comment. If you have any questions regarding these comments, please call me at (213) 897-1338.

Sincerely,

Wilford Melton

WILFORD MELTON
Senior Transp. Planner
IGR\CEQA Coordinator
Office of Advance Planning

cc: Mark Goss
State Clearinghouse

nh\6027

RECEIVED
JUN 6 1995

TO SJ

BURBANK UNIFIED SCHOOL DISTRICT
330 NORTH BUENA VISTA STREET • BURBANK • CA • 91505-3698
TELEPHONE • (818) 558-4600 FAX • (818) 846-9483

VIA FAX & U.S. MAIL

June 23, 1995

Mr. Rick Pruetz, City Planner
City of Burbank
275 East Olive Avenue
Burbank, CA 91505-6459

RE: ENVIRONMENTAL IMPACT REPORT FOR THE PROPOSED SOIL VAPOR EXTRACTION SYSTEM ON VACANT PROPERTY AT 1705 VICTORY PLACE, OWNED BY LOCKHEED-MARTIN CORPORATION.

Dear Mr. Pruetz:

The Burbank Unified School District is in receipt of the notice of preparation of an environment impact report (EIR) for a proposed soil vapor extraction system on the Lockheed-Martin Corporation property located at 1705 Victory Place in the City of Burbank. We are very pleased the City of Burbank, as the lead agency, is taking a very active role in this issue.

As I am sure you are aware, the School District has been very concerned about the potential impact and public health risks of the proposed soil vapor extraction system at the subject property. Last year the Board of Education raised questions about the soil clean up facility proposed by Lockheed-Martin Corporation. On September 7, 1994 School District staff, in a letter to the South Coast Air Quality Management District (SCAQMD) and Lockheed Corporation formally protested the issuance of a permit to construct and operate the proposed soil vapor extraction system. Furthermore, we invited representatives of the SCAQMD and Lockheed Corporation to appear before the Board of Education at the regular meeting of Oct 6, 1994. At that meeting representatives from Lockheed Corporation answered questions from the School District's Board of Education, staff, students and parents regarding potential public health risks of the proposed facility. Subsequently, at the regular meeting of November 17, 1994 the Board of Education, acting on behalf of the students and employees of the School District, officially took the position that an EIR should be completed relative to the proposed project.

Now that the City of Burbank is proceeding with the preparation of the subject EIR, the Burbank Unified School District wishes to request that, at minimum, the following issues be addressed:

1) How safe is the proposed soil vapor extraction system as relates to the health and safety of the Burbank Community?

2) What are the cumulative impact of the proposed system and other soil clean up systems currently in place and/or planned for future installations in the City of Burbank?

3) What are all of the specific health risks associated with the proposed system, especially relative to students and employees of the School District?

4) Have other clean up systems with fewer potential health risks been considered for the soil clean up of the property? If not, why? If yes, why has this particular system been selected?

5) Is the proposed system the safest, the must effective or the least expensive soil clean up system available?

Thank you very much for providing the opportunity to comment on the proposed EIR. Should you have any questions regarding the above, please feel free to contact me at (818) 558-5300.

Sincerely,

Ali A Klafar, Assistant Superintendent
Planning, Development & Facilities

AAK/dd
S:\users\facilts\eir

STATE OF CALIFORNIA — CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

orig BJ

PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

cc RP's "UES"

1011 N. GRANDVIEW AVENUE
GLENDALE, CA 91201
(818) 551-2800

June 29, 1995

Mr. Rick Pruetz
City of Burbank
275 East Olive Avenue
P.O. Box 6459
Burbank, CA 91510-6459

Dear Mr. Pruetz:

COMMENTS ON THE NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT (EIR) FOR A PROPOSED SOIL VAPOR EXTRACTION SYSTEM ON VACANT PROPERTY AT 1705 VICTORY PLACE, OWNED BY LOCKHEED-MARTIN CORP.

The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) has reviewed the Notice of Preparation of an Environmental Impact Report (EIR) for a Proposed Soil Vapor Extraction System on Property owned by Lockheed-Martin Corp. The Draft EIR should address the following concerns:

1. A monitoring program for:

   a) fungus and organic materials which would restrict flow through the venting system

   b) vinyl chloride and what measures will be taken if the concentration exceeds the risk of 1×10^{-6}.

   c) operational flexibility of emissions during start up for fine tuning system.

2. Include clearer reproductions of Attachments 1 and 2.

3. Land Use and Planning - An explanation of why an emissions stack 50 feet high is necessary over an emissions stack 35 feet high.

4. Page 11, Geological Problems. State if exposure to emissions will occur as a result of excavation activities and if so, what measures will be taken to protect residents from exposure to these emissions.

5. Section VII. Biological Resources. State if the habitats for threatened or endangered wildlife exist at the Site.

If you have questions or would like to discuss this matter further, please contact Penny Nakashima at (818) 551-2881 or myself at (818) 551-2822.

Sincerely,

for Sara Amir
Unit Chief
Site Mitigation Operations Branch

Pamela Van Cortlandt
P.O. Box 66790, West Los Angeles, CA 90066 213-857-8062

July 3, 1995

City of Burbank
Community Development Department
275 East Olive Avenue
P.O. Box 6459
Burbank, California 91510-6459

Attention: Mr. William Jacobs, AICP
Assistant Planner, Planning Division

RE: Lockheed Enhanced Vapor Extraction System (VES) Project and current Environmental Impact Report (EIR) for the Project

Dear Mr. Jacobs:

The following points are ones which I expressed concern about and commented on at the Preliminary Scoping Meeting on June 22, regarding Lockheed's planned vapor extraction system. I have listed a few additional comments as well.

I am speaking not only for myself, but also for various neighbors and several environmental consultants who have promised to assist us with our concerns over the impending construction and operation of the VES.

1) We insist on responsible monitoring 24 hours a day throughout the life of the Project.

2) Who will be the responsible party in the interest of the citizens of Burbank and surrounding areas, to monitor the VES (not including Lockheed)?

3) We will be developing a liaison with the all or some of the following agencies: SCAQMD, Diamond Bar; CAL-EPA, Glendale; Los Angeles County Public Works Dept.; California Coalition for Clean Air; California Earth Corps; Natural Resources Defense Council; Los Angeles Water District.

4) What on-site monitors will be used? Will there be a monitor in the emmissions stack? Will there be a 50 foot monitor? Will there be a one mile monitor? Many of the chemicals are on the Proposition 65 list and require that their presence in the atmosphere be posted within a designated area.

5) Over 200 extraction systems (smokestacks) in California are operating at 99.93% efficiency. There is no explainable reason why this is not also possible with Lockheed's VES, other than a disregard for the safety of citizens, a desire to cut costs, and/or expedite start-up of project. So far we have only heard efficiency percentages in the approximate range of 96% or 97%, a best-case estimate for this project.

6) The extraction system facility, as well as certain designated high-risk areas, should be run under a vacuum at all times, in order to detect leaks of any kind (all leaks pose a potential hazard).

7) We are particularly concerned about the operation of the VES during the 60 days prior to the beginning of the permit limitations agreement. During this time there exists the potential for heavy concentrations of contaminants (especially those listed on Prop 65) to be emitted in the surrounding residential areas.

8) We are also concerned about the dispersion of toxins from the smokestack on days where a zero wind factor exists.

9) We have not been assured that toxic water or "sludge" from the holding tank will be safely transported (to be completely reused?) or alternatively, to be rendered harmless by treatment with ultraviolate and ozone (in the case of the solvents).

10) We are not sure that every effort has been made to protect us from serious exposure to Methyline Chloride and Lead emmissions from the stack.

Thank you for your attention in this matter. We kindly ask that we be kept posted regarding all meetings, findings, plans, etc. that pertain to Lockheed's planned VES.

Sincerely,

Pamela Van Cortlandt

cc: Copies of this letter will be sent out as needed to city, county and state agencies as well as environmental monitoring organizations.

A Scoping Meeting for the Lockheed Enhanced Vapor Extraction System Initial Study was held on May 15, 1995, at 6:00 p.m. in the Council Chamber.

CITY STAFF IN ATTENDANCE:	Robert Tague, Community Development Director Joe Fletcher, City Attorney Rick Pruetz, City Planner William Jacobs, Assistant Planner
OTHERS PRESENT:	Ben Kaufman, Freilich, Kaufman, Fox and Sohagi Mike Mills, So. Coast Air Quality Mgmt. District Steve Jones, So. Coast Air Quality Mgmt. District Alex Carlos, Regional Water Quality Control Board Roy Secada, Regional Water Quality Control Board Penny Nakashima, Dept. of Toxic Substances Control

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Mr. Pruetz introduced staff and representatives of the various agencies attending this meeting. Mr. Kaufman said this scoping meeting was required under the Public Resources Code to secure consultation on the draft initial study. He explained that the initial study would be finalized at a City Council meeting to be held on May 23, 1995, with a presentation by the consultants for this project, The Peartree Group and Dames and Moore. He said the purpose of the scoping meeting was not to discuss whether Lockheed's application should be approved by the City or any other agency, but to discuss the possible impacts of the project as established by state guidelines. He reviewed state CEQA guidelines requiring an initial study and scoping meeting.

Mr. Kaufman described the project which would be located on Lockheed's B-1 site, bounded by the I-5 Freeway, the railroad, Empire Avenue and Buena Vista Street. He said in 1987 the Regional Water Quality Control Board (RWQCB) had ordered Lockheed to clean up soil contamination on this site, resulting in Lockheed's submittal of an analysis of various clean-up technologies; the RWQCB accepted the vapor extraction system (VES) to be used by Lockheed. He said that pursuant to Lockheed's agreement with the RWQCB, Lockheed applied to the City and the AQMD in June 1994 to obtain permits to construct and operate the VES. He noted that, under AQMD rules, Lockheed notified nearby residents of the plans, but after public opposition, withdrew its application and suspended all processing with AQMD and the City in October 1994. He said that Lockheed then redesigned the project and submitted an enhanced VES project for consideration. He said the initial VES was expected to emit approximately 40 pounds of reactive organic gases per day while the enhanced VES would emit 9.8 pounds of reactive organic gases per day. He explained that the City hired The Peartree Group and Dames and Moore to review both the initial and enhanced VES project applications and health risk assessment and to make a formal report at the May 23 Council meeting; staff assumes an initial study will be

prepared and approved at that time. He noted that one purpose of this scoping meeting would be to finalize the lead agency designation; it was confirmed that the City of Burbank would be the lead agency for this project.

Mr. Kaufman reviewed the AQMD's CEQA Air Quality Handbook, noting that they were at the point for determining the level of significance in processing of the Lockheed application; within the next two weeks the City must prepare a notice of preparation leading to a scoping meeting after which a draft EIR is prepared and circulated to responsible agencies. He assured the audience that AQMD maintains a close relation with the lead agency during this process; after the consultation period, the lead agency will respond to comments and revise the EIR if necessary, then present the EIR for certification. He noted that the Planning Board would review the EIR and the CUP application which includes an opportunity for appeal to Council by any interested party. He said that after EIR is finalized, the lead agency files a notice of determination with the County Clerk's office to begin a review period during which any interested party may challenge the EIR. He cautioned, however, that only parties who had participated in the public input process would be permitted to challenge the EIR.

He reviewed the issue of projecting contaminant levels which was brought to the Council last week but not yet heard by the responsible agencies. Lockheed initially proposed two levels of system operation: one emitting 548 pounds of contaminants per day and a "high efficiency" operation emitting 410 pounds of contaminants per day. Dames and Moore indicated that there was little difference between these levels and expressed concern about the projected levels of vinyl chloride. Lockheed's consultant assumes the VES will remove none of the vinyl chloride coming into the plant and therefore, under high efficiency operation, about .14 pounds of vinyl chloride would be emitted daily. Both Dames and Moore and The Peartree Group indicate that the VES with carbon absorption is the best method to remediate the contamination problems at this site; however, they find Lockheed's estimated levels of vinyl chloride emission to be optimistic since their calculations indicate .206 pounds of vinyl chloride would be emitted daily in proportion to the amount of vinyl chloride collected in processing. Although Lockheed uses a linear calculation for all chemicals, they found a more conservative estimate to be reasonable for vinyl chloride. Lockheed's health risk assessment concludes that a system emitting .14 pounds of vinyl chloride per day will cause an additional .93/million cases of cancer over a 70-year period; however, Dames and Moore estimates a level of .206 pounds per day which increases the number of potential cancer cases. The AQMD rules establish separate requirements for projects having different cancer risk levels: for project having above one but below 10 cancer cases per million, the applicant must demonstrate that the project uses "toxic best available control technology". Dames and Moore contends that 70 percent reinjection is attainable for the VES system whereas Lockheed currently commits to 50 percent reinjection. This issue will be addressed at the Council meeting on May 23. In analyzing this project, the public agencies must determine what is appropriate to

require of the project, including the level of reinjection.

He reviewed the initial study. He asked about Question No. 10, concerning the inclusion of the Department of Toxic Substances Control as a reviewing agency; Ms. Nakashima answered that her agency would like to review the document and provide input where appropriate. Mr. Kaufman said the Department of Toxic Substances Control would be added to the response to Question No. 10. He noted that the initial study indicates an EIR is required for this project. He reviewed the potential impacts of the VES project to be addressed by the EIR.

Land Use: He said the conditions of the CUP would ensure that no significant impacts are created at this site. He noted that residences are located within one-quarter mile of the subject site; however, the AQMD establishes a process for health risk assessment and conditions to determine that a project is not a significant risk to sensitive receptors, such as residences. He noted that the City also has land use powers to impose conditions ensuring that new sensitive receptors do not move into the area, for example, by prohibiting residential uses on this site.

Water Impacts: He noted that the Public Works Department and Building Division indicate that there are some concerns about drainage patterns on the subject property and described the proposed vacuum/vapor pipe system.

Air Quality: He noted that this was of the greatest concern, especially with sensitive receptors located within one-quarter mile of the subject site; however, Dames and Moore and The Peartree Group would prepare an analysis of the air quality health risk assessment and reinjection program. He said objectionable odors would not be a problem. Mr. Mills said the AQMD was still reviewing the proposal which they received last week. He made the following preliminary remarks: this project is well under the CEQA Guidelines significance level of 55 pounds of contaminants per day; it appears that the exposure of sensitive receptors to pollutants would meet current regulations but the question of the number of potential cancer cases needs to be resolved; no changes in climate or impacts from odors are foreseen due to the low amount of emissions and the height of the stack, although construction emissions must be reviewed as well. Mr. Kaufman asked whether the AQMD has guidelines indicating that 97 percent efficiency for a VES could be considered best available control technology. Mr. Mills answered that their concern was that in the original initial study Lockheed indicated a 98 percent efficiency; AQMD intends to find out why this level of efficiency couldn't be achieved in the enhanced project.

Transportation/Circulation: Mr. Kaufman said the estimated number of trips to run and construct the system was not significant. He noted that the Fire Department will establish a route for Lockheed to haul off site the small amount of water having a high level of contaminants created during the steaming process.

Hazards: He said this project would involve on-site processing water having high levels of contaminants and vinyl chloride; Lockheed intends to construct a berm

around the tanks to preclude leakage into the streets as required by the Fire Department and state and federal law.

Public Services: He said this project would require an industrial pre-treatment ordinance as required by the Federal Clean Water Act and the BMC. He explained that the project involves two types of water which will be discharged into the City's sewers after a City permit is issued: condensed water from the cooling towers and condensed steam from the carbon units which will have small levels of PC and BC; however, any significant amounts of spent carbon will be sent off site.

Aesthetics: He said mitigation measures, including landscaping, would be required for the building and stack as well a requirement that the existing 200-foot monopole on the adjacent property be painted a color similar to the sky.

Mandatory Findings of Significance: He said the major concern in this section were cumulative impacts and substantial adverse impacts on human beings.

Mr. Pruetz opened the meeting for public input.

R. C. CZAPIEWSKI, 10720 Hortense Street, North Hollywood, expressed appreciation of this meeting which allows both dissemination of information and public input. He referred to page 8, Historical Resources, noting that Lockheed has already destroyed their buildings on the historic B-1 site where Air Force bombers and other innovative aircraft were designed and constructed. He informed staff that Steve Shanday, Vice President of Public Relations for Lockheed, had told him and a group of retired CIA people in person, that the government has ordered Lockheed to destroy the buildings and clean up the soil; however, Mr. Pruetz and Mr. Kaufman indicate that the EPA, RWQCB and Department of Toxic Substances Control only require that the soil and water be decontaminated and that no buildings are required to be destroyed. He asked whether any of the agencies involved had written formally to Lockheed to inform them that the buildings must be destroyed.

THOMAS YARDLEY, 215 Avon Street, asked whether the VES had been used elsewhere and what were the results of this prior use. He asked that the EIR address possible system damage from an earthquake which could result in contamination of the residential area. He noted that in Las Vegas, contamination of a railroad yard had been cleaned by removing the contaminated soil, burning it in a remote furnace and replacing it at the railroad site.

JAMES ARONE, 1809 Clark Avenue, appreciated this opportunity to speak and receive information. He said his comments were preliminary since more information was expected to be given at the upcoming meeting with Dames and Moore and the Peartree Group. He said that although the original petition circulated by Citizens United of Burbank last year had requested a full EIR, he recognized that a full EIR

might not be needed, considering the focussed information brought forward at this scoping hearing. He asked that the City, as lead agency, consider the effects of vinyl chloride (listed on page 5, Air Quality) especially since the effects on children and senior citizens was unknown and the VES was new technology. He thought that moving forward with the EIR process would strengthen the communication among the citizens, staff and consultants, while achieving the safest way to deal with this problem. He said he would continue to monitor the project and ask questions.

JULES KIMMETT, 116 North Lomita Avenue, expressed concern that few citizens attended this meeting and that the study was superficial. He asked that several town hall meetings--perhaps weekly--be held to allow full disclosure of information and to address what effect the legal implications would have on the EIR. He urged that more experts attend the meeting to answer questions.

TOM PATERSON, 4828 Radford, North Hollywood, Valley Village Homeowners Association, asked that the EIR address cumulative effects as stated on page 9, Item No. 16c. He said the EIR should disclose the degree of contamination on the other Lockheed sites which are located on airport or airport adjacent property and the link between remediation of these sites and this project as well as the cumulative effects of remediating all these sites. He expressed concern that study of the environmental significance of the project remediation would be piecemeal and not address the actual threshold level of significance. He thought the EIR should identify the full extent of the toxic contamination problems on all the sites and the relation to this project, noting that additional towers might be needed on those sites, thereby creating impacts on this project. He said that before the City could move forward with a determination, fuller disclosure of the degree of contamination and the type of remediation required at the other sites must be given.

SANDY WALKER, 410 North Fairview Street, representing the Burbank Council PTA, asked whether the following two issues had been addressed: the miscalculations noted by the Peartree Group concerning the effect of the plume since Lockheed based its figures on a flat terrain model which didn't include the effects of the local mountains; and the disparity between the EPA's requirement for a five-year EIR and Lockheed's one-year study.

Mr. Kaufman informed the audience that their questions would be taken to staff, the Peartree Group and Dames and Moore. He said a joint meeting of the Redevelopment Agency and Council would be held on May 23 to further discuss the initial study and to answer public questions. He told Ms. Walker that the May 2, 1995, response from the Peartree Group addresses both her questions. He thanked the audience and agencies for attending this scoping meeting. Mr. Pruetz noted that a staff report for the May 23 Council meeting would be available for public review by May 19 at the Planning Division counter.

The meeting was adjourned at 7:30 p.m.

A Scoping Meeting for the Lockheed Enhanced Vapor Extraction System Initial Study was held on June 22, 1995, at 2:30 p.m. in the Central Library Auditorium.

CITY STAFF IN ATTENDANCE:	William Jacobs, Assistant Planner Val Bridgeford, Senior Clerk
OTHERS PRESENT:	Ben Kaufman, Freilich, Kaufman, Fox and Sohagi Les Senger, Dames and Moore, Project Manager Mike Mills, So. Coast Air Quality Mgmt. District Alex Carlos, Regional Water Quality Control Board Roy Sakaida, Regional Water Quality Control Board Penny Nakashima, Dept. of Toxic Substances Control Bill Milner, So. Coast Air Quality Mgmt. District

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Mr. Kaufman, special counsel to the City of Burbank, opened the meeting for public input, noting that another meeting would be held later to ensure maximum public input. He explained that the purpose of this meeting was to get input from both responsible agencies and the public concerning any additional matters which are not included in the City's initial study and which should be included in the Lockheed Enhanced Vapor Extraction System EIR to ensure that the EIR has complete coverage of the issues. He described the environmental process, noting that the 30-day review of the initial study would end on July 3. He introduced City staff and agency members. He informed the audience that prior to this meeting, he had met with the applicant and agencies to refine the project description. He acknowledged receipt of a comment letter from the Regional Water Quality Control Board (RWQCB) today.

ROY SAKAIDA, RWQCB, said the letter asked that the EIR be expedited to ensure prompt clean up of the site. Mr. Kaufman noted that an aggressive schedule was proposed for this project, with an EIR certification expected within five months from the end of May 1995.

MIKE MILLS, AQMD, had no additions to the EIR's scope; however, he noted that the AQMD wouldn't approve a permit for a project which has potentially significant impacts as indicated in the initial study, air quality section. Mr. Kaufman explained that mitigation measures would ensure that the impacts were not significant. He noted that the City must also have a mitigation monitoring program adopted when the EIR is finalized. Mr. Mills asked whether the vinyl chloride emission ratios increased from the low and high levels; Mr. Senger answered that potential vinyl chloride levels would be examined and the figures adjusted for the entire health risk assessment.

PENNY NAKASHIMA, Department of Toxic Substances Control (DTSC), asked whether the monitoring would determine the presence of fungus and organic material which could restrict the flow through the venting system. Mr. Kaufman said this was listed in the initial study as a potential impact and therefore would be addressed in the EIR. Ms. Nakashima asked whether the EIR would examine possible emissions from excavation, as noted on page 11. Mr. Kaufman said the initial response was that the excavation emissions would not be significant because the horizontal pipes would be shallowly trenched and the vertical pipes would be drilled in. Mr. Senger said no large earth-moving activities would occur. Mr. Sakaida said excavation emissions would not be a problem because surface contamination has already been removed from the site. Mr. Kaufman said they could take a look at the issue since any long-term exposure would require mitigation measures under AQMD rules.

Mr. Jacobs acknowledged receipt of the following letters: 1) a letter in opposition from a neighboring resident; 2) confirmation of receipt by the State Office of Planning and Research which has assigned a case number to the project; 3) confirmation of receipt and intent to post in their newsletter from Southern California Association of Governments with no further comments; and 4) a letter from Creative Images indicating concern about potential heavy metals and fugitive emissions resulting from construction.

JAMES ARONE, 1809 Clark Avenue, stated that he helped draft the Creative Images letter. He asked whether the same environmental process would be required for any future stacks needed at the site and whether Lockheed intended to appeal the focussed EIR. He asked that cumulative impacts and heavy metals contamination be addressed. Mr. Kaufman answered that no one has appealed the decision to prepare an EIR and the appeal period has ended. He said that after receipt of comments during this period, Dames and Moore, The Peartree Group and involved agencies would identify and agree on the project alternatives and mitigation measures required for this project during preparation of the draft EIR; this draft would then be distributed to the public and responsible agencies for comment during a 45-day review period, including a Planning Board hearing. He said that the responses to these comments together with any revisions of the draft would constitute the final EIR; simultaneously, a mitigation monitoring program would be prepared to be certified by Council with the EIR. He said that the City must decide whether or not to handle the EIR programmatically because the mitigation measures would be in place for this first VES and because the 100 percent reinjection proposed by Lockheed for any future VES would preclude emissions and the need for further environmental review. He noted that because there might be vapor extraction systems at the Weber and Crain sites, it must be determined at what point these other systems are background to the Lockheed VES and at what point their impacts overlap. He noted that there are no permits for operation of the Weber VES. Mr. Sakaida stated that heavy metal emissions were not volatile and therefore wouldn't be removed by the VES. ALEX CARLOS, RWQCB, noted that a very limited amount of heavy metals was found in the

site samples. BILL MILNER explained that the system of prefilters would remove particulate matter prior to exposure to the carbon filters. Mr. Kaufman noted that the Creative Images letter refers to an L. A. Times article concerning heavy metals contamination of a dump site from fill originating at a Lockheed site, although not necessarily this specific site. He said this matter would be examined. Mr. Carlos reiterated that he didn't find any significant levels of lead in the analysis. Mr. Senger assured the audience that they would have an opportunity during review of the draft EIR to see that their comments were answered.

Mr. Sakaida asked how the consultants arrived at such a high estimate of the vinyl chloride ratio when only one sample showed one part per million of vinyl chloride; JOHN PINSONNAULT, environmental scientist from Lorax Company, explained that the vinyl chloride figures were generated by ICF Kaiser based on soil gas analyses and that they used the most conservative, worst-case estimates to ensure maximum mitigation.

Mr. Kaufman thanked the audience and the agencies for their attendance and adjourned the meeting until 6 p.m.

Mr. Kaufman re-opened the meeting at 6:00 p.m., with Mr. Jacobs, Mr. Senger and Ms. Nakashima in attendance. He repeated his presentation to the audience. He reviewed the comments made at the earlier meeting.

HOWARD ROTHENBACH, 830 East San Jose, thought this meeting wasn't noticed; Mr. Jacobs answered that there was a public notice in the *Burbank Leader* on June 10 and notices sent to the property owners in the area surrounding the subject site. Mr. Kaufman explained that the public noticing must meet state law requirements. Mr. Rothenbach asked whether other methods of clean up would be considered in the EIR. Mr. Kaufman answered that a reasonable range of alternatives to the project were reviewed by the RWQCB and the consultants in the EIR; these include different technologies such as excavation, synthetic resin and incineration. Mr. Rothenbach noted that the Weber site would have 100 percent reinjection and asked if this could be accomplished on the Lockheed site by dividing the project into six or seven smaller units. Mr. Kaufman said the Weber and Crain projects would not have 100 percent reinjection, however, Lockheed's three additional projects would have 100 percent reinjection. Mr. Senger explained that air reinjection was a function of the characteristics of the soil into which the air is injected, therefore one could reinject 100 percent into deep soil but a smaller percentage into shallow soil because the air is allowed to return to the surface. Mr. Kaufman noted that the large site size exceeds the soil's capacity to absorb air. Mr. Rothenbach suggested excavating the shallow soil; Mr. Kaufman explained that air must be returned where the contamination is found. Mr. Rothenbach thought that the dispersed emissions would mix with the emissions from other vapor extraction systems in the area. Mr. Senger explained that the purpose of dispersing the emissions through the stack was to dilute the

concentration and therefore when it meets other emissions over this distance, the cumulative impact would be small. Mr. Rothenbach asked about the requested permit limitations. Mr. Kaufman explained that permit limitations would be in effect throughout the project's duration; however, because the health risk for this project would be assessed over 70 years, the applicant was asking for relaxation of penalties in the first 60 days due to system start up and possible spiking. He emphasized that any acute exceedances of limits would result in shut down for correction to the system.

PAMELA VAN CORTLANDT, Box 66790, West Los Angeles, said she had been in contact with a toxic clean up expert and asked whether the projected 10 pounds of emissions per day could be reduced further since some stacking systems are 95 to 99 percent efficient. She asked how the wastes would be removed from the site and where they would be taken. Mr. Kaufman said the VES would operate at 97 percent efficient at the low level and 98 or 99 percent efficiency at the high level with 9.8 pounds per day of emissions. He said the emissions would be captured in the carbon which is steam cleaned to liberate most VOCs which then sink to the bottom of the tank; the clean water is discharged into the sewer system with a permit for industrial discharge; the small amount of water with concentrated VOCs would be stored on site in a steel double-lined tank with a capacity of 5,000 gallons to be hauled away every three months. He said the tank would need a DTSC permit to be taken to a treatment facility where a recycler removes the VOCs for reuse, and therefore no on-site treatment facility was considered. Ms. Van Cortlandt asked whether a scrubber would be used in the stack; Mr. Kaufman explained that scrubbers were used for particulate matter which would not be emitted by this system which handles vapor. He asked her to give him information on other technologies which could remove more emissions before the July 3 deadline. Ms. Van Cortlandt asked about monitoring; Mr. Kaufman answered that Lockheed with either the City or AQMD would be monitoring the emissions. He reminded her that the purpose of the EIR is to allow the other agencies, Council and the public to resolve these issues and this meeting was to raise any additional matters which are not included in the City's initial study and which should be included in the Lockheed Enhanced Vapor Extraction System EIR. He repeated the schedule of review to her. Ms. Van Cortlandt asked whether the plant would be run under a vacuum which would prevent leaks and whether it would be monitored for leaks. Mr. Kaufman said constant vigilance would be undertaken to ensure no fugitive gases escape and the mitigation further analyzed in the EIR. Ms. Van Cortlandt said she would submit additional comments in writing.

Mr. Kaufman told Mr. Rothenbach that he would check whether VOCs could accumulate on the stack sides and leak through. He answered Mr. Rothenbach that previously Lockheed had violated the permit for sewer water discharge and had been fined. Mr. Jacobs told Mr. Rothenbach that reference copies of the entire Lockheed VES report including consultant and staff reports would be available at the libraries, Planning Department and City Manager's office. Mr. Kaufman told Ms. Van Cortlandt

that he had no indication that Burbank was drilling to find the cleanest ground water to be used although two wells were drilled and in use at PSD. He explained that the groundwater beneath Burbank and the entire San Fernando and San Gabriel valleys was contaminated and these areas recorded on the federal Superfund list. He told Mr. Rothenbach that wells had been drilled along Vanowen and the groundwater from these wells would be treated at the plant on Hollywood Way and blended with Metropolitan District water to be stored on site in a reservoir.

Mr. Kaufman thanked the audience for their input and said their questions would be taken to staff, the Peartree Group and Dames and Moore.

The meeting was adjourned at 7:25 p.m.

APPENDIX C

REVISED HEALTH RISK ASSESSMENT

APPENDIX C

REVISED HEALTH RISK ASSESSMENT

FOREWORD

This Appendix C contains a revised SCAQMD "Rule 1401" Health Risk Assessment based on prior review of Lockheed analyses by Dames & Moore and the Peartree Group. These reports are provided in this EIR as Appendices E & F. The Health Risk Assessment that follows describes the environmental setting, environmental impacts, and mitigation measures relevant to the risks posed to human health by the Lockheed B-1 VES with regard to cancer, chronic non-cancer, and acute non-cancer health effects.

1.0 ENVIRONMENTAL SETTING

1.1 CLIMATE, METEOROLOGY, AND TOPOGRAPHY

California lies in the latitudinal range of prevailing westerly winds. The North Pacific high-pressure cell is the dominant influence on the low-level wind flow of the eastern North Pacific Ocean, particularly during the summer. The high-pressure cell is a semi-permanent feature of the Northern Hemisphere circulation pattern and produces a predominantly northwesterly flow of maritime air over the California coastal waters. During winter, the Pacific High weakens and moves south, resulting in weaker and less-persistent northwesterly winds along the California coast than in the warm half of the year.

As the air mass approaches the coast of California, this large-scale circulation pattern is modified to a more westerly flow by continental influences. The differential heating between the land area of California and the adjacent Pacific Ocean modifies the predominant flow, which enhances it during the warm half of the year and diminishes it during the cold half. On a local and regional basis, the air flow in California is channeled by its mountain ranges and valleys.

The coastal mountain ranges limit the flow of maritime air into the interior of California. These mountains are generally higher than the inversion layer, which limits the penetration of marine air flows to breaks or low points in the coastal mountain range. All seasons generally exhibit onshore flows during the day and offshore flows at night, after the land cools below the temperature of the ocean. During the winter, there is a greater likelihood of stronger offshore flows, including Santa Ana winds, than during the summer (California Air Resources Board, 1984).

The topography and climate of southern California combine to produce generally poor air quality in the South Coast Air Basin (SCAB). The SCAB includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. SCAB climate is characterized by warm summers, mild winters, infrequent rainfall, moderate onshore daytime breezes, and moderate humidities. During the summer, onshore flows of cool, moist marine air enter the SCAB. The warm upper layer of air forms a cap over the cool marine layer, preventing air pollutants near the ground from dispersing upward. During night and early morning in the winter, temperature inversions occur close to the ground level due to radiant

cooling of the land. These inversions limit vertical mixing of the air near the ground and all of the air pollutants contained in that layer.

Sunlight is needed for the photochemical reactions which produce ozone, which in turn is an indicator of poor regional air quality. The region's abundance of days of sunlight in the region, combined with the combination of low-temperature inversions, light winds, shallow vertical mixing, and topographical features (such as mountains) hinders dispersion of air pollutants and contributes to poor air quality.

Burbank is located in the San Fernando Valley and experiences a high frequency of east-southeasterly, southeasterly, and south winds. Burbank Airport data collected over a 30-year period indicate that the annual average temperature in Burbank is 18°C, with a range of 0°C to 41°C over the 30-year period. Approximately 93% of the City's annual average precipitation of about 14 inches occurs between November and April.

1.2 EXISTING AIR QUALITY

Regional Emissions

Substantial concentrations of air toxics, both carcinogenic and non-carcinogenic, exist in urban areas as a result of emissions from both mobile and stationary sources. Examples of stationary sources that emit air toxics include gasoline service stations, automotive repair shops, dry cleaners, various types of manufacturing, and large industrial operations. Examples of mobile sources of air toxics include motor vehicles and aircraft. An inventory of emissions of air toxics compiled by the South Coast Air Quality Management District (SCAQMD) in 1984 (SCAQMD, 1987) indicated that emissions of 20 major air toxics in the SCAB totaled about 9,400 tons.

Smog can rise to unhealthful levels from mid-April through the summer months in the South Coast Air Basin, particularly in the inland areas. Smog episodes typically peak during the afternoon, and unhealthful levels can persist into the early evening. When ozone levels exceed 138 on the pollution standards index, the Air Quality Management District advises healthy adults and children to avoid prolonged, vigorous outdoor exercise, such as jogging. Susceptible individuals, especially those with heart of lung disease, are instructed to avoid all outdoor activities. When ozone exceeds the federal Stage I episode level of 200 on the index, AQMD advises everyone to avoid vigorous outdoor exercise and susceptible individuals to stay indoors.

Ozone forms when nitrogen oxides and hydrocarbons (emitted from both mobile and stationary sources) combine and chemically react in the sunlight. Ozone reduces breathing capacity, causes inflammation of lung tissue, may increase asthma attacks, and may accelerate the lung's aging process. Some people experience chest pains, coughing, wheezing, labored breathing, and nausea. Ozone can also irritate eyes and reduce the respiratory system's ability to fight infections.

VES Emissions

Operation of the proposed vapor extraction system (VES) poses the potential to emit substances identified as air toxics by the State of California and the SCAQMD. These substances were first

identified as contaminants in groundwater at the Lockheed site, and their removal from the groundwater is the basis for the air emissions posed by operation of the VES. Emission rates for proposed operation of the VES were based on the following information:

- Influent concentrations of air toxics in groundwater that would be treated by the VES;
- VES flow rates based on system design specifications and expected operating performance; and
- Expected treatment efficiencies posed by use of the granular activated carbon filtration.

Information for each of the above bulleted items was obtained from engineering plans for design and construction of the VES.

Ambient Air Monitoring

The SCAQMD monitors ambient concentrations of air toxics in the SCAB (SCAQMD, 1994). Average SCAB-wide concentrations of eight types of air toxics expected to be emitted by the VES are presented in Table 1. Based on the SCAQMD monitoring efforts, the SCAQMD estimates that the excess public health risk of cancer in Burbank (the project area) is approximately 1,300 in one million (SCAQMD, 1994). Because these estimates are based only upon the air toxics for which the SCAQMD performed air monitoring, the actual excess lifetime cancer risks posed by these levels could be greater.

Health Risk Assessment Approach

Inhalation of toxic air pollutants can pose cancer and other health risks. Risk assessment is a method used to estimate the chance that a person will contract cancer or other health effects due to exposure to toxic air pollutants. SCAQMD Rule 1401 uses risk assessments to estimate the likelihood that a new source of air pollutants will cause cancer in persons who live or work near that source. Rule 1401 imposes limits on the cancer risk to the public due to the new source. SCAQMD Rule 212 requires applicants to notify the exposed public if the cancer risk is expected to exceed one in one million due to the proposed project.

Risk assessments are typically composed of the following four components:

- Hazard identification, in which health agencies evaluate chemicals to determine what health problems they can cause;

- Dose-response assessment, in which health agencies estimate the level of health effects caused by different levels of exposure to a chemical;

- Exposure assessment, in which the amount of a chemical to which people are exposed from a source is quantified; and

- Risk characterization, in which the excess risk of health problems posed by the source is estimated by combining the dose-response information with the exposure amounts.

The cancer and non-cancer health risk assessment performed for the VES involved:

- Identification of substances identified in soil vapor at the Lockheed facility;
- Calculation of pollutant emission rates using throughput rates and soil vapor concentration data;
- Estimation of maximum annual average ground-level concentrations of air toxics beyond the perimeter of the Lockheed facility using appropriate air dispersion models and site-specific air data; and
- Characterization of health risks by combining SCAQMD-developed dose-response information and the exposure levels estimated in the previous step.

1.3 SENSITIVE RECEPTORS

Not all members of a population respond in the same manner to chemical exposures, and there are hypersensitive individuals who will respond adversely to exposure concentrations well below levels where most individuals would normally respond. Population groups that are typically more susceptible to air quality-related health problems are categorized as "sensitive receptors" and can include groups such as children, the elderly, and the acutely and chronically ill, especially if the illness involves cardiovascular or respiratory diseases. These population groups of sensitive receptors can be adapted to fit various land use categories. Land uses such as schools, hospitals, playgrounds, child care centers, retirement homes, and clinics are all considered to be sensitive to poor air quality because they exist to serve these various sensitive population subgroups. Residential areas are also considered to be sensitive to air pollution because residents may be comprised of sensitive subgroups, such as children and the elderly, and because the duration of exposure may be considerable. Industrial and commercial areas are considered to represent the healthiest segment of the general population and pose a shorter exposure duration compared to residential areas.

Recreational areas are considered to be moderately sensitive to air pollution since recreational activities represent "physiologically-demanding" activities that occur over comparatively short exposure periods.

1.4 REGULATORY FRAMEWORK

Federal Regulations

Under Title III of the 1990 Clean Air Act Amendments (CAAA), a facility is subject to Maximum Achievable Control Technology (MACT) for emissions of 189 listed Hazardous Air Pollutants (HAPs). MACT will require a major source to control its emissions to the degree controlled by the best 12 percent of similar sources in the same industry. The US Environmental Protection Agency (EPA) is developing MACT guidelines for numerous source

categories to be considered under Title III of the 1990 CAAA. Once the controls have been identified and applied, EPA will require facilities to assess the individual risk associated with residual emissions from the facility. If the facility's residual emissions are determined by EPA to pose an unacceptable risk to public health, then the facility would be required to apply a risk-based approach to controlling emissions to levels at which no unacceptable risk is posed.

State Regulations

Authority to develop and implement HAP programs can be delegated by EPA to individual states. The California Air Resources Board (CARB) has the authority to implement regulations regarding air toxics that are passed by the State. AB 1807, the "California Toxic Air Contaminant Identification and Control Law," required development of a program to:

- Identify air toxics;
- Determine priorities for control;
- Achieve early control;
- Promote the development and use of advanced control technologies and alternative processes;
- Assist local air pollution control districts; and
- Provide a consistent level of protection throughout the state.

Additionally, AB 1807 requires emission of air toxics to be controlled to levels that prevent harm to public health. Air toxics identified in AB 1807 include asbestos, benzene, cadmium, carbon tetrachloride, chlorinated dioxins and furans, ethylene dibromide, ethylene dichloride, ethylene oxide, and hexavalent chromium. Benzene, carbon tetrachloride, and ethylene dichloride are substances expected to be emitted from the VES during routine operations. AB 2588, the "1987 Air Toxics 'Hot Spots' Information and Assessment Act," requires facilities to quantify emissions, and, if designated by the local air authority as a "high priority" facility, requires facilities to prepare a health risk assessment (HRA) to estimate the health risk posed by the facility's emissions. Depending on the facility classification, the facility may be required to perform a variety of actions that range from public notification of estimated risks associated with the facility to a mandatory audit of the facility to develop and implement future risk reduction measures. The SCAQMD's guidelines for implementing the AB 2588 Air Toxics Hot Spots Program proposes an excess cancer risk of ten in one million as the threshold for public notification and an excess cancer risk of 100 in one million as the threshold for performing risk reduction measures.

Local Regulations

The following list represents requirements that must be fulfilled as part of the air permit application process for sources in the SCAQMD:

Regulation II governs the issuance of permits to construct and operate stationary sources of air pollutants. In particular, Rule 212 requires notification of schools, hospitals, and other facilities housing sensitive receptors within one quarter-mile of the source.

Regulation III includes Rule 301, which requires the payment of a permit application fee. The permit application is not considered by the SCAQMD without submittal of the payment.

Regulation IV represents a set of rules established to control air pollution emission sources in a manner that places specific restrictions on the manner in which substances may be emitted. Two key rules within Regulation IV that must be fulfilled in the permit application process for the VES include Rule 401, "visible emissions," and Rule 402, "Nuisance."

Regulation XI includes Rule 1166, "Volatile Organic Compound Emissions from Decontamination of Soil." Rule 1166 was adopted on August 5, 1988, to reduce emissions of volatile organic compounds (VOCs) during the excavation and treatment of VOC-impacted soils.

Regulation XIII implements the Federally-mandated New Source Review process, which sets forth preconstruction review requirements for new, modified, and relocated emission sources to ensure that operation of such facilities does not interfere with progress toward attainment of ambient air quality standards. In the SCAB, the specific goal of this regulation is to achieve future annual emission reduction of nonattainment pollutants that are five percent or greater than the total annual emission increases from new, modified, and relocation equipment.

The New Source Review provisions also apply to sources of halogenated hydrocarbons and ammonia, which invoke a review of "emissions offsets" and Best Available Control Technology (BACT). Rule 1303 of Regulation XIII establishes a zero emission threshold limit, which means that any new, modified, or relocated stationary source requiring a permit from SCAQMD must perform air modeling and install BACT if the net increase in emissions exceeds one pound per month. The requirement for BACT is invoked if overall emissions from the source exceed one pound per day, irrespective of net emission considerations. "BACT" means the most stringent emission control technology that has been demonstrated to be appropriate for a particular type or class of an emission source.

Regulation XIV includes Rule 1401, "New Source Review of Carcinogenic Air Contaminants." This rule establishes health risk thresholds that must be met by permit applicants to obtain an air permit. The rule applies to the cumulative emissions from a new, relocated, or modified permit unit and all other units located within a radius of 100 meters that are owned or operated by the applicant that are expected to emit a Rule 1401-listed pollutant. The health risk thresholds include a:

- Maximum individual cancer risk (i.e., excess *individual risk*) of less than one in one million at any off-site receptor location or less than ten in one million if the permit unit is constructed with Toxics-Best Available Control Technology (T-BACT); and

- Threshold of 0.5 excess cancer cases in the population (i.e., excess *population risk*) subject to a risk of greater than one in one million.

The risk assessment procedures used to determine the excess individual and excess population risks are loosely based on the framework provided in the CAPCOA Guidelines by assuming that an off-site resident is exposed for 70 years and that the upper bound of the cancer potency levels be used to calculate health risk. The significance criteria set forth for issuing air quality permits for new sources requires excess cancer risks for the maximally exposed individual (MEI) to be less than one in one million (1×10^{-6}) if T-BACT is not applied and less than ten in one million (1×10^{-5}) if T-BACT is applied.

The SCAQMD recently proposed to amend Rule 1401 to address the calculation of non-cancer health risk and to expand the list of substances considered to be carcinogenic. In particular, the amended Rule 1401 would have included perchloroethylene as an air toxic subject to cancer risk limits (SCAQMD, 1994). Perchloroethylene is regarded by EPA to be a carcinogen. This amendment, however, was disallowed, and perchloroethylene is not presently treated as a carcinogen in the Rule 1401 risk assessment guidelines.

Lockheed prepared a health risk assessment for cancer risks from the VES in accordance with SCAQMD's Rule 1401 (Montgomery Watson, 1994), a "project life" health risk assessment that bases risks upon an 8.5-year project duration with a variety of cancer unit risk factor sources (Montgomery-Watson, 1995a), and a health risk assessment for non-cancer risks (Montgomery Watson, 1995b) from the VES in accordance with CAPCOA guidelines (CAPCOA, 1990). The Rule 1401 risk assessment was performed as part of Lockheed's air permit application to the SCAQMD to operate the VES, and the "project life" and non-cancer risk assessments were subsequently performed to supplement the Rule 1401 risk assessment effort. The modeling approaches and results are discussed in the following Environmental Impacts section.

2.0 ENVIRONMENTAL IMPACTS

2.1 SIGNIFICANCE CRITERIA AND THRESHOLDS FOR AIR TOXICS

The VES is expected to emit air toxics, which are compounds known to adversely affect the health of individuals exposed under certain exposure conditions. The potential health effects of these air toxics include cancer, chronic non-cancer effects, and acute non-cancer effects. Excess cancer risk is the significance criterion for the carcinogenic risk assessment. The cancer risk from this project is defined as the change due to the project in the probability of contracting cancer from working or living near the VES site. This incremental risk is expressed as the likelihood of contracting cancer in an exposed population of a specified size, such as one million.

State CEQA guidelines indicate that the environmental effects of a project are considered to be significant when the project "will cause substantial adverse effects on human beings, either directly or indirectly."

The SCAQMD considers a project employing T-BACT to be significant if it emits air toxics at levels yielding an excess cancer risk of ten in one million (1×10^{-5}). The significance threshold for sources not employing T-BACT is one in one million (1×10^{-6}).

Hazard indices were used to evaluate non-cancer health effects of short-term (acute) and long-term (chronic) exposures. These indices, which are estimated for various affected organs, were developed by Cal-EPA. The hazard index is the ratio between the receptor concentration and the threshold concentration, called a *reference dose*, that would cause a health effect. A hazard index of 1.0 or less assures that adverse health effects will not occur, and emissions from the VES that result in an overall hazard index less than or equal to 1.0 are not considered to be significant.

Substantial conflict of the VES project with existing regulations, plans, and policies would be considered to be a significant impact, according to Appendix G of the State CEQA Guidelines.

Determinations of how substantial a conflict is considered to be are typically made by the government agency with the authority to develop the policy, administer the program, or enforce the applicable regulation.

2.2 IMPACT ASSESSMENT APPROACH

Air Toxics Emission Calculations

Based on the project description for the VES, treatment of soil gases is expected to occur over a period of 8.5 years. While the influent concentrations of soil vapors is anticipated to vary as different areas of the Lockheed site are treated, the total emissions of toxic air contaminants from the VES would be maintained at an amount no greater than 9.8 pounds per day (30-day average). The maximum flow capacity of the VES would be 6000 standard cubic feet per minute (SCFM), and the 9.8 pounds-per-day threshold would be maintained by continuously monitoring VOC emissions using a flame ionization-based hydrocarbon detector.

Substances expected to be emitted from the VES and their expected average influent concentrations are presented in Table 2. Table 2 also provides unit risk factors for substances regulated by SCAQMD Rule 1401 as carcinogens and CAPCOA Reference Exposure Levels (RELs) for non-carcinogenic effects (CAPCOA, 1990). The carcinogenic substances are benzene, carbon tetrachloride, chloroform, 1,2-dichloroethane, methylene chloride, trichloroethylene, and vinyl chloride.

The variability of influent concentrations of soil vapors is expected to affect the control efficiency of the granular activated carbon system for treatment of perchloroethylene and trichloroethylene. This variability ranges from conditions of low-flow, high-loading of contaminants that can yield an upper-bound control efficiency of 99% to conditions of low-loading, high-flow that result in a lower-bound control efficiency of 97%. The control efficiencies for treatment of other VES contaminants are unaffected by this variation of influent flow conditions. This range of control treatment capabilities was used to develop two emission profiles that both result in effluent loadings of no more than 9.8 pounds per day. The "low efficiency" emission profile is based on VES operating conditions that result in a control treatment efficiency of 97% for emissions of perchloroethylene and trichloroethylene; under this profile, the VES would be expected to process up to 548 pounds per day of influent VOCs while maintaining the total daily effluent loading of 9.8 pounds per day. The "high efficiency" emission profile is based on VES operating conditions that result in a control treatment efficiency of 99.2% for emissions of perchloroethylene and trichloroethylene. This emission profile would allow the VES to treat up to 1410 pounds per day of influent VOCs while maintaining the total daily effluent loading limit of 9.8 pounds per day. Because the control efficiencies for all of the other substances are unaffected by the variations between these two profiles, the emissions of these substances under the "high efficiency" profile, except for vinyl chloride, increase proportionately to the increase in influent loading quantities, which is 1410 pounds per day divided by 548 pounds per day. Emissions of vinyl chloride will be limited to 0.14 pounds per day. A summary of expected emission rates for each substance in the two profiles is provided as Table 3.

Dispersion Modeling

Dispersion modeling of expected emissions from the VES was performed using EPA-approved air model Industrial Source Complex for Short-Term impacts (ISCST2) (Montgomery Watson, 1994). Use of this model, along with site-specific meteorological data, is recommended by the SCAQMD for estimating maximum annual average ground-level concentrations that could occur at any location outside the perimeter of the facility. The results of the air dispersion modeling are used to estimate ground-level concentrations of air toxics, which in turn are combined with unit risk factors to estimate health risks.

Dispersion modeling was performed using the following inputs and parameters:

- SCAQMD-required regulatory default settings were used (or not used as indicated) in the ISCST2 model, to include

  - calculation of concentrations using discrete receptors
  - use of flat terrain
  - calculation of 365-day average concentrations
  - use of urban, rather than rural, dispersion coefficients
  - use of final plume rise
  - use of stack-tip downwash
  - use of buoyancy-induced dispersion
  - no use of the ISCST2 calms processing routine
  - no use of the ISCST2 missing data processing routine
  - use of model-default wind profile exponents
  - assumption of ground-level receptors
  - use of an anemometer height of 10 meters;

- Meteorological data gathered in Burbank from SCAQMD Station Number 51100 were used;

- The discrete receptor grid was developed using 50-meter intervals along the facility perimeter and Lockheed property perimeter, 50- to 100-meter intervals along lines dividing residential and commercial properties, 50-meter intervals around the facility out to a distance of 250 meters, 100-meter intervals out to a distance of 500 meters, 250-meter intervals out to a distance of approximately 1 kilometer, and 500-meter intervals out to a distance of about 3 kilometers.

- Emissions from the VES would be discharged from a single 50-feet-tall stack with a minimum exit velocity of 30 feet per second.

The meteorological data used as the basis for air modeling in this report are derived from meteorological monitoring performed by the SCAQMD at the Burbank monitoring station in 1981. These data were electronically formatted by the SCAQMD to serve as a resource for modeling air impacts using US EPA-approved computer models and to provide a common reference to present modeling results to air permitting agencies and the public. While meteorological conditions have certainly varied from year to year in the Burbank area, as they have throughout the U.S., the 1981 data set has become the default reference standard for use by industry and the government for air modeling, permitting, and enforcement issues relating to the Burbank area.

A receptor category was assigned to each discrete receptor grid as being residential, commercial, facility, or off-site. A complete listing of receptors, locations, and classifications is provided in the Rule 1401 Risk Assessment (Montgomery Watson, 1994).

The results of air dispersion modeling for the VES calculated annual average dispersion coefficients for each discrete receptor grid. Dispersion coefficients or dispersion factors are numerical estimates of the amount of dispersion that occurs as a contaminant travels away from its release point. These dispersion factors are a ratio of the concentration of a substance in air divided by the release rate of the substance from the source and may be expressed in units such as $(ug/m^3)/(tons/year)$ or $(ug/m^3)/(g/s)$. Based on the results of air dispersion modeling for the VES, the maximum annual average dispersion coefficient for each receptor (i.e., *land use*) category was identified. These maximum annual average dispersion coefficients are presented in Table 4.

Exposure Assessment

The exposure assessment involves the quantification of the amounts of chemicals to which people are exposed from a source. This quantification involves incorporation of exposure factors specific to the receptor category where the exposure is expected to occur. To differentiate exposures among these groups, the annual average dispersion coefficients estimated by the ISCST2 model run are used to determine exposures to receptors in each of the discrete receptor grids. The SCAQMD Rule 1401 risk assessment method distinguishes between residential receptors and the other categories through the use of a *Lifetime Exposure Adjustment* (LEA). For a residential exposure scenario, a 70-year lifetime exposure duration is used, and the LEA is 1.0. Receptors working at off-site locations, however, are not expected to be exposed for the same 70-year duration, and an LEA of approximately 0.15 is used to account for the reduced hours of exposure per day (8/24), reduced days of exposure per year (240/365), and the reduced years of overall exposure (46/70). This adjustment that is made for off-site workers is based on the operating schedule of the permit unit, which in this example is assumed to operate continuously for 24 hours a day and 365 days a year. The SCAQMD specifies that the LEA for all other operating schedules is 46/70 = 0.66 (SCAQMD, 1995).

Cancer Health Risk

The health risk assessment involves the multiplication of unit risk factors times the location-specific dispersion factor and the location-specific LEA for each carcinogen expected to be emitted from the VES. The excess cancer risk calculated for each substance was added for each receptor location to determine the excess cancer risk posed by all substances emitted from the VES. The maximum individual excess cancer risk (MICR) to the MEI due to emissions of air toxics from the VES was calculated by multiplying the unit risk factors for each substance times the maximum annual ground level concentration at the location of the maximum exposed individual. The results of cancer risk calculations are presented in Table 5 for both of the emission profiles described previously in this report.

Maximum Residential Exposure

Based on the results of cancer health risk calculations presented in Table 5, the MICR for the maximum exposed individual resident ranges from 6.94×10^{-7} to 9.29×10^{-7}. The 6.94×10^{-7}

risk is posed under the "low efficiency" profile in which up to 548 pounds per day of VES influent loading occurs. The 9.29×10^{-7} risk is posed by the "high efficiency" emission profile in which up to 1410 pounds per day of VES influent loading may occur. The cancer risk posed by the "high efficiency" emission profile reflects the additional contribution to cancer risk from carcinogens that are not affected by the change in treatment efficiency that impacts TCE and PCE emissions. Because capture efficiency of substances other than TCE and PCE is not affected by the changes causing more efficient TCE and PCE capture, the emission quantities (and thus contribution to cancer risk) are expected to increase proportionately to the increase in influent loading (i.e., 1410/548). This proportionate treatment, however, does not apply to vinyl chloride emissions because emissions will be limited to no more than 0.14 pounds per day. Treatment of increases of vinyl chloride emissions as proportionate to the increase in overall emissions in previous analyses yielded a slightly higher cancer risk posed to the MEIR. Limiting emissions of vinyl chloride to 0.14 pounds per day is expected to yield excess cancer risks posed to the MEIR as calculated above for the "high efficiency" profile.

Occupational Exposure

The MICR for the maximum exposed individual worker ranges from 2.30×10^{-7} to 3.07×10^{-7}. As discussed above, the risk ranges are based on differences in influent loading and emissions posed under the "low efficiency" and "high efficiency" profiles, allowing for control of emissions of vinyl chloride to no more than 0.14 pounds per day. The MICR posed to the maximum exposed individual worker at an off-site commercial location ranges from 2.36×10^{-7} to 3.15×10^{-7}.

Project Life Cancer Risks

Excess cancer risks posed to residential, facility, offsite, and commercial receptors were calculated based upon the expected project life of 8.5 years (using the same approaches previously employed for air toxics emissions calculations, dispersion modeling, and exposure modeling) in the "Project Life" health risk assessment (Montgomery Watson, 1995a). The "project life" approach differs from the Rule 1401 approach in that the project life approach considers the contribution to excess cancer risk posed by chemicals that are listed under Proposition 65 and are not required to be considered under Rule 1401. In general, the "project life" risk assessment methodology includes the same elements employed in the Rule 1401 approach, to include hazard identification, exposure assessment, dose-response assessment, and risk characterization. The "project life" approach differed from the Rule 1401 approach in the following three ways:

- The hazard identification section of the project life approach considered any substance listed under Proposition 65, yielding a greater number of substances emitted from the VES for consideration as carcinogens than yielded by the Rule 1401 approach;

- The dose-response assessment employed unit risk factors (URFs) from the US EPA and Cal-EPA in addition to those presented in SCAQMD Rule 1401; and

- The "project life" approach calculated excess cancer risks to the four receptor populations identified above based on the expected 8.5-year project life, rather than the 70-year project life required by the Rule 1401 approach.

The "project life" approach allows the consideration of a greater number of substances as carcinogens than allowed by Rule 1401. It also bases the calculation of excess cancer risk on the expected project life, rather than a hypothetical 70-year life. For these reasons the "project life" approach may be considered to be more representative of actual health risks than the 1401 approach because it allows incorporation of more project-specific elements. The results of the "project life" health risk assessment indicated that the VES will result in an Maximum Individual Excess Cancer Risk (MICR) at the Maximally Exposed Individual Resident of less than 0.08 in one million over the life of the project. The MICR at the Maximally Exposed Individual Worker is expected to be about 0.046 in one million over the same project life.

Chronic Non-Cancer Health Risk

Non-cancer health risks were quantified by comparing predicted levels of exposure to acceptable levels of exposure using the CAPCOA RELs to determine hazard indices for each receptor category. The hazard index was calculated by dividing the annual average concentration of each chemical at each location by the substance-specific REL. Emissions of vinyl chloride under the "high efficiency" profile were limited to 0.14 pounds per day. The results of calculations of hazard indices for each emissions profile are presented in Table 6. The Hazard Index ranges for the maximum exposed individuals are as follows:

- MEI residential: 0.00721 to 0.00915
- MEI commercial: 0.0164 to 0.0207
- MEI facility: 0.0159 to 0.0202

In the case of control of non-cancer health effects, the improvement in control treatment efficiency yields diminished hazards indices for each receptor category.

Acute Non-Cancer Health Risks

The potential for short-term non-cancer health effects was quantified by calculating hazard indices in the same approach that was used to evaluate chronic non-cancer health risks. The acute hazard index was calculated by dividing the maximum 1-hour hourly concentration at the receptor points identified as having the highest annual average for each category by the REL. Results of the calculations of acute hazard indices for each emission profile are presented in Table 7. Acute hazard indices calculated for each of the emission profiles are well below the significance level of 1.0.

Fungus Concerns

A concern has been raised about the possibility of fungi and other microorganisms posing a health risk as pollutants in emissions from the VES. In general, exposures to fungi, bacteria, and other microbes through this pathway could conceivably result in respiratory infections or immunotoxic effects. The potential for such health risks to be posed by the VES, however, is greatly reduced by the following considerations:

- Exposure to microorganisms through the air pathway has been associated with activities at landfills, where the high-organic content of decaying household and other wastes readily supports the existence of microorganisms. No such compost sources are known to exist at the Lockheed B-1 plant site, and native microorganism populations are expected to be orders of magnitude less concentrated at the Lockheed site than at most municipal landfills.

- Microorganisms rely on the availability of moisture and organic materials to survive and reproduce. Operation of the 6,000 SCFM-VES represents a high air flow that is expected to desiccate (dry out) any microorganisms that are introduced into the VES, which in turn renders them non-viable.

- Exposure to microorganisms through the air pathway is considered to be insignificant compared to other pathways associated with infection from microorganisms.

The potential for such health risks to be posed by the VES is therefore considered to be negligible for the above reasons.

2.3 PROJECT IMPACTS

Community Health Risk

Carcinogenic Risk

The maximum individual cancer risks to the maximum exposed individual resident, facility worker, commercial worker, and off-site receptor were calculated and presented in Table 5 based on a range of likely conditions under which the VES would operate. Based on the results of these calculations, the MICR posed to the maximum exposed individual resident may approach a level as high as 9.29×10^{-7} under the conditions prescribed in the health risk calculations. These conditions include the following assumptions:

- Use of "worst-case" emissions of carcinogens that are unaffected by the increase in control treatment efficiency affecting emissions of trichloroethylene and perchloroethylene;

- Emissions would take place over a period of 70 years, when the actual project life of the VES is expected to be 8.5 years; and

- Emissions of ***carcinogenic*** substances would be emitted at the stated rates for the lifetime of the project whereas they are expected to decline.

The MICR calculations prescribed by the SCAQMD do not consider the cancer effects of emissions of perchloroethylene, which is regarded as a carcinogen by EPA. The ongoing calculation of excess cancer risks based on monitoring data for the VES will, however, include consideration of perchloroethylene and other substances not regulated by the SCAQMD as carcinogens.

Chronic Non-carcinogenic Risk

Chronic non-cancer health risks posed by operation of the VES are well below the threshold hazard index of 1.0 established under CAPCOA guidelines and are not considered to be significant for the VES project.

Acute Non-carcinogenic Risk

Acute non-cancer health risks posed by routine operation of the VES are well below the threshold hazard index of 1.0 established under CAPCOA guidelines and are not expected to be significant for the VES project.

2.4 CONSISTENCY WITH REGULATIONS, PLANS, AND POLICIES

Federal Regulations, Plans, and Policies

The project is not considered to be subject to Title III of the CAAA because MACT determinations have not yet been made for soil vapor extraction systems and the amount of emissions from the facility would not invoke its categorization as a "major source."

State Regulations, Plans, and Policies

The SCAQMD will not identify the VES as a "high priority" facility due to the operating conditions, and therefore, the facility will not be required to perform a "Hot Spots" health risk assessment.

Local Regulations, Plans, and Policies

A permit for the VES would be issued by the SCAQMD only after it determined that the project met all SCAQMD requirements.

3.0 MITIGATION MEASURES

No mitigation measures are required for the following reasons:

- Per the project description, Lockheed will be performing human health risk assessments using the "8.5-year" and "1401" approaches to help ensure excess cancer risks posed by the VES are below one in one million;
- VOC emissions will be maintained at a level of 9.8 lbs/day or less;
- Vinyl chloride emissions will be maintained at a level of 0.14 lbs/day or less; and
- The project is limited to a duration of 8.5 years

4.0 REFERENCES

California Air Resources Board, 1984. *California Surface Wind Climatology.*

CAPCOA, 1987. *AB 2588, 1987 Air Toxics "Hot Spots" Information and Assessment Act*

————, 1990. *Air Toxics "Hot Spots" Program Risk Assessment Guidelines.*

Montgomery Watson, 1994. *Rule 1401 Health Risk Assessment, Lockheed Plant B1 Soil Vapor Extraction System*, December, 1994.

————, 1995a. *Project Life Health Risk Assessment, Lockheed Plant B1 Soil Vapor Extraction System*, January, 1995.

————, 1995b. *Non-Cancer Health Risk Assessment, Lockheed Plant B1 Soil Vapor Extraction System*, February, 1995.

SCAQMD, 1987. *CEQA Implementation Guidelines.*

————, 1988. *Analysis of Ambient Data from Potential Toxics "Hot Spots" in the South Coast Air Basin.*

————, 1988. *Rule 1166, Volatile Organic Compound Emissions from Decontamination of Soil.*

————, 1994. *Draft Staff Report for Proposed Amended Rule 1401 - New Source Review of Toxic Air Contaminants*, (Public Review Draft), November 2, 1994.

————, 1995. *Risk Assessment Procedures for Rules 1401 and 212*, Version 2.1, July 1995.

US EPA, 1995. Region 3 Risk-Based Concentration Tables.

TABLE 1: REGIONAL AMBIENT AIR TOXICS CONCENTRATIONS	
Substance	**Concentration (parts per billion)**
Benzene	4.0
1,2-Dibromomethane	<0.1
Carbon tetrachloride	0.2
Chloroform	0.4
Perchloroethylene	5.2
Toluene	10
1,1,1-Trichloroethane	4.9
Trichloroethylene	0.6

Source: SCAQMD, 1988.

Table 2: Lockheed SVES Emission Profiles

Chemical	CAS	Influent Comp. (ug/L)	Low Efficiency Conditions Loading 548 lbs/day			High Efficiency Conditions Loading 1410 lbs/day		
			Control Efficiency	Emissions (lb/day)	(g/s)	Control Efficiency	Emissions (lb/day)	(g/s)
Acetone	67641	3.09	0.1	1.24E-01	6.52E-04	0.1	3.19E-01	1.68E-03
Benzene	71432	0.15	0.05	6.00E-03	3.34E-05	0.05	1.54E-02	8.59E-05
Bromodichloromethane	75274	0.1	0.05	4.00E-03	2.23E-05	0.05	1.03E-02	5.73E-05
Bromoform	75252	0.1	0.05	4.00E-03	2.23E-05	0.05	1.03E-02	5.73E-05
Bromomethane	74839	0.15	0.05	6.00E-03	3.34E-05	0.05	1.54E-02	8.59E-05
2-Butanone	78933	2.5	0.1	1.00E-01	5.27E-04	0.1	2.57E-01	1.36E-03
Carbon Tetrachloride	56235	0.3	0.05	1.30E-02	6.68E-05	0.05	3.34E-02	1.72E-04
Chlorobenzene	108907	0.11	0.05	5.00E-03	2.45E-05	0.05	1.29E-02	6.30E-05
Chloroethane	75003	0.15	0.02	7.00E-03	3.44E-05	0.02	1.80E-02	8.85E-05
Chloroform	67663	0.49	0.05	2.10E-02	1.09E-04	0.05	5.40E-02	2.80E-04
Chlorotrifluoroethylene	79389	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
Dibromochlormoethane	124481	0.13	0.02	6.00E-03	2.98E-05	0.02	1.54E-02	7.67E-05
1,2-Dichloro-1,1,2-trifluoroethane		0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
1,2-Dichloroethane	107062	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
1,1-Dichloroethane	75343	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
1,1-Dichloroethene	75354	0.76	0.05	3.20E-02	1.69E-04	0.05	8.23E-02	4.35E-04
1,2-Dichloroethene (Total)		7.37	0.1	2.96E-01	1.55E-03	0.1	7.62E-01	3.99E-03
1,2-Dichloropropane	78875	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
cis-1,3-Dichloropropene	10061015	0.1	0.05	4.00E-03	2.23E-05	0.05	1.03E-02	5.74E-05
trans-1,3-Dichloropropene	10061026	0.1	0.05	4.00E-03	2.23E-05	0.05	1.03E-02	5.74E-05
Ethylbenzene	100414	0.14	0.05	6.00E-03	3.12E-05	0.05	1.54E-02	8.03E-05
Freon-11	75694	1.29	0	5.80E-02	3.02E-04	0	1.49E-01	7.77E-04
Freon-113	76131	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
Freon-12		0.05	0	2.00E-03	1.17E-05	0	5.15E-03	3.01E-05
2-Hexanone	591786	0.1	0.05	4.00E-03	2.23E-05	0.05	1.03E-02	5.74E-05
Hydrocarbons		10.88	0.1	4.37E-01	2.29E-03	0.1	1.12E+00	5.89E-03
Light hydrocarbons		6.99	0.02	3.05E-01	1.60E-03	0.02	7.85E-01	4.12E-03
4-Methyl-2-pentanone	108101	0.25	0.05	1.10E-02	5.56E-05	0.05	2.83E-02	1.43E-04
Methylene chloride	75092	0.17	0.02	7.00E-03	3.90E-05	0.02	1.80E-02	1.00E-04
Perchloroethylene	127184	4006.8	0.97	5.36E+00	2.82E-02	0.992	3.68E+00	1.93E-02
Styrene	100425	0.15	0.05	6.00E-03	3.34E-05	0.05	1.54E-02	8.59E-05
1,1,2,2-Tetrachloroethane	25322207	0.25	0.02	1.10E-02	5.74E-05	0.02	2.83E-02	1.48E-04
1,1,1,2-Tetrachloroethane	630206	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
Toluene	108883	0.16	0.05	7.00E-03	3.56E-05	0.05	1.80E-02	9.16E-05
1,1,2-Trichloroethane	79005	0.07	0.02	3.00E-03	1.61E-05	0.02	7.72E-03	4.14E-05
1,1,1-Trichloroethane	71556	0.96	0.05	4.10E-02	2.14E-04	0.05	1.05E-01	5.51E-04
Trichloroethylene	79016	2101.4	0.97	2.81E+00	1.48E-02	0.992	1.93E+00	1.01E-02
Vinyl chloride	75014	1.8	0	8.00E-02	4.22E-04	0	1.40E-01	7.36E-04
Xylenes (Total)		0.19	0.05	8.00E-03	4.23E-05	0.05	2.06E-02	1.09E-04
Total		6147.6		9.80E+00	5.16E-02		9.74E+00	5.11E-02

Table 3: Lockheed VES Emission Profiles

Chemical	CAS	Influent Comp. (ug/L)	Low Efficiency Conditions Loading 548 lbs/day			High Efficiency Conditions Loading 1410 lbs/day		
			Control Efficiency	Emissions (lb/day)	Emissions (g/s)	Control Efficiency	Emissions (lb/day)	Emissions (g/s)
Acetone	67641	3.09	0.1	1.24E-01	6.52E-04	0.1	3.19E-01	1.68E-03
Benzene	71432	0.15	0.05	6.00E-03	3.34E-05	0.05	1.54E-02	8.59E-05
Bromodichloromethane	75274	0.1	0.05	4.00E-03	2.23E-05	0.05	1.03E-02	5.73E-05
Bromoform	75252	0.1	0.05	4.00E-03	2.23E-05	0.05	1.03E-02	5.73E-05
Bromomethane	74839	0.15	0.05	6.00E-03	3.34E-05	0.05	1.54E-02	8.59E-05
2-Butanone	78933	2.5	0.1	1.00E-01	5.27E-04	0.1	2.57E-01	1.36E-03
Carbon Tetrachloride	56235	0.3	0.05	1.30E-02	6.68E-05	0.05	3.34E-02	1.72E-04
Chlorobenzene	108907	0.11	0.05	5.00E-03	2.45E-05	0.05	1.29E-02	6.30E-05
Chloroethane	75003	0.15	0.02	7.00E-03	3.44E-05	0.02	1.80E-02	8.85E-05
Chloroform	67663	0.49	0.05	2.10E-02	1.09E-04	0.05	5.40E-02	2.80E-04
Chlorotrifluoroethylene	79389	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
Dibromochlormoethane	124481	0.13	0.02	6.00E-03	2.98E-05	0.02	1.54E-02	7.67E-05
1,2-Dichloro-1,1,2-trifluoroethane		0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
1,2-Dichloroethane	107062	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
1,1-Dichloroethane	75343	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
1,1 Dichloroethene	75354	0.76	0.05	3.20E-02	1.69E-04	0.05	8.23E-02	4.35E-04
1,2 Dichloroethene (Total)		7.37	0.1	2.96E-01	1.55E-03	0.1	7.62E-01	3.99E-03
1,2 Dichloropropane	78875	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
cis-1,3-Dichloropropene	10061015	0.1	0.05	4.00E-03	2.23E-05	0.05	1.03E-02	5.74E-05
trans-1,3-Dichloropropene	10061026	0.1	0.05	4.00E-03	2.23E-05	0.05	1.03E-02	5.74E-05
Ethylbenzene	100414	0.14	0.05	6.00E-03	3.12E-05	0.05	1.54E-02	8.03E-05
Freon-11	75694	1.29	0	5.80E-02	3.02E-04	0	1.49E-01	7.77E-04
Freon-113	76131	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
Freon-12		0.05	0	2.00E-03	1.17E-05	0	5.15E-03	3.01E-05
2-Hexanone	591786	0.1	0.05	4.00E-03	2.23E-05	0.05	1.03E-02	5.74E-05
Hydrocarbons		10.88	0.1	4.37E-01	2.29E-03	0.1	1.12E+00	5.89E-03
Light hydrocarbons		6.99	0.02	3.05E-01	1.60E-03	0.02	7.85E-01	4.12E-03
4-Methyl-2-pentanone	108101	0.25	0.05	1.10E-02	5.56E-05	0.05	2.83E-02	1.43E-04
Methylene chloride	75092	0.17	0.02	7.00E-03	3.90E-05	0.02	1.80E-02	1.00E-04
Perchloroethylene	127184	4006.8	0.97	5.36E+00	2.82E-02	0.992	3.68E+00	1.93E-02
Styrene	100425	0.15	0.05	6.00E-03	3.34E-05	0.05	1.54E-02	8.59E-05
1,1,2,2-Tetrachloroethane	25322207	0.25	0.02	1.10E-02	5.74E-05	0.02	2.83E-02	1.48E-04
1,1,1,2-Tetrachloroethane	630206	0.05	0.02	2.00E-03	1.15E-05	0.02	5.15E-03	2.96E-05
Toluene	108883	0.16	0.05	7.00E-03	3.56E-05	0.05	1.80E-02	9.16E-05
1,1,2-Trichloroethane	79005	0.07	0.02	3.00E-03	1.61E-05	0.02	7.72E-03	4.14E-05
1,1,1-Trichloroethane	71556	0.96	0.05	4.10E-02	2.14E-04	0.05	1.05E-01	5.51E-04
Trichloroethylene	79016	2101.4	0.97	2.81E+00	1.48E-02	0.992	1.93E+00	1.01E-02
Vinyl chloride	75014	1.8	0	8.00E-02	4.22E-04	0	2.06E-01	1.09E-03
Xylenes (Total)		0.19	0.05	8.00E-03	4.23E-05	0.05	2.06E-02	1.09E-04
Total		**6147.6**		9.80E+00	5.16E-02		9.80E+00	5.15E-02

Table 4: Maximum Average Annual Dispersion Coefficients for VES Emissions			
Receptor Category	**Location (UTM Coordinate)**		**Maximum Annual Average Dispersion Coefficient (ug/m^3)/(g/s)**
	Easting (m)	**Northing (m)**	
Commercial	378154	3783569	23.47048
Facility	378094	3783527	22.86938
Offsite	378141	3783572	25.24185
Residential	378146	3783706	10.37292

Table 5: Excess Cancer Risks from Lockheed SVES Emissions

97% Control of Major Components

Chemical	CAS	Unit Risk Factor (m3/ug)	Emissions (g/s)	Maximum Concentration				Excess Cancer Risk			
				Residential (ug/m3)	Commercial (ug/m3)	Facility (ug/m3)	Offsite (ug/m3)	Residential	Commercial	Facility	Offsite
Benzene	71432	2.90E-05	3.34E-05	3.46E-04	7.83E-04	7.63E-04	8.43E-04	1.00E-08	3.41E-09	3.32E-09	3.67E-09
Carbon Tetrachloride	56235	4.20E-05	6.68E-05	6.93E-04	1.57E-03	1.53E-03	1.69E-03	2.91E-08	9.89E-09	9.64E-09	1.06E-08
Chloroform	67663	5.30E-06	1.09E-04	1.13E-03	2.56E-03	2.49E-03	2.75E-03	5.99E-09	2.04E-09	1.98E-09	2.19E-09
1,2-Dichloroethane	107062	2.00E-05	1.15E-05	1.19E-04	2.69E-04	2.63E-04	2.90E-04	2.38E-09	8.07E-10	7.89E-10	8.70E-10
Methylene chloride	75092	1.00E-06	3.90E-05	4.05E-04	9.16E-04	8.93E-04	9.85E-04	4.05E-10	1.37E-10	1.34E-10	1.48E-10
Trichloroethylene	79016	2.00E-06	1.48E-02	1.53E-01	3.47E-01	3.38E-01	3.73E-01	3.06E-07	1.04E-07	1.01E-07	1.12E-07
Vinyl chloride	75014	7.80E-05	4.22E-04	4.36E-03	9.86E-03	9.61E-03	1.06E-02	3.40E-07	1.15E-07	1.12E-07	1.24E-07
								6.94E-07	2.36E-07	2.30E-07	2.53E-07

99.2% Control of Major Components

Chemical	CAS	Unit Risk Factor (m3/ug)	Emissions (g/s)	Maximum Concentration				Excess Cancer Risk			
				Residential (ug/m3)	Commercial (ug/m3)	Facility (ug/m3)	Offsite (ug/m3)	Residential	Commercial	Facility	Offsite
Benzene	71432	2.90E-05	8.59E-05	8.91E-04	2.02E-03	1.96E-03	2.17E-03	2.58E-08	8.79E-09	8.53E-09	9.44E-09
Carbon Tetrachloride	56235	4.20E-05	1.72E-04	1.78E-03	4.03E-03	3.93E-03	4.34E-03	7.48E-08	2.54E-08	2.48E-08	2.73E-08
Chloroform	67663	5.30E-06	2.80E-04	2.91E-03	6.58E-03	6.42E-03	7.08E-03	1.54E-08	5.23E-09	5.10E-09	5.63E-09
1,2-Dichloroethane	107062	2.00E-05	2.96E-05	3.06E-04	6.93E-04	6.75E-04	7.45E-04	6.12E-09	2.08E-09	2.03E-09	2.24E-09
Methylene chloride	75092	1.00E-06	1.00E-04	1.04E-03	2.36E-03	2.30E-03	2.53E-03	1.04E-09	3.54E-10	3.45E-10	3.80E-10
Trichloroethylene	79016	2.00E-06	1.01E-02	1.05E-01	2.38E-01	2.32E-01	2.56E-01	2.10E-07	7.14E-08	6.96E-08	7.68E-08
Vinyl chloride	75014	7.80E-05	7.36E-04	7.63E-03	1.73E-02	1.68E-02	1.86E-02	5.95E-07	2.02E-07	1.97E-07	2.18E-07
								9.28E-07	3.16E-07	3.07E-07	3.39E-07

Table 6: Chronic Hazard Indices from Lockheed SVES Emissions

97% Control of Major Components

Chemical	CAS	Reference Dose (ug/m3)	Emissions (g/s)	Maximum Concentration				Chronic Hazard Index			
				Residential (ug/m3)	Commercial (ug/m3)	Facility (ug/m3)	Offsite (ug/m3)	Residential	Commercial	Facility	Offsite
Benzene	71432	7.10E+01	3.34E-05	3.46E-04	7.83E-04	7.63E-04	8.43E-04	4.87E-06	1.10E-05	1.07E-05	1.19E-05
Carbon Tetrachloride	56235	2.40E+00	6.68E-05	6.93E-04	1.57E-03	1.53E-03	1.69E-03	2.89E-04	6.54E-04	6.38E-04	7.04E-04
Chlorobenzene	108907	7.00E+01	2.45E-05	2.54E-04	5.74E-04	5.60E-04	6.18E-04	3.63E-06	8.20E-06	8.00E-06	8.83E-06
Chloroform	67663	3.50E+01	1.09E-04	1.13E-03	2.56E-03	2.49E-03	2.75E-03	3.23E-05	7.31E-05	7.11E-05	7.86E-05
1,2-Dichloro-1,1,2-trifluoroethane		7.00E+02	1.15E-05	1.19E-04	2.69E-04	2.63E-04	2.90E-04	1.70E-07	3.84E-07	3.76E-07	4.14E-07
1,2-Dichloroethane	107062	9.50E+01	1.15E-05	1.19E-04	2.69E-04	2.63E-04	2.90E-04	1.25E-06	2.83E-06	2.77E-06	3.05E-06
1,1-Dichloroethene	75354	3.20E+01	1.69E-04	1.75E-03	3.97E-03	3.87E-03	4.27E-03	5.47E-05	1.24E-04	1.21E-04	1.33E-04
Freon-11		7.00E+02	3.02E-04	3.13E-03	7.09E-03	6.91E-03	7.63E-03	4.47E-06	1.01E-05	9.87E-06	1.09E-05
Freon-113	76131	7.00E+02	1.15E-05	1.19E-04	2.69E-04	2.63E-04	2.90E-04	1.70E-07	3.84E-07	3.76E-07	4.14E-07
Freon-12		7.00E+02	1.17E-05	1.22E-04	2.75E-04	2.68E-04	2.96E-04	1.74E-07	3.93E-07	3.83E-07	4.23E-07
Methylene chloride	75092	3.00E+03	3.90E-05	4.05E-04	9.16E-04	8.93E-04	9.85E-04	1.35E-07	3.05E-07	2.98E-07	3.28E-07
Perchloroethylene	127184	3.50E+01	2.82E-02	2.92E-01	6.61E-01	6.44E-01	7.11E-01	8.34E-03	1.89E-02	1.84E-02	2.03E-02
Styrene	100425	7.00E+02	3.34E-05	3.46E-04	7.83E-04	7.63E-04	8.42E-04	4.94E-07	1.12E-06	1.09E-06	1.20E-06
Toluene	108883	2.00E+02	3.56E-05	3.69E-04	8.36E-04	8.14E-04	8.99E-04	1.85E-06	4.18E-06	4.07E-06	4.50E-06
1,1,1-Trichloroethane	71556	3.20E+02	2.14E-04	2.22E-03	5.01E-03	4.88E-03	5.39E-03	6.94E-06	1.57E-05	1.53E-05	1.68E-05
Trichloroethylene	79016	6.40E+02	1.48E-02	1.53E-01	3.47E-01	3.38E-01	3.73E-01	2.39E-04	5.42E-04	5.28E-04	5.83E-04
Vinyl chloride	75014	2.60E+01	4.22E-04	4.36E-03	9.86E-03	9.61E-03	1.06E-02	1.68E-04	3.79E-04	3.70E-04	4.08E-04
Xylenes (Total)		3.00E+02	4.23E-05	4.38E-04	9.92E-04	9.67E-04	1.07E-03	1.46E-06	3.31E-06	3.22E-06	3.57E-06
								9.15E-03	2.07E-02	2.02E-02	2.23E-02

99.2% Control of Major Components

Chemical	CAS	Reference Dose (ug/m3)	Emissions (g/s)	Maximum Concentration				Excess Cancer Risk			
				Residential (ug/m3)	Commercial (ug/m3)	Facility (ug/m3)	Offsite (ug/m3)	Residential	Commercial	Facility	Offsite
Benzene	71432	7.10E+01	8.59E-05	8.91E-04	2.02E-03	1.96E-03	2.17E-03	1.25E-05	2.85E-05	2.76E-05	3.06E-05
Carbon Tetrachloride	56235	2.40E+00	1.72E-04	1.78E-03	4.03E-03	3.93E-03	4.34E-03	7.42E-04	1.68E-03	1.64E-03	1.81E-03
Chlorobenzene	108907	7.00E+01	6.30E-05	6.53E-04	1.48E-03	1.44E-03	1.59E-03	9.33E-06	2.11E-05	2.06E-05	2.27E-05
Chloroform	67663	3.50E+01	2.80E-04	2.91E-03	6.58E-03	6.42E-03	7.08E-03	8.31E-05	1.88E-04	1.83E-04	2.02E-04
1,2-Dichloro-1,1,2-trifluoroethane		7.00E+02	2.95E-05	3.06E-04	6.93E-04	6.75E-04	7.46E-04	4.37E-07	9.90E-07	9.64E-07	1.07E-06
1,2-Dichloroethane	107062	9.50E+01	2.95E-05	3.06E-04	6.93E-04	6.75E-04	7.45E-04	3.22E-06	7.29E-06	7.11E-06	7.84E-06
1,1-Dichloroethene	75354	3.20E+01	4.35E-04	4.51E-03	1.02E-02	9.95E-03	1.10E-02	1.41E-04	3.19E-04	3.11E-04	3.44E-04
Freon-11		7.00E+02	7.78E-04	8.07E-03	1.83E-02	1.78E-02	1.96E-02	1.15E-05	2.61E-05	2.54E-05	2.80E-05
Freon-113	76131	7.00E+02	2.95E-05	3.06E-04	6.93E-04	6.75E-04	7.46E-04	4.37E-07	9.90E-07	9.64E-07	1.07E-06
Freon-12		7.00E+02	3.01E-05	3.13E-04	7.07E-04	6.89E-04	7.61E-04	4.47E-07	1.01E-06	9.84E-07	1.09E-06
Methylene chloride	75092	3.00E+03	1.00E-04	1.04E-03	2.36E-03	2.30E-03	2.53E-03	3.47E-07	7.87E-07	7.67E-07	8.43E-07
Perchloroethylene	127184	3.50E+01	1.93E-02	2.00E-01	4.53E-01	4.42E-01	4.88E-01	5.71E-03	1.29E-02	1.26E-02	1.39E-02
Styrene	100425	7.00E+02	8.59E-05	8.91E-04	2.02E-03	1.96E-03	2.17E-03	1.27E-06	2.89E-06	2.80E-06	3.10E-06
Toluene	108883	2.00E+02	9.16E-05	9.50E-04	2.15E-03	2.09E-03	2.31E-03	4.75E-06	1.08E-05	1.05E-05	1.16E-05
1,1,1-Trichloroethane	71556	3.20E+02	5.50E-04	5.70E-03	1.29E-02	1.26E-02	1.39E-02	1.78E-05	4.03E-05	3.94E-05	4.34E-05
Trichloroethylene	79016	6.40E+02	1.01E-02	1.05E-01	2.38E-01	2.32E-01	2.56E-01	1.64E-04	3.72E-04	3.63E-04	4.00E-04
Vinyl chloride	75014	2.60E+01	7.36E-04	7.63E-03	1.73E-02	1.68E-02	1.86E-02	2.94E-04	6.64E-04	6.47E-04	7.15E-04
Xylenes (Total)		3.00E+02	1.09E-03	1.13E-03	2.55E-03	2.49E-03	2.75E-03	3.77E-06	8.50E-06	8.30E-06	9.17E-06
								7.20E-03	1.63E-02	1.59E-02	1.76E-02

Table 7: Acute Hazard Indices from the Lockheed VES						
Chemical	**CAS**	**Reference Dose (ug/m^3)**	**Emissions (g/s)**	**Dispersion Coefficient (ug/m^3)/(g/s)**	**Concentration at MEI (ug/m^3)**	**Acute Hazard Index**
Low Efficiency Conditions						
Carbon tetrachloride	56235	190.0	6.68E-05	382.764	2.56E-02	0.000135
Methylene chloride	75092	3500.0	3.9E-05	382.764	1.49E-02	0.00000427
Perchloroethylene	127184	6800.0	2.82E-02	382.764	1.08E+01	0.00159
1,1,1-Trichloroethane	71556	190000.0	2.14E-04	382.764	8.19E-02	0.000000431
Xylenes (Total)		4400.0	4.23E-05	382.764	1.62E-02	0.00000368
Total						**0.00173**
High Efficiency Conditions						
Carbon tetrachloride	56235	190.0	1.72E-04	382.764	6.58E-02	0.000347
Methylene chloride	75092	3500.0	1.00E-04	382.764	3.83E-02	0.0000109
Perchloroethylene	127184	6800.0	1.93E-02	382.764	7.39E+00	0.0000109
1,1,1-Trichloroethane	71556	190000.0	5.50E-04	382.764	2.11E-01	0.00000111
Xylenes (Total)		4400.0	1.09E-04	382.764	4.17E-02	0.00000948
Total						**0.00145**

APPENDIX D

HEALTH RISK HAZARDS ANALYSIS

APPENDIX D

HEALTH RISK HAZARDS ANALYSIS

In general, risk of upset is the study of hypothetical scenarios involving accidents and their associated impacts on human health and the environment. The reliance of the risk of upset analysis on these hypothetical scenarios can make it difficult to identify and quantify specific environmental impacts. This section discusses the risk reduction measures in place for the soil vapor extraction system (VES), upset events which may occur, and predicts the impacts posed by hypothetical "worst case" hazard consequence analyses.

Risk of upset is typically defined as the number of members of the public potentially affected by maximum single events defined as "credible near worst-case" incidents. Due to their infrequency and severity, the exposures to the public that may result are typically high-concentration exposures that occur over a relatively short duration. A human reaction from such an acute exposure to a toxic chemical may vary from minor eye and throat irritation to immediate coughing and breathing difficulty.

METHODOLOGY

Hazard analysis typically focusses on public health risk in the event of an upset condition (accident) during operations. A hazard analysis of the VES would therefore be expected to evaluate public and worker health and safety risks posed by accidental explosions or releases of hazardous substances from VES operations, to address the following impacts:

- the risk of accidental explosions or releases of hazardous substances;
- the potential impacts posed to public and worker health and safety by accidental explosions or releases; and
- the impacts of exposure of people to existing sources of potential hazards posed by accidental explosions or releases of hazardous substances.

In performing the hazard analysis, a profile of likely VES operating conditions and potential accident scenarios must be developed. These operating conditions and accident scenarios serve as the basis for evaluating the impacts of accidental explosions and releases to the public and site

workers. A series of possible accident scenarios is then developed for each set of VES operations, from which explosion and release impacts will be determined. Emergency planning software is used as a screening tool to estimate emission rates, explosion impacts, and downwind concentrations of hazardous substances. Based on the results of screening of downwind concentrations of hazardous substances, a more refined air model may be employed that considers site-specific meteorological data.

DEVELOPMENT OF UPSET SCENARIOS

Chemical hazards during upset conditions include flammability, reactivity, and toxicity. A discussion of each of the hazards posed by upset conditions is described in this section.

Flammability Hazards

In the case of gases or vapors that form flammable mixtures with air, oxygen, or other oxidizers, there is a minimum concentration below which propagation of a flame cannot occur. There, likewise, is a maximum concentration above which propagation of flame cannot occur. These boundary concentrations are known as the "lower and upper flammable or explosive limits" and are typically expressed as percent by volume of the material in air. A mixture of chemicals below the lower flammable limit is too "lean" to burn, while a mixture of chemicals in air above the upper flammable limit is too "rich" to burn. All concentrations of a gas or vapor in air that exist between their flammable limits are ignitable.

In the case of operating the VES, organic chemicals are being captured as vapors in a granular activated carbon medium. The National Fire Protection Association (NFPA, 1994) has identified lower explosive limits for a majority of the chemicals identified for treatment in the VES. Common lower explosivity limits (LEL) values include 2.5% for acetone, 1.2% for benzene, and 8% for trichloroethylene. These values, which are expressed as percent in air by volume (i.e., *parts per hundred*), equate to parts per million levels of 25,000 ppm for acetone, 12,000 ppm for benzene, and 80,000 ppm for trichloroethylene. To compare these LEL values to the influent concentrations of substances into the VES, trichloroethylene is a useful substance. Trichloroethylene is useful as a flammability hazard indicator because it represents the substance with the highest influent concentration into the VES for which there is a published LEL. The influent concentration of trichloroethylene in the VES of 2101.4 ug/L equates to approximately 391 parts per million (v/v air), or 0.0391 %. The influent concentration of trichloroethylene would have to be increased by a factor of 8% ÷ 0.391%, or 205, to approach the lowest concentration of trichloroethylene in air that can support ignition. The NFPA (1994) indicates

that there is no LEL value in existence for perchloroethylene, which is the only other substance introduced into the VES at concentrations similar to trichloroethylene.

Because airborne concentrations of the remainder of substances in the VES are on the order of fractions of parts per million, and because it is believed to be unlikely that influent trichloroethylene concentrations will increase by a factor of over 200, it is not anticipated that soil vapors feeding into the VES or being emitted from the VES will pose flammability hazards.

Chemical Reactivity and Compatibility Hazards

A resource for evaluating chemical reactivity and compatibility hazards is the NFPA's *Manual of Hazardous Chemical Reactions* (1991). NFPA 491M, *Manual of Hazardous Chemical Reactions*, was developed by the NFPA's Technical Committee on Hazardous Chemical Reactions and was originally published in 1975. The manual includes over 3500 entries of hazardous or potentially hazardous chemical reactions and is updated periodically as further information on hazardous reactions is accumulated. This resource was consulted to determine if any reactivity or compatibility hazards are posed by combining the chemicals to be treated in the VES. Based on this review, the NFPA Manual indicates that the potential for chemical incompatibilities is posed by mixing acetone and chloroform and acetone with methyl chloroform (1,1,1-trichloroethane) in an alkaline environment. According to the NFPA, a mixture of acetone and chloroform in a residue bottle exploded; since addition of chloroform to acetone in the presence of a base will result in a highly exothermic reaction, it is thought that a base may have been in the bottle. The same potential for an exothermic reaction is posed by a mixing acetone with 1,1,1-trichloroethane due to structural similarities between chloroform and 1,1,1-trichloroethane (NFPA, 1991).

In addition to the above reactions, many of the chemicals that will be treated by the VES are incompatible with metals and oxygenated compounds under certain conditions. Because routine operation of the VES will not involve alkaline conditions or the potential for interaction with metals or oxygenated compounds described by the NFPA, it is believed that the risk of upset conditions posed by chemical incompatibilities is highly unlikely.

Toxicity Hazards

Selection of Exposure Criteria

As described above, the exposures to the public that may result from upset conditions are typically high-concentration exposures that occur over a relatively short duration. A human reaction from such an acute exposure to a toxic chemical may vary from minor eye and throat irritation to immediate coughing and breathing difficulty. Key tasks in planning for hazardous materials emergencies can include preparations for identifying, notifying, evacuating, sheltering, or otherwise protecting potentially exposed populations from releases of gases and vapors. Planning for each of these activities involves the establishment of thresholds of airborne concentrations of chemicals, or "levels of concern," at which it is believed populations must take protective action to avoid unacceptable exposures. Derivation of these levels of concern is an important process for emergency planning and is typically based on primary data sources such as the following:

- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs)
- OSHA Permissible Exposure Limits (PELs)
- American Industrial Hygiene Association Workplace Environmental Exposure Limits (WEELs) and Emergency Response Planning Guidelines (ERPGs)
- NIOSH Immediately Dangerous to Life or Health (IDLH) values
- National Academy of Sciences (NAS)/National Research Council (NRC) Emergency Exposure Guidance Levels (EEGLs) and Short-Term Public Emergency Guidance Levels (SPEGLs)

Because of the variations of exposure limits and toxicological data sources for each chemical, the Federal Emergency Management Agency (FEMA) and the U.S. Environmental Protection Agency (EPA) have developed criteria for use of emergency exposure levels for the general public (appearing below in order of preference):

- The NAS/NRC SPEGL/EEGL or the AIHA "ERPG-2" value for the chemical if one has been established;

- Guidance from a toxicologist or similarly qualified individual based on a formal review of the toxicity of the material of concern;

- Use of the highest value among the following:

  - IDLH value divided by 10 (with "10" being a safety factor)
  - TLV-Short Term Exposure Limit (STEL)
  - TLV-TWA multiplied by 3 (if a TLV-STEL does not exist)
  - TLV-C.

- Use of the TLV-TWA or TLV-C if evacuation of additional areas is not a problem or if the exposure may be greater than one hour in duration (FEMA, 1989).

Each of these categories of exposure criteria is described below, along with a rationale for their use in this hazard analysis.

Emergency Response Planning Guideline Values

The ERPG values, which are published by the AIHA, are intended to provide estimates of concentration ranges above which one could reasonably anticipate observing adverse effects as described in the definitions for ERPG-1, ERPG-2, and ERPG-3 as a consequence of exposure to the specific substance.

- The **ERPG-1** is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing any effects other than mild transient adverse health effects or perceiving a clearly objectionable odor.

- The **ERPG-2** is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their ability to take protective action.

- The **ERPG-3** is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

The ERPG values are not necessarily expected to protect everyone, but are applicable to most individuals in the general population. In all populations there are hypersensitive individuals who will respond adversely to exposure concentrations well below levels where most individuals would normally respond. Also, the AIHA cautions that because these values are intended to be used as planning and emergency response guidelines, rather than as *exposure* guidelines, they do not contain the safety factors commonly incorporated into exposure guidelines. The emphasis of the ERPG values is intended to be upon the estimation of the thresholds above which there would be an unacceptable likelihood of observing the listed effects.

The AIHA's Emergency Response Planning Committee has developed ERPG values for 69 chemicals as of June 27, 1995. Of the substances that will be emitted from the VES, ERPG values have been approved for seven of these substances, including benzene, carbon tetrachloride, chlorobenzene, chlorotrifluoroethylene, methylene chloride, styrene, and toluene. The AIHA has previously published the ERPG values for carbon tetrachloride, chlorobenzene, chlorotrifluoroethylene, and styrene, while the ERPG values for benzene, methylene chloride, and toluene have been approved by the Emergency Response Planning Committee and are in press for publication by the AIHA. These seven ERPG values have been employed for use in this hazard analysis as exposure criteria for emergency releases of these substances from the VES. This hazard analysis used ERPG-1 and ERPG-3 values to provide a range of health effects for consideration, rather than solely using the ERPG-2 value. This approach allows for a "framing" of risks from substances expected to be emitted from the VES, with the ERPG-1 value representing the risk of mild irritation and the ERPG-3 value representing the potential for life-threatening health effects.

Emergency Exposure Guidance Levels (EEGLs)

The NRC has developed emergency exposure guidelines for 42 chemicals of concern to the Department of Defense. These guidelines are used in planning for sudden contamination of air during military and space operations, and are specifically used to choose protective equipment and response plans for non-routine but predictable occurrences such as line breaks, spills, and fires. The NRC has developed EEGLs with the intent of determining peak levels of exposure considered to be acceptable for rare situations; EEGLs are not considered to be appropriate for applications involving repeated exposures.

An EEGL is defined as the concentration of a substance in air judged by the Department of Defense to be acceptable for the performance of specific tasks by military personnel during emergency conditions lasting from one to 24 hours. Exposure to an EEGL is not considered to

be safe, but is considered to be acceptable when the exposure occurs in the context of preventing greater risks, such as fires or explosions. Exposures at the EEGLs may produce transient central nervous system effects or irritation of the eyes or respiratory system, but are not considered to be serious enough to prevent proper responses to emergency conditions.

Of the 42 EEGLs that have been developed to date, five exist for substances expected to be emitted from the VES. These substances include acetone, benzene, chloroform, 1,1-dichloroethylene, and xylenes. Of these five substances, the only one for which an ERPG value has been approved is benzene, and the EEGL of 1,000 ppm for a one-hour exposure period matches the ERPG-3 value for benzene. These five EEGLs have been employed for use in this hazard analysis as exposure criteria for emergency releases of these substances from the VES.

Substances for which ERPG or EEGL values have been developed appear in the table on the following page. The source of IDLH values used in the table is the NIOSH Pocket Guide to Chemical Hazards (US DHHS, 1990), while the source of other exposure and toxicological data is Lewis (1992).

VES Chemicals with ERPG or EEGL Values			
Chemical	ERPG-1	ERPG-3	60-minute EEGL
Acetone	NA	NA	8,500 ppm
Benzene	25 ppm	1000 ppm	1000 ppm
Carbon tetrachloride	20 ppm	750 ppm	NA
Chlorobenzene	1 ppm	25 ppm	NA
Chloroform	NA	NA	100 ppm
Chlorotrifluoroethylene	20 ppm	300 ppm	NA
1,1-Dichloroethene	NA	NA	10 ppm (24 hr)
Methylene chloride	200 ppm	4000 ppm	NA
Styrene	50 ppm	1000 ppm	NA
Toluene	50 ppm	1000 ppm	NA
Xylenes	NA	NA	200 ppm

Levels of Concern

Because ERPG values and EEGLs have not been developed for all hazardous substances, alternative values must be derived to estimate appropriate exposure thresholds to chemicals under emergency release scenarios. In these situations, FEMA and the US EPA recommend using occupational exposure limits, such as NIOSH IDLH values, OSHA PELs, and ACGIH TLVs.

The PEL and TLV values are intended to prevent health effects associated with both acute and chronic exposures experienced by normally healthy workers throughout their working careers. These values are therefore believed to be typically lower than what they need to be to protect the public from exposures associated with non-routine, short-duration accidental releases. For this reason, use of a TLV or PEL is likely to be overprotective in accidental release scenarios, although corrosive materials and other irritants would be considered an exception to this generalization.

IDLH values are much higher than PELs or TLVs and were developed by NIOSH to serve as the basis for respirator selection in emergency environments of 30 minutes in duration. The IDLH values are intended to represent the borderline between levels that are barely tolerable and those that may cause significant injury to normally healthy workers. Because the IDLH values apply to worker populations, they are not appropriate for application to non-occupational populations or for exposures exceeding 30 minutes in duration.

A table showing the derivation of levels of concern for substances without ERPG or EEGL values follows.

Derivation of Levels of Concern for Substances without ERPG or EEGL Values					
Chemical	IDLH	TLV-STEL	TLV-TWA x 3.0	TLV-C	LOC
Bromodichloromethane	NA	NA	NA	NA	*
Bromoform	NA	NA	1.5 ppm		1.5 ppm
Bromomethane	2000 ppm	NA	15 ppm		200 ppm
2-Butanone	3000 ppm	300 ppm	600 ppm		300 ppm
Chloroethane	20000 ppm	NA	3000 ppm		3000 ppm
Dibromochloromethane	NA	NA	NA	NA	*
1,2-Dichloro-1,1,2-trifluoroethane	NA	NA	NA	NA	**
1,2-Dichloroethane	1000 ppm	NA	NA	NA	100 ppm
1,1-Dichloroethane	4000 ppm	250 ppm	600 ppm	NA	400 ppm
1,2-Dichloroethene (Total)	4000 ppm	NA	600 ppm	NA	400 ppm
1,2-Dichloropropane	2000 ppm	110 ppm	225 ppm	NA	200 ppm
cis-1,3-Dichloropropene	NA	NA	3 ppm	NA	3 ppm
trans-1,3-Dichloropropene	NA	NA	NA	NA	**
Ethyl benzene	2000 ppm	125 ppm	300 ppm	NA	200 ppm
Freon-11	NA	NA	NA	1000 ppm	1000 ppm
Freon-113	4500 ppm	1250 ppm	3000 ppm	NA	1250 ppm
Freon-12	50,000 ppm	NA	3000 ppm	NA	5000 ppm
2-Hexanone	5000 ppm	NA	15 ppm	NA	500 ppm
4-Methyl-2-pentanone	3000 ppm	75 ppm	150 ppm	NA	300 ppm
Perchloroethylene	500 ppm	200 ppm	150 ppm	NA	200 ppm
1,1,2,2-Tetrachloroethane	150 ppm	NA	3 ppm	NA	15 ppm
1,1,1,2-Tetrachloroethane	NA	NA	NA	NA	**
1,1,2-Trichloroethane	500 ppm	NA	30 ppm	NA	50 ppm
1,1,1-Trichloroethane	1000 ppm	450 ppm	1050 ppm	NA	450 ppm
Trichloroethylene	1000 ppm	200 ppm	150 ppm	NA	200 ppm
Vinyl chloride	NA	NA	15 ppm	5 ppm	15 ppm

* Indicates that no IDLH, TLV-STEL, TLV-TWA, or TLV-C value was identified.

** Indicates that no IDLH, TLV-STEL, TLV-TWA, or TLV-C value was identified, nor was any LC_{50}, LCLo, or LD_{50} value identified.

Alternate Levels of Concern

Under the Superfund Amendments and Reauthorization Act (SARA) of 1986, the EPA established a list of several hundred Extremely Hazardous Substances subject to emergency planning, community right-to-know reporting, hazardous emissions reporting, and emergency notification requirements. In providing guidance to planning personnel for screening and prioritizing threats posed by releases of these substances, the EPA developed threshold values called "Levels of Concern" (LOCs) (FEMA, 1989). For substances for which NIOSH has established IDLH values, the EPA set LOCs equal to one-tenth the IDLH value until such time as industry and government develop more appropriate exposure limits. For substances for which NIOSH has not developed IDLH values, the EPA recommended a procedure for deriving approximate IDLH values to estimate LOCs. The EPA employed the following equations to estimate IDLH values:

1) Estimated IDLH = LC_{50} x 0.1
2) Estimated IDLH = LCLo
3) Estimated IDLH = LD_{50} x 0.01
4) Estimated IDLH = LDLo x 0.1

The abbreviations "LC_{50}," "LCLo," "LD_{50}," and "LDLo" are toxicological terms used to express the toxicity of various materials derived from animal studies. *LD* is an abbreviation for *lethal dose*, while *LC* is the abbreviation for *lethal concentration*. The number "50" means that 50% of the test population of animals were killed under the conditions stated in the study results, while the letters "Lo" indicate the lowest reported level having a particular toxic effect. LC_{50} is therefore the airborne concentration of a substance to which a test population was exposed that resulted in the deaths of 50% of the animals in the test population. The LD_{50} value likewise represents the oral or skin-applied dose of a chemical that resulted in the deaths of 50% of the test population. LCLo represents that lowest airborne concentration of a toxic substance that resulted in a death of an animal in a test population. The LC values are preferred over the LD values in the above procedure since they are based on inhalation data rather than ingestion or skin application data.

Using these relationships for estimating LOCs and IDLHs, estimations of appropriate exposure thresholds under emergency release conditions may be derived for the remaining specific substances emitted from the VES. The derivation of LOCs appears in the following table for bromodichloromethane and dibromochloromethane. Because IDLH values have not been developed by NIOSH for these substances, the table also indicates the derived value of the IDLH

based on the LD_{50} value for that specific substance. Toxicity values were taken from "Sax's Dangerous Properties of Industrial Materials" (Lewis, 1992).

Derivation of Levels of Concern Using Toxicological Data				
	Toxicity Data	Type	"IDLH"	LOC
Bromodichloromethane	450 mg/kg (mouse)	LD_{50}	4.5 ppm	0.45
Dibromochloromethane	800 mg/kg (mouse)	LD_{50}	8.0 ppm	0.8 ppm

It is important to note that although this derivation methodology is the best available, the EPA is developing new methods for making these determinations. Additionally, no levels of concern could be derived for light hydrocarbons, hydrocarbons, 1,2-dichloro-1,1,2-trifluoroethane, trans-1,3-dichloropropene, or 1,1,1,2-tetrachloroethane. However, the lack of this information is not considered to be a limitation to the hazards analysis.

SUMMARY OF SELECTION OF EXPOSURE CRITERIA FOR UPSET CONDITIONS

Based on EPA and FEMA guidance, the exposure limits used in the hazard analysis for toxicity hazards posed by upset conditions of the VES are based on the following criteria:

- The AIHA ERPG-3 and ERPG-1 values and the NAS/NRC SPEGL/EEGL if available;

- Use of the highest value among the following:

  - IDLH value divided by 10 (with "10" being a safety factor)
  - TLV-Short Term Exposure Limit (STEL)
  - TLV-TWA multiplied by 3 (if a TLV-STEL does not exist)
  - TLV-C

  The "TLV-TWA x 3" value was used only if there was no TLV-STEL available for a particular substance and the "TLV-TWA x 3" value was greater than one tenth the IDLH value and the TLV-C.

- Use of a level of concern derived from animal toxicological data, such as LD_{50} or LC_{50} values.

Modeling

With the identification of hazardous substances and their levels of concern identified, the next step in the hazards analysis was to develop a credible "worst case" release scenario. For the purpose of this hazards analysis, the credible "worst case" release was based upon a scenario in which the "breakthrough" of the activated carbon system might occur in the VES, and the system continued to release groundwater contaminants at the design flow rate of 6000 SCFM for one hour before being shut down. The flow rate of 6000 SCFM was based on the rate established for the first half-year of system operation, and the continued operation of the VES after breakthrough of the activated carbon system assumes that alarm systems fail to shut down the VES automatically.

Based on this release scenario, the input flow rates and concentrations of VES chemicals may be calculated, and the "source term," or amount of material released in one hour, may be used as an input in a screening level air model. The chemical flow rate (grams per minute) is determined by multiplying the influent concentration for each component (micrograms per liter) times the specified VES flow rate of 6000 SCFM, or 171,827 liters per minute, and converting units of micrograms to grams by dividing by one million. The input flow rates and concentrations for VES chemicals appear in the table on the next page.

Chemical	Average Influent Concentration (ug/L)	Year 0.0 - 0.5
		Chemical Flow Rate (g/min)
Acetone	3.09	5.3095 E-1
Benzene	0.15	2.5774 E-2
Bromodichloromethane	0.10	1.7183 E-1
Bromoform	0.10	1.7183 E-1
Bromomethane	0.10	1.7183 E-1
2-Butanone	2.50	4.2957 E-1
Carbon tetrachloride	0.30	5.1548 E-2
Chlorobenzene	0.11	1.8901 E-2
Chloroethane	0.15	2.5774 E-2
Chloroform	0.49	8.4195 E-2
Chlorotrifluoroethylene	0.05	8.5914 E-3
Dibromochloromethane	0.13	2.2338 E-2
1,2-Dichloro-1,1,2-trifluoroethane	0.05	8.5914 E-3
1,2-Dichloroethane	0.05	8.5914 E-3
1,1-Dichloroethane	0.05	8.5914 E-3
1,1-Dichloroethene	0.76	1.3059 E-1
1,2-Dichloroethene (Total)	7.37	1.2664 E+0
1,2-Dichloropropane	0.05	8.5914 E-3
cis-1,3-Dichloropropene	0.10	1.7183 E-1
trans-1,3-Dichloropropene	0.10	1.7183 E-1
Ethyl benzene	0.14	2.4056 E-2
Freon-11	1.29	2.2166 E-1
Freon-113	0.05	8.5914 E-3
Freon-12	0.05	8.5914 E-3
2-Hexanone	0.10	1.7183 E-1
4-Methyl-2-pentanone	0.25	4.2957 E-2
Methylene chloride	0.17	2.9211 E-2
Perchloroethylene	4006.80	6.8848 E+2
Styrene	0.15	2.5774 E-2

Chemical	Average Influent Concentration (ug/L)	Year 0.0 - 0.5 Chemical Flow Rate (g/min)
1,1,2,2-Tetrachloroethane	0.25	4.2957 E-2
1,1,1,2-Tetrachloroethane	0.05	8.5914 E-3
Toluene	0.16	2.7492 E-2
1,1,2-Trichloroethane	0.07	1.2028 E-2
1,1,1-Trichloroethane	0.96	1.6495 E-1
Trichloroethylene	2101.40	3.6108 E+2
Vinyl chloride	1.8	3.0929 E-1
Xylenes (Total)	0.19	3.2647 E-2

The above-listed input concentrations and flow rates were used in the Emergency Prediction Information Code (EPICode) to estimate maximum downwind concentrations posed by the release of these substances under the prescribed worst case scenario. EPICode is a straight-line Gaussian dispersion model that is used as a screening tool for emergency planning. EPICode modeling runs were performed for each substance for which an LOC was derived using conservative, worst-case meteorological conditions, a one-hour release duration, substance-specific influent concentrations, and the VES design flow rate. The maximum downwind concentration estimated for each substance was then identified for comparison with LOC values.

Results

Maximum downwind concentrations for each substance are presented in the following two tables for comparison to their respective LOC values. The results of air modeling of chemical releases for each of the VES substances under worst-case conditions indicate that no LOC is exceeded for any VES chemical. Output files appear as an attachment to this hazards analysis report. Therefore, no significant impacts to public health are expected.

Impacts of One-Hour Releases of Chemicals with ERPG or EEGL Values					
Chemical	Chemical Flow Rate (g/min)	ERPG-1	ERPG-3	60-minute EEGL	Maximum Downwind Concentration (One-Hour Release)
Acetone	5.3095 E-1	NA	NA	8,500 ppm	1.3E-02 ppm
Benzene	2.5774 E-2	25 ppm	1000 ppm	1000 ppm	4.9E-02 ppm
Carbon tetrachloride	5.1548 E-2	20 ppm	750 ppm	NA	< 0.001 ppm
Chlorobenzene	1.8901 E-2	1 ppm	25 ppm	NA	< 0.001 ppm
Chloroform	8.4195 E-2	NA	NA	100 ppm	1.0E-03 ppm
Chlorotrifluoroethylene	8.5914 E-3	20 ppm	300 ppm	NA	< 0.001 ppm
1,1-Dichloroethene	1.3059 E-1	NA	NA	10 ppm (24 hr)	2.0E-03 ppm
Methylene chloride	2.9211 E-2	200 ppm	4000 ppm	NA	< 0.001 ppm
Styrene	2.5774 E-2	50 ppm	1000 ppm	NA	3.7E-02 ppm
Toluene	2.7492 E-2	50 ppm	1000 ppm	NA	< 0.001 ppm
Xylenes	3.2647 E-2	NA	NA	200 ppm	< 0.001 ppm

Impacts of One-Hour Releases of Chemicals with Occupational Exposure Limit Bases				
Chemical	Year 0.0 - 0.5 Chemical Flow Rate (g/min)	Exposure Criteria	Source of Exposure Criteria	Maximum Downwind Concentration (One-Hour Release)
Bromodichloromethane	1.7183 E-1	0.45 ppm	LD_{50}	1.5E-03 ppm
Bromoform	1.7183 E-1	1.5 ppm	TLV-TWA x 3	1.0E-03 ppm
Bromomethane	1.7183 E-1	200 ppm	IDLH x 0.1	2.7E-03 ppm
2-Butanone	4.2957 E-1	300 ppm	TLV-STEL	8.8E-03 ppm
Chloroethane	2.5774 E-2	3000 ppm	TLV-TWA x 3	< 0.001 ppm
Dibromochloromethane	2.2338 E-2	0.8 ppm	LD_{50}	< 0.001 ppm
1,2-Dichloroethane	8.5914 E-3	100 ppm	IDLH x 0.1	< 0.001 ppm
1,1-Dichloroethane	8.5914 E-3	400 ppm	IDLH x 0.1	< 0.001 ppm
1,2-Dichloroethene (Total)	1.2664 E+0	400 ppm	IDLH x 0.1	1.9E-02 ppm
1,2-Dichloropropane	8.5914 E-3	200 ppm	IDLH x 0.1	< 0.001 ppm
cis-1,3-Dichloropropene	1.7183 E-1	3 ppm	TLV-TWA x 3	2.3E-03 ppm
Ethyl benzene	2.4056 E-2	200 ppm	IDLH x 0.1	< 0.001 ppm
Freon-11	2.2166 E-1	1000 ppm	TLV-C	2.4E-03 ppm
Freon-113	8.5914 E-3	1250 ppm	TLV-STEL	< 0.001 ppm
Freon-12	8.5914 E-3	5000 ppm	IDLH x 0.1	< 0.001 ppm
2-Hexanone	1.7183 E-1	500 ppm	IDLH x 0.1	2.5E-03 ppm
4-Methyl-2-pentanone	4.2957 E-2	300 ppm	IDLH x 0.1	6.3E-03 ppm
Perchloroethylene	6.8848 E+2	200 ppm	TLV-STEL	61 ppm
1,1,2,2-Tetrachloroethane	4.2957 E-2	15 ppm	IDLH x 0.1	3.8E-03 ppm
1,1,2-Trichloroethane	1.2028 E-2	50 ppm	IDLH x 0.1	< 0.001 ppm
1,1,1-Trichloroethane	1.6495 E-1	450 ppm	TLV-STEL	1.8E-03 ppm
Trichloroethylene	3.6108 E+2	200 ppm	TLV-STEL	4.0 ppm
Vinyl chloride	3.0929 E-1	15 ppm	TLV-TWA x 3	7.3E-03 ppm

Based on the hazards analysis, the results of upset conditions at the Lockheed VES are not likely to pose significant impacts to on-site or off-site human receptors. These potential impacts include the health effects of "irritation" that would be indicated by exceedance of an ERPG-1 value, as well as impacts resulting in serious injuries, fatalities, or an inability to seek protection from airborne exposures.

Mitigation Measures

The hazards analysis presented in the preceding section indicates that the most credible scenario posed by the VES involves the uncontrolled release of chemicals from the VES unit. Measures in the proposed project that address this scenario include the on-line, continuous monitoring of effluent organic vapor concentrations from the VES coupled with an alarm system and automatic shutdown feature. Use of these systems, along with use of a site-specific health and safety plan, VES operating and maintenance procedures, and emergency response procedures should be sufficient for the mitigation of potential hazards posed by the uncontrolled release of chemicals from the VES. No additional mitigation is required.

CUMULATIVE IMPACTS

Based on professional judgment gained from experience with VES systems, the cumulative impacts from and between the onsite operation of the VES and other off-site projects are not anticipated to be significant. This conclusion is drawn because it is extremely unlikely that upset conditions would occur at more than one project at a time. An exception to this assumption would be the occurrence of an earthquake, which would likely pose impacts of far greater magnitude and concern those posed by the VES. It is also extremely unlikely that an upset condition from an offsite project would create an upset condition for the Lockheed VES. Upset conditions at facilities handling substances similar to those being treated by the VES, such as dry cleaners, gasoline stations, and other projects would not be likely to affect Lockheed VES activities.

MITIGATION MEASURES

A number of project design measures are in place for the operation of the VES to minimize the risk of upset conditions. Implementation of these measures would minimize the risk of upset conditions. Similar measures are typically employed for soil vapor extraction systems in use at other sites.

Level of Significance

The cumulative risk of upset posed by VES is considered to be less than significant.

REFERENCES

Federal Emergency Management Agency, 1989. Handbook of Chemical Hazard Analysis Procedures.

Lewis, Richard, 1992. Sax's Dangerous Properties of Industrial Materials, Eighth Edition, Van Nostrand Reinhold.

National Fire Protection Association, 1991. NFPA 491M, "Manual of Hazardous Chemical Reactions," National Fire Protection Association, Batterymarch Park, MA, 1991.

————, 1994. Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, Batterymarch Park, MA.

U.S. Department of Health and Human Services, 1990. NIOSH Pocket Guide to Chemical Hazards, U.S. Government Printing Office.

Attachment

EPICode Model Output Files for VES Chemicals

EPIcode 5.0 12767 8-04-1995 9:25
SUBSTANCE I.D. : 1,1,1,2-TETRACHLOROETHANE Library-
Molecular Weight : 167.90 gram/mole

TERM : 5.15E-01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 5.2E-04 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stabilit
0.05	8.0E-04	1.2E-04	0:01	F
0.10	2.0E-04	2.9E-05	0:03	F
0.20	5.1E-05	7.5E-06	0:05	F
0.30	2.3E-05	3.4E-06	0:08	F
0.40	1.3E-05	2.0E-06	0:11	F
0.50	8.8E-06	1.3E-06	0:13	F
0.60	6.3E-06	9.2E-07	0:16	F
0.70	4.7E-06	6.9E-07	0:19	F
0.80	3.7E-06	5.4E-07	0:21	F
0.90	3.0E-06	4.3E-07	0:24	F
1.00	2.5E-06	3.6E-07	0:27	F
2.00	7.3E-07	1.1E-07	0:54	F
3.00	3.7E-07	5.4E-08	1:20	F
4.00	2.3E-07	3.4E-08	1:47	F
5.00	1.6E-07	2.4E-08	2:14	F
6.00	1.2E-07	1.8E-08	2:41	F
7.00	9.7E-08	1.4E-08	3:08	F
8.00	7.9E-08	1.2E-08	3:35	F
9.00	6.6E-08	9.6E-09	4:01	F
10.0	5.7E-08	8.2E-09	4:28	F
20.0	2.2E-08	3.3E-09	8:57	D
40.0	1.0E-08	1.5E-09	17:53	D
60.0	5.9E-09	8.6E-10	26:50	D
80.0	3.6E-09	5.3E-10	35:47	D
100	2.5E-09	3.7E-10	44:43	F

EPIcode 5.0 12767 8-04-1995 9:27
SUBSTANCE I.D. : METHYL CHLOROFORM Library-93
Molecular Weight : 133.41 gram/mole
CAS Number: [71-55-6]
TWA : 350 ppm TWA : 1910 mg/m^3
STEL : 450 ppm STEL : 2460 mg/m^3
IDLH : 1000 ppm

TERM : 9.99E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.0E-02 mg/m^3 1.8E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.015	0.0028	0:01	F
0.10	0.0039	0.00071	0:03	F
0.20	1.0E-03	1.8E-04	0:05	F
0.30	4.5E-04	8.3E-05	0:08	F
0.40	2.6E-04	4.8E-05	0:11	F
0.50	1.7E-04	3.1E-05	0:13	F
0.60	1.2E-04	2.2E-05	0:16	F
0.70	9.2E-05	1.7E-05	0:19	F
0.80	7.2E-05	1.3E-05	0:21	F
0.90	5.8E-05	1.1E-05	0:24	F
1.00	4.8E-05	8.8E-06	0:27	F
2.00	1.4E-05	2.6E-06	0:54	F
3.00	7.2E-06	1.3E-06	1:20	F
4.00	4.5E-06	8.3E-07	1:47	F
5.00	3.2E-06	5.8E-07	2:14	F
6.00	2.4E-06	4.4E-07	2:41	F
7.00	1.9E-06	3.4E-07	3:08	F
8.00	1.5E-06	2.8E-07	3:35	F
9.00	1.3E-06	2.4E-07	4:01	F
10.0	1.1E-06	2.0E-07	4:28	F
20.0	4.4E-07	8.0E-08	8:57	D
40.0	2.0E-07	3.7E-08	17:53	D
60.0	1.1E-07	2.1E-08	26:50	D
80.0	7.0E-08	1.3E-08	35:47	D
100	4.9E-08	9.0E-09	44:43	F

EPIcode 5.0 12767 8-04-1995 9:24
SUBSTANCE I.D. : 1,1,2,2-TETRACHLOROETHANE Library-93
Molecular Weight : 167.85 gram/mole
CAS Number: [79-34-5]
TWA : 1.0 ppm TWA : 6.9 mg/m^3
IDLH : 150 ppm

TERM : 2.58E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 2.6E-02 mg/m^3 3.8E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.040	0.0058	0:01	F
0.10	0.010	0.0015	0:03	F
0.20	0.0026	0.00037	0:05	F
0.30	0.0012	0.00017	0:08	F
0.40	6.7E-04	9.8E-05	0:11	F
0.50	4.4E-04	6.4E-05	0:13	F
0.60	3.1E-04	4.6E-05	0:16	F
0.70	2.4E-04	3.4E-05	0:19	F
0.80	1.8E-04	2.7E-05	0:21	F
0.90	1.5E-04	2.2E-05	0:24	F
1.00	1.2E-04	1.8E-05	0:27	F
2.00	3.7E-05	5.3E-06	0:54	F
3.00	1.9E-05	2.7E-06	1:20	F
4.00	1.2E-05	1.7E-06	1:47	F
5.00	8.2E-06	1.2E-06	2:14	F
6.00	6.1E-06	8.9E-07	2:41	F
7.00	4.8E-06	7.0E-07	3:08	F
8.00	4.0E-06	5.8E-07	3:35	F
9.00	3.3E-06	4.8E-07	4:01	F
10.0	2.8E-06	4.1E-07	4:28	F
20.0	1.1E-06	1.6E-07	8:57	D
40.0	5.2E-07	7.5E-08	17:53	D
60.0	2.9E-07	4.3E-08	26:50	D
80.0	1.8E-07	2.6E-08	35:47	D
100	1.3E-07	1.8E-08	44:43	F

EPIcode 5.0 12767 8-04-1995 9:26
SUBSTANCE I.D. : 1,1,2-TRICHLOROETHANE Library-93
Molecular Weight : 133.40 gram/mole
CAS Number: [79-00-5]
TWA : 10 ppm TWA : 55 mg/m^3
IDLH : 500 ppm

TERM : 7.25E-01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 7.3E-04 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.0011	0.00021	0:01	F
0.10	2.8E-04	5.2E-05	0:03	F
0.20	7.2E-05	1.3E-05	0:05	F
0.30	3.3E-05	6.0E-06	0:08	F
0.40	1.9E-05	3.5E-06	0:11	F
0.50	1.2E-05	2.3E-06	0:13	F
0.60	8.8E-06	1.6E-06	0:16	F
0.70	6.6E-06	1.2E-06	0:19	F
0.80	5.2E-06	9.5E-07	0:21	F
0.90	4.2E-06	7.7E-07	0:24	F
1.00	3.5E-06	6.4E-07	0:27	F
2.00	1.0E-06	1.9E-07	0:54	F
3.00	5.2E-07	9.6E-08	1:20	F
4.00	3.3E-07	6.0E-08	1:47	F
5.00	2.3E-07	4.2E-08	2:14	F
6.00	1.7E-07	3.2E-08	2:41	F
7.00	1.4E-07	2.5E-08	3:08	F
8.00	1.1E-07	2.0E-08	3:35	F
9.00	9.3E-08	1.7E-08	4:01	F
10.0	8.0E-08	1.5E-08	4:28	F
20.0	3.2E-08	5.8E-09	8:57	D
40.0	1.4E-08	2.7E-09	17:53	D
60.0	8.3E-09	1.5E-09	26:50	D
80.0	5.1E-09	9.4E-10	35:47	D
100	3.6E-09	6.5E-10	44:43	F

EPIcode 5.0 12767 8-04-1995 9:11
SUBSTANCE I.D. : 1,1-DICHLOROETHANE Library-93
Molecular Weight : 98.96 gram/mole
CAS Number: [75-34-3]
TWA : 100 ppm TWA : 405 mg/m^3
IDLH : 4000 ppm

TERM : 5.15E-01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 5.2E-04 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	8.0E-04	2.0E-04	0:01	F
0.10	2.0E-04	5.0E-05	0:03	F
0.20	5.1E-05	1.3E-05	0:05	F
0.30	2.3E-05	5.8E-06	0:08	F
0.40	1.3E-05	3.3E-06	0:11	F
0.50	8.8E-06	2.2E-06	0:13	F
0.60	6.3E-06	1.6E-06	0:16	F
0.70	4.7E-06	1.2E-06	0:19	F
0.80	3.7E-06	9.1E-07	0:21	F
0.90	3.0E-06	7.4E-07	0:24	F
1.00	2.5E-06	6.1E-07	0:27	F
2.00	7.3E-07	1.8E-07	0:54	F
3.00	3.7E-07	9.2E-08	1:20	F
4.00	2.3E-07	5.7E-08	1:47	F
5.00	1.6E-07	4.0E-08	2:14	F
6.00	1.2E-07	3.0E-08	2:41	F
7.00	9.7E-08	2.4E-08	3:08	F
8.00	7.9E-08	2.0E-08	3:35	F
9.00	6.6E-08	1.6E-08	4:01	F
10.0	5.7E-08	1.4E-08	4:28	F
20.0	2.2E-08	5.5E-09	8:57	D
40.0	1.0E-08	2.5E-09	17:53	D
60.0	5.9E-09	1.5E-09	26:50	D
80.0	3.6E-09	9.0E-10	35:47	D
100	2.5E-09	6.3E-10	44:43	F

EPIcode 5.0 12767 8-04-1995 9:06
SUBSTANCE I.D. : ETHYLENE DICHLORIDE Library-93
Molecular Weight : 98.96 gram/mole
CAS Number: [107-06-2]
TWA : 10 ppm TWA : 40 mg/m^3
IDLH : 1000 ppm

TERM : 5.15E-01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 5.2E-04 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	8.0E-04	2.0E-04	0:01	F
0.10	2.0E-04	5.0E-05	0:03	F
0.20	5.1E-05	1.3E-05	0:05	F
0.30	2.3E-05	5.8E-06	0:08	F
0.40	1.3E-05	3.3E-06	0:11	F
0.50	8.8E-06	2.2E-06	0:13	F
0.60	6.3E-06	1.6E-06	0:16	F
0.70	4.7E-06	1.2E-06	0:19	F
0.80	3.7E-06	9.1E-07	0:21	F
0.90	3.0E-06	7.4E-07	0:24	F
1.00	2.5E-06	6.1E-07	0:27	F
2.00	7.3E-07	1.8E-07	0:54	F
3.00	3.7E-07	9.2E-08	1:20	F
4.00	2.3E-07	5.7E-08	1:47	F
5.00	1.6E-07	4.0E-08	2:14	F
6.00	1.2E-07	3.0E-08	2:41	F
7.00	9.7E-08	2.4E-08	3:08	F
8.00	7.9E-08	2.0E-08	3:35	F
9.00	6.6E-08	1.6E-08	4:01	F
10.0	5.7E-08	1.4E-08	4:28	F
20.0	2.2E-08	5.5E-09	8:57	D
40.0	1.0E-08	2.5E-09	17:53	D
60.0	5.9E-09	1.5E-09	26:50	D
80.0	3.6E-09	9.0E-10	35:47	D
100	2.5E-09	6.3E-10	44:43	F

EPIcode 5.0 12767 8-04-1995 9:13
SUBSTANCE I.D. : 1,2-DICHLOROETHENE Library-
Molecular Weight : 96.94 gram/mole

TERM : 7.60E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 7.6E-02 mg/m^3 1.9E-02 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.12	0.030	0:01	F
0.10	0.030	0.0075	0:03	F
0.20	0.0076	0.0019	0:05	F
0.30	0.0035	0.00087	0:08	F
0.40	0.0020	0.00050	0:11	F
0.50	0.0013	0.00033	0:13	F
0.60	9.3E-04	2.3E-04	0:16	F
0.70	7.0E-04	1.8E-04	0:19	F
0.80	5.4E-04	1.4E-04	0:21	F
0.90	4.4E-04	1.1E-04	0:24	F
1.00	3.6E-04	9.2E-05	0:27	F
2.00	1.1E-04	2.7E-05	0:54	F
3.00	5.5E-05	1.4E-05	1:20	F
4.00	3.4E-05	8.6E-06	1:47	F
5.00	2.4E-05	6.1E-06	2:14	F
6.00	1.8E-05	4.6E-06	2:41	F
7.00	1.4E-05	3.6E-06	3:08	F
8.00	1.2E-05	2.9E-06	3:35	F
9.00	9.8E-06	2.5E-06	4:01	F
10.0	8.3E-06	2.1E-06	4:28	F
20.0	3.3E-06	8.3E-07	8:57	D
40.0	1.5E-06	3.8E-07	17:53	D
60.0	8.7E-07	2.2E-07	26:50	D
80.0	5.4E-07	1.4E-07	35:47	D
100	3.7E-07	9.4E-08	44:43	F

EPIcode 5.0 12767 8-04-1995 9:14
SUBSTANCE I.D. : PROPYLENE DICHLORIDE Library-93
Molecular Weight : 112.99 gram/mole
CAS Number: [78-87-5]
TWA : 75 ppm TWA : 347 mg/m^3
STEL : 110 ppm STEL : 509 mg/m^3
IDLH : 2000 ppm

TERM : 5.15E-01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 5.2E-04 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	8.0E-04	1.7E-04	0:01	F
0.10	2.0E-04	4.3E-05	0:03	F
0.20	5.1E-05	1.1E-05	0:05	F
0.30	2.3E-05	5.1E-06	0:08	F
0.40	1.3E-05	2.9E-06	0:11	F
0.50	8.8E-06	1.9E-06	0:13	F
0.60	6.3E-06	1.4E-06	0:16	F
0.70	4.7E-06	1.0E-06	0:19	F
0.80	3.7E-06	8.0E-07	0:21	F
0.90	3.0E-06	6.5E-07	0:24	F
1.00	2.5E-06	5.3E-07	0:27	F
2.00	7.3E-07	1.6E-07	0:54	F
3.00	3.7E-07	8.0E-08	1:20	F
4.00	2.3E-07	5.0E-08	1:47	F
5.00	1.6E-07	3.5E-08	2:14	F
6.00	1.2E-07	2.7E-08	2:41	F
7.00	9.7E-08	2.1E-08	3:08	F
8.00	7.9E-08	1.7E-08	3:35	F
9.00	6.6E-08	1.4E-08	4:01	F
10.0	5.7E-08	1.2E-08	4:28	F
20.0	2.2E-08	4.9E-09	8:57	D
40.0	1.0E-08	2.2E-09	17:53	D
60.0	5.9E-09	1.3E-09	26:50	D
80.0	3.6E-09	7.9E-10	35:47	D
100	2.5E-09	5.5E-10	44:43	F

EPIcode 5.0 12767 8-04-1995 9:02
SUBSTANCE I.D. : METHYL ETHYL KETONE Library-93
Molecular Weight : 72.11 gram/mole
CAS Number: [78-93-3]
TWA : 200 ppm TWA : 590 mg/m^3
STEL : 300 ppm STEL : 885 mg/m^3
IDLH : 3000 ppm

TERM : 2.58E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 2.6E-02 mg/m^3 8.8E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stabilit
0.05	0.040	0.014	0:01	F
0.10	0.010	0.0034	0:03	F
0.20	0.0026	0.00087	0:05	F
0.30	0.0012	0.00040	0:08	F
0.40	6.7E-04	2.3E-04	0:11	F
0.50	4.4E-04	1.5E-04	0:13	F
0.60	3.1E-04	1.1E-04	0:16	F
0.70	2.4E-04	8.0E-05	0:19	F
0.80	1.8E-04	6.3E-05	0:21	F
0.90	1.5E-04	5.1E-05	0:24	F
1.00	1.2E-04	4.2E-05	0:27	F
2.00	3.7E-05	1.2E-05	0:54	F
3.00	1.9E-05	6.3E-06	1:20	F
4.00	1.2E-05	3.9E-06	1:47	F
5.00	8.2E-06	2.8E-06	2:14	F
6.00	6.1E-06	2.1E-06	2:41	F
7.00	4.8E-06	1.6E-06	3:08	F
8.00	4.0E-06	1.3E-06	3:35	F
9.00	3.3E-06	1.1E-06	4:01	F
10.0	2.8E-06	9.6E-07	4:28	F
20.0	1.1E-06	3.8E-07	8:57	D
40.0	5.2E-07	1.7E-07	17:53	D
60.0	2.9E-07	1.0E-07	26:50	D
80.0	1.8E-07	6.2E-08	35:47	D
100	1.3E-07	4.3E-08	44:43	F

EPIcode 5.0 12767 8-04-1995 9:21
SUBSTANCE I.D. : METHYL N-BUTYL KETONE Library-93
Molecular Weight : 100.16 gram/mole
CAS Number: [591-78-6]
TWA : 5 ppm TWA : 20 mg/m^3
IDLH : 5000 ppm

TERM : 1.03E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.0E-02 mg/m^3 2.5E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.016	0.0039	0:01	F
0.10	0.0040	0.0010	0:03	F
0.20	0.0010	0.00025	0:05	F
0.30	4.7E-04	1.1E-04	0:08	F
0.40	2.7E-04	6.6E-05	0:11	F
0.50	1.8E-04	4.3E-05	0:13	F
0.60	1.3E-04	3.1E-05	0:16	F
0.70	9.4E-05	2.3E-05	0:19	F
0.80	7.4E-05	1.8E-05	0:21	F
0.90	6.0E-05	1.5E-05	0:24	F
1.00	4.9E-05	1.2E-05	0:27	F
2.00	1.5E-05	3.6E-06	0:54	F
3.00	7.4E-06	1.8E-06	1:20	F
4.00	4.6E-06	1.1E-06	1:47	F
5.00	3.3E-06	8.0E-07	2:14	F
6.00	2.5E-06	6.0E-07	2:41	F
7.00	1.9E-06	4.7E-07	3:08	F
8.00	1.6E-06	3.9E-07	3:35	F
9.00	1.3E-06	3.2E-07	4:01	F
10.0	1.1E-06	2.8E-07	4:28	F
20.0	4.5E-07	1.1E-07	8:57	D
40.0	2.1E-07	5.0E-08	17:53	D
60.0	1.2E-07	2.9E-08	26:50	D
80.0	7.3E-08	1.8E-08	35:47	D
100	5.1E-08	1.2E-08	44:43	F

EPIcode 5.0 12767 8-04-1995 9:00
SUBSTANCE I.D. : BROMODICHLOROMETHANE Library-
Molecular Weight : 163.83 gram/mole

TERM : 1.03E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.0E-02 mg/m^3 1.5E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stabilit
0.05	0.016	0.0024	0:01	F
0.10	0.0040	0.00060	0:03	F
0.20	0.0010	0.00015	0:05	F
0.30	4.7E-04	7.0E-05	0:08	F
0.40	2.7E-04	4.0E-05	0:11	F
0.50	1.8E-04	2.6E-05	0:13	F
0.60	1.3E-04	1.9E-05	0:16	F
0.70	9.4E-05	1.4E-05	0:19	F
0.80	7.4E-05	1.1E-05	0:21	F
0.90	6.0E-05	8.9E-06	0:24	F
1.00	4.9E-05	7.4E-06	0:27	F
2.00	1.5E-05	2.2E-06	0:54	F
3.00	7.4E-06	1.1E-06	1:20	F
4.00	4.6E-06	6.9E-07	1:47	F
5.00	3.3E-06	4.9E-07	2:14	F
6.00	2.5E-06	3.7E-07	2:41	F
7.00	1.9E-06	2.9E-07	3:08	F
8.00	1.6E-06	2.4E-07	3:35	F
9.00	1.3E-06	2.0E-07	4:01	F
10.0	1.1E-06	1.7E-07	4:28	F
20.0	4.5E-07	6.7E-08	8:57	D
40.0	2.1E-07	3.1E-08	17:53	D
60.0	1.2E-07	1.8E-08	26:50	D
80.0	7.3E-08	1.1E-08	35:47	D
100	5.1E-08	7.6E-09	44:43	F

EPIcode 5.0 12767 8-04-1995 9:01
SUBSTANCE I.D. : BROMOFORM Library-93
Molecular Weight : 252.75 gram/mole
CAS Number: [75-25-2]
TWA : 0.5 ppm TWA : 5.2 mg/m^3

TERM : 1.03E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.0E-02 mg/m^3 1.0E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.016	0.0015	0:01	F
0.10	0.0040	0.00039	0:03	F
0.20	0.0010	0.00010	0:05	F
0.30	4.7E-04	4.5E-05	0:08	F
0.40	2.7E-04	2.6E-05	0:11	F
0.50	1.8E-04	1.7E-05	0:13	F
0.60	1.3E-04	1.2E-05	0:16	F
0.70	9.4E-05	9.1E-06	0:19	F
0.80	7.4E-05	7.2E-06	0:21	F
0.90	6.0E-05	5.8E-06	0:24	F
1.00	4.9E-05	4.8E-06	0:27	F
2.00	1.5E-05	1.4E-06	0:54	F
3.00	7.4E-06	7.2E-07	1:20	F
4.00	4.6E-06	4.5E-07	1:47	F
5.00	3.3E-06	3.2E-07	2:14	F
6.00	2.5E-06	2.4E-07	2:41	F
7.00	1.9E-06	1.9E-07	3:08	F
8.00	1.6E-06	1.5E-07	3:35	F
9.00	1.3E-06	1.3E-07	4:01	F
10.0	1.1E-06	1.1E-07	4:28	F
20.0	4.5E-07	4.3E-08	8:57	D
40.0	2.1E-07	2.0E-08	17:53	D
60.0	1.2E-07	1.1E-08	26:50	D
80.0	7.3E-08	7.0E-09	35:47	D
100	5.1E-08	4.9E-09	44:43	F

EPIcode 5.0 12767 8-04-1995 9:38
SUBSTANCE I.D. : METHYL BROMIDE Library-93
Molecular Weight : 94.95 gram/mole
CAS Number: [74-83-9]
TWA : 5 ppm TWA : 19 mg/m^3
IDLH : 2000 ppm

TERM : 1.03E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.0E-02 mg/m^3 2.7E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.016	0.0041	0:01	F
0.10	0.0040	0.0010	0:03	F
0.20	0.0010	0.00026	0:05	F
0.30	4.7E-04	1.2E-04	0:08	F
0.40	2.7E-04	6.9E-05	0:11	F
0.50	1.8E-04	4.6E-05	0:13	F
0.60	1.3E-04	3.2E-05	0:16	F
0.70	9.4E-05	2.4E-05	0:19	F
0.80	7.4E-05	1.9E-05	0:21	F
0.90	6.0E-05	1.5E-05	0:24	F
1.00	4.9E-05	1.3E-05	0:27	F
2.00	1.5E-05	3.8E-06	0:54	F
3.00	7.4E-06	1.9E-06	1:20	F
4.00	4.6E-06	1.2E-06	1:47	F
5.00	3.3E-06	8.4E-07	2:14	F
6.00	2.5E-06	6.3E-07	2:41	F
7.00	1.9E-06	5.0E-07	3:08	F
8.00	1.6E-06	4.1E-07	3:35	F
9.00	1.3E-06	3.4E-07	4:01	F
10.0	1.1E-06	2.9E-07	4:28	F
20.0	4.5E-07	1.2E-07	8:57	D
40.0	2.1E-07	5.3E-08	17:53	D
60.0	1.2E-07	3.0E-08	26:50	D
80.0	7.3E-08	1.9E-08	35:47	D
100	5.1E-08	1.3E-08	44:43	F

EPIcode 5.0 12767 8-04-1995 9:16
SUBSTANCE I.D. : CIS 1,3-DICHLOROPROPENE Library-
Molecular Weight : 110.97 gram/mole

TERM : 1.03E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.0E-02 mg/m^3 2.3E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	MAXIMUM CONCENTRATION ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.016	0.0035	0:01	F
0.10	0.0040	0.00088	0:03	F
0.20	0.0010	0.00023	0:05	F
0.30	4.7E-04	1.0E-04	0:08	F
0.40	2.7E-04	5.9E-05	0:11	F
0.50	1.8E-04	3.9E-05	0:13	F
0.60	1.3E-04	2.8E-05	0:16	F
0.70	9.4E-05	2.1E-05	0:19	F
0.80	7.4E-05	1.6E-05	0:21	F
0.90	6.0E-05	1.3E-05	0:24	F
1.00	4.9E-05	1.1E-05	0:27	F
2.00	1.5E-05	3.2E-06	0:54	F
3.00	7.4E-06	1.6E-06	1:20	F
4.00	4.6E-06	1.0E-06	1:47	F
5.00	3.3E-06	7.2E-07	2:14	F
6.00	2.5E-06	5.4E-07	2:41	F
7.00	1.9E-06	4.3E-07	3:08	F
8.00	1.6E-06	3.5E-07	3:35	F
9.00	1.3E-06	2.9E-07	4:01	F
10.0	1.1E-06	2.5E-07	4:28	F
20.0	4.5E-07	9.9E-08	8:57	D
40.0	2.1E-07	4.5E-08	17:53	D
60.0	1.2E-07	2.6E-08	26:50	D
80.0	7.3E-08	1.6E-08	35:47	D
100	5.1E-08	1.1E-08	44:43	F

EPIcode 5.0 12767 8-04-1995 9:05
SUBSTANCE I.D. : DIBROMOCHLOROMETHANE Library-
Molecular Weight : 208.29 gram/mole

TERM : 1.34E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.3E-03 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.0021	0.00024	0:01	F
0.10	5.2E-04	6.1E-05	0:03	F
0.20	1.3E-04	1.6E-05	0:05	F
0.30	6.1E-05	7.1E-06	0:08	F
0.40	3.5E-05	4.1E-06	0:11	F
0.50	2.3E-05	2.7E-06	0:13	F
0.60	1.6E-05	1.9E-06	0:16	F
0.70	1.2E-05	1.4E-06	0:19	F
0.80	9.6E-06	1.1E-06	0:21	F
0.90	7.8E-06	9.1E-07	0:24	F
1.00	6.4E-06	7.5E-07	0:27	F
2.00	1.9E-06	2.2E-07	0:54	F
3.00	9.6E-07	1.1E-07	1:20	F
4.00	6.0E-07	7.1E-08	1:47	F
5.00	4.2E-07	5.0E-08	2:14	F
6.00	3.2E-07	3.7E-08	2:41	F
7.00	2.5E-07	3.0E-08	3:08	F
8.00	2.1E-07	2.4E-08	3:35	F
9.00	1.7E-07	2.0E-08	4:01	F
10.0	1.5E-07	1.7E-08	4:28	F
20.0	5.8E-08	6.9E-09	8:57	D
40.0	2.7E-08	3.1E-09	17:53	D
60.0	1.5E-08	1.8E-09	26:50	D
80.0	9.5E-09	1.1E-09	35:47	D
100	6.6E-09	7.7E-10	44:43	F

EPIcode 5.0 12767 8-04-1995 9:18
SUBSTANCE I.D. : ETHYL BENZENE Library-93
Molecular Weight : 106.17 gram/mole
CAS Number: [100-41-4]
TWA : 100 ppm TWA : 434 mg/m^3
STEL : 125 ppm STEL : 543 mg/m^3
IDLH : 2000 ppm

TERM : 1.44E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.4E-03 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.0022	0.00051	0:01	F
0.10	5.6E-04	1.3E-04	0:03	F
0.20	1.4E-04	3.3E-05	0:05	F
0.30	6.6E-05	1.5E-05	0:08	F
0.40	3.8E-05	8.7E-06	0:11	F
0.50	2.5E-05	5.7E-06	0:13	F
0.60	1.8E-05	4.1E-06	0:16	F
0.70	1.3E-05	3.0E-06	0:19	F
0.80	1.0E-05	2.4E-06	0:21	F
0.90	8.4E-06	1.9E-06	0:24	F
1.00	6.9E-06	1.6E-06	0:27	F
2.00	2.0E-06	4.7E-07	0:54	F
3.00	1.0E-06	2.4E-07	1:20	F
4.00	6.5E-07	1.5E-07	1:47	F
5.00	4.6E-07	1.1E-07	2:14	F
6.00	3.4E-07	7.9E-08	2:41	F
7.00	2.7E-07	6.2E-08	3:08	F
8.00	2.2E-07	5.1E-08	3:35	F
9.00	1.9E-07	4.3E-08	4:01	F
10.0	1.6E-07	3.6E-08	4:28	F
20.0	6.3E-08	1.4E-08	8:57	D
40.0	2.9E-08	6.6E-09	17:53	D
60.0	1.6E-08	3.8E-09	26:50	D
80.0	1.0E-08	2.3E-09	35:47	D
100	7.1E-09	1.6E-09	44:43	F

EPIcode 5.0 12767 8-04-1995 9:18
SUBSTANCE I.D. : TRICHLOROFLUOROMETHANE Library-93
Molecular Weight : 137.40 gram/mole
CAS Number: [75-69-4]
TWA : 1000 ppm TWA : 5620 mg/m^3
IDLH : 10000 ppm

TERM : 1.33E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.3E-02 mg/m^3 2.4E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stabilit
0.05	0.021	0.0037	0:01	F
0.10	0.0052	0.00092	0:03	F
0.20	0.0013	0.00024	0:05	F
0.30	6.0E-04	1.1E-04	0:08	F
0.40	3.5E-04	6.2E-05	0:11	F
0.50	2.3E-04	4.1E-05	0:13	F
0.60	1.6E-04	2.9E-05	0:16	F
0.70	1.2E-04	2.2E-05	0:19	F
0.80	9.5E-05	1.7E-05	0:21	F
0.90	7.7E-05	1.4E-05	0:24	F
1.00	6.4E-05	1.1E-05	0:27	F
2.00	1.9E-05	3.4E-06	0:54	F
3.00	9.6E-06	1.7E-06	1:20	F
4.00	6.0E-06	1.1E-06	1:47	F
5.00	4.2E-06	7.5E-07	2:14	F
6.00	3.2E-06	5.6E-07	2:41	F
7.00	2.5E-06	4.4E-07	3:08	F
8.00	2.0E-06	3.6E-07	3:35	F
9.00	1.7E-06	3.0E-07	4:01	F
10.0	1.5E-06	2.6E-07	4:28	F
20.0	5.8E-07	1.0E-07	8:57	D
40.0	2.7E-07	4.7E-08	17:53	D
60.0	1.5E-07	2.7E-08	26:50	D
80.0	9.4E-08	1.7E-08	35:47	D
100	6.5E-08	1.2E-08	44:43	F

EPIcode 5.0 12767 8-04-1995 9:19
SUBSTANCE I.D. : 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE Library-93
Molecular Weight : 197.50 gram/mole
CAS Number: [76-13-1]
TWA : 1000 ppm TWA : 7670 mg/m^3
STEL : 1250 ppm STEL : 9590 mg/m^3
IDLH : 4500 ppm

TERM : 5.15E-01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 5.2E-04 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	8.0E-04	9.9E-05	0:01	F
0.10	2.0E-04	2.5E-05	0:03	F
0.20	5.1E-05	6.4E-06	0:05	F
0.30	2.3E-05	2.9E-06	0:08	F
0.40	1.3E-05	1.7E-06	0:11	F
0.50	8.8E-06	1.1E-06	0:13	F
0.60	6.3E-06	7.8E-07	0:16	F
0.70	4.7E-06	5.8E-07	0:19	F
0.80	3.7E-06	4.6E-07	0:21	F
0.90	3.0E-06	3.7E-07	0:24	F
1.00	2.5E-06	3.1E-07	0:27	F
2.00	7.3E-07	9.0E-08	0:54	F
3.00	3.7E-07	4.6E-08	1:20	F
4.00	2.3E-07	2.9E-08	1:47	F
5.00	1.6E-07	2.0E-08	2:14	F
6.00	1.2E-07	1.5E-08	2:41	F
7.00	9.7E-08	1.2E-08	3:08	F
8.00	7.9E-08	9.8E-09	3:35	F
9.00	6.6E-08	8.2E-09	4:01	F
10.0	5.7E-08	7.0E-09	4:28	F
20.0	2.2E-08	2.8E-09	8:57	D
40.0	1.0E-08	1.3E-09	17:53	D
60.0	5.9E-09	7.3E-10	26:50	D
80.0	3.6E-09	4.5E-10	35:47	D
100	2.5E-09	3.1E-10	44:43	F

EPIcode 5.0 12767 8-04-1995 9:20
SUBSTANCE I.D. : DICHLORODIFLUOROMETHANE Library-93
Molecular Weight : 120.91 gram/mole
CAS Number: [75-71-8]
TWA : 1000 ppm TWA : 4950 mg/m^3
IDLH : 50000 ppm

TERM : 5.15E-01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 5.2E-04 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	8.0E-04	1.6E-04	0:01	F
0.10	2.0E-04	4.1E-05	0:03	F
0.20	5.1E-05	1.0E-05	0:05	F
0.30	2.3E-05	4.7E-06	0:08	F
0.40	1.3E-05	2.7E-06	0:11	F
0.50	8.8E-06	1.8E-06	0:13	F
0.60	6.3E-06	1.3E-06	0:16	F
0.70	4.7E-06	9.6E-07	0:19	F
0.80	3.7E-06	7.5E-07	0:21	F
0.90	3.0E-06	6.0E-07	0:24	F
1.00	2.5E-06	5.0E-07	0:27	F
2.00	7.3E-07	1.5E-07	0:54	F
3.00	3.7E-07	7.5E-08	1:20	F
4.00	2.3E-07	4.7E-08	1:47	F
5.00	1.6E-07	3.3E-08	2:14	F
6.00	1.2E-07	2.5E-08	2:41	F
7.00	9.7E-08	2.0E-08	3:08	F
8.00	7.9E-08	1.6E-08	3:35	F
9.00	6.6E-08	1.3E-08	4:01	F
10.0	5.7E-08	1.1E-08	4:28	F
20.0	2.2E-08	4.5E-09	8:57	D
40.0	1.0E-08	2.1E-09	17:53	D
60.0	5.9E-09	1.2E-09	26:50	D
80.0	3.6E-09	7.4E-10	35:47	D
100	2.5E-09	5.1E-10	44:43	F

EPIcode 5.0 12767 8-03-1995 12:33
SUBSTANCE I.D. : VINYLIDENE CHLORIDE Library-93
Molecular Weight : 96.95 gram/mole
CAS Number: [75-35-4]
TWA : 5 ppm TWA : 20 mg/m^3
STEL : 20 ppm STEL : 79 mg/m^3

TERM : 7.84E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 7.9E-03 mg/m^3 2.0E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.012	0.0031	0:01	F
0.10	0.0031	0.00077	0:03	F
0.20	7.8E-04	2.0E-04	0:05	F
0.30	3.6E-04	9.0E-05	0:08	F
0.40	2.1E-04	5.2E-05	0:11	F
0.50	1.3E-04	3.4E-05	0:13	F
0.60	9.6E-05	2.4E-05	0:16	F
0.70	7.2E-05	1.8E-05	0:19	F
0.80	5.6E-05	1.4E-05	0:21	F
0.90	4.5E-05	1.1E-05	0:24	F
1.00	3.7E-05	9.4E-06	0:27	F
2.00	1.1E-05	2.8E-06	0:54	F
3.00	5.6E-06	1.4E-06	1:20	F
4.00	3.5E-06	8.9E-07	1:47	F
5.00	2.5E-06	6.3E-07	2:14	F
6.00	1.9E-06	4.7E-07	2:41	F
7.00	1.5E-06	3.7E-07	3:08	F
8.00	1.2E-06	3.0E-07	3:35	F
9.00	1.0E-06	2.5E-07	4:01	F
10.0	8.6E-07	2.2E-07	4:28	F
20.0	3.4E-07	8.6E-08	8:57	D
40.0	1.6E-07	3.9E-08	17:53	D
60.0	8.9E-08	2.3E-08	26:50	D
80.0	5.5E-08	1.4E-08	35:47	D
100	3.9E-08	9.7E-09	44:43	F

EPIcode 5.0 12767 8-03-1995 12:32
SUBSTANCE I.D. : ACETONE Library-93
Molecular Weight : 58.08 gram/mole
CAS Number: [67-64-1]
TWA : 750 ppm TWA : 1780 mg/m^3
STEL : 1000 ppm STEL : 2380 mg/m^3
IDLH : 20000 ppm

TERM : 3.19E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 3.2E-02 mg/m^3 1.3E-02 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stabilit
0.05	0.049	0.021	0:01	F
0.10	0.012	0.0052	0:03	F
0.20	0.0032	0.0013	0:05	F
0.30	0.0014	0.00061	0:08	F
0.40	8.3E-04	3.5E-04	0:11	F
0.50	5.5E-04	2.3E-04	0:13	F
0.60	3.9E-04	1.6E-04	0:16	F
0.70	2.9E-04	1.2E-04	0:19	F
0.80	2.3E-04	9.6E-05	0:21	F
0.90	1.8E-04	7.8E-05	0:24	F
1.00	1.5E-04	6.4E-05	0:27	F
2.00	4.5E-05	1.9E-05	0:54	F
3.00	2.3E-05	9.6E-06	1:20	F
4.00	1.4E-05	6.0E-06	1:47	F
5.00	1.0E-05	4.2E-06	2:14	F
6.00	7.6E-06	3.2E-06	2:41	F
7.00	6.0E-06	2.5E-06	3:08	F
8.00	4.9E-06	2.1E-06	3:35	F
9.00	4.1E-06	1.7E-06	4:01	F
10.0	3.5E-06	1.5E-06	4:28	F
20.0	1.4E-06	5.8E-07	8:57	D
40.0	6.4E-07	2.7E-07	17:53	D
60.0	3.6E-07	1.5E-07	26:50	D
80.0	2.2E-07	9.5E-08	35:47	D
100	1.6E-07	6.6E-08	44:43	F

EPIcode 5.0 12767 8-02-1995 15:08
SUBSTANCE I.D. : BENZENE Library-93
Molecular Weight : 78.11 gram/mole
CAS Number: [71-43-2]
TWA : 10 ppm TWA : 32 mg/m^3
IDLH : 3000 ppm

TERM : 1.55E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.6E-01 mg/m^3 4.9E-02 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.0024	0.00075	0:01	F
0.10	6.0E-04	1.9E-04	0:03	F
0.20	1.5E-04	4.8E-05	0:05	F
0.30	7.0E-05	2.2E-05	0:08	F
0.40	4.0E-05	1.3E-05	0:11	F
0.50	2.7E-05	8.3E-06	0:13	F
0.60	1.9E-05	5.9E-06	0:16	F
0.70	1.4E-05	4.4E-06	0:19	F
0.80	1.1E-05	3.5E-06	0:21	F
0.90	8.9E-06	2.8E-06	0:24	F
1.00	7.4E-06	2.3E-06	0:27	F
2.00	2.2E-06	6.9E-07	0:54	F
3.00	1.1E-06	3.5E-07	1:20	F
4.00	7.0E-07	2.2E-07	1:47	F
5.00	4.9E-07	1.5E-07	2:14	F
6.00	3.7E-07	1.2E-07	2:41	F
7.00	2.9E-07	9.1E-08	3:08	F
8.00	2.4E-07	7.4E-08	3:35	F
9.00	2.0E-07	6.2E-08	4:01	F
10.0	1.7E-07	5.3E-08	4:28	F
20.0	6.7E-08	2.1E-08	8:57	D
40.0	3.1E-08	9.7E-09	17:53	D
60.0	1.8E-08	5.5E-09	26:50	D
80.0	1.1E-08	3.4E-09	35:47	D
100	7.6E-09	2.4E-09	44:43	F

EPIcode 5.0 12767 8-02-1995 15:10
SUBSTANCE I.D. : CARBON TETRACHLORIDE Library-93
Molecular Weight : 153.83 gram/mole
CAS Number: [56-23-5]
TWA : 5 ppm TWA : 31 mg/m^3
IDLH : 300 ppm

TERM : 3.09E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 3.1E-03 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.0048	0.00076	0:01	F
0.10	0.0012	0.00019	0:03	F
0.20	3.1E-04	4.9E-05	0:05	F
0.30	1.4E-04	2.2E-05	0:08	F
0.40	8.1E-05	1.3E-05	0:11	F
0.50	5.3E-05	8.4E-06	0:13	F
0.60	3.8E-05	6.0E-06	0:16	F
0.70	2.8E-05	4.5E-06	0:19	F
0.80	2.2E-05	3.5E-06	0:21	F
0.90	1.8E-05	2.8E-06	0:24	F
1.00	1.5E-05	2.4E-06	0:27	F
2.00	4.4E-06	7.0E-07	0:54	F
3.00	2.2E-06	3.5E-07	1:20	F
4.00	1.4E-06	2.2E-07	1:47	F
5.00	9.8E-07	1.6E-07	2:14	F
6.00	7.4E-07	1.2E-07	2:41	F
7.00	5.8E-07	9.2E-08	3:08	F
8.00	4.7E-07	7.5E-08	3:35	F
9.00	4.0E-07	6.3E-08	4:01	F
10.0	3.4E-07	5.4E-08	4:28	F
20.0	1.3E-07	2.1E-08	8:57	D
40.0	6.2E-08	9.8E-09	17:53	D
60.0	3.5E-08	5.6E-09	26:50	D
80.0	2.2E-08	3.5E-09	35:47	D
100	1.5E-08	2.4E-09	44:43	F

EPIcode 5.0 12767 8-03-1995 12:31
SUBSTANCE I.D. : CHLOROFORM Library-93
Molecular Weight : 119.39 gram/mole
CAS Number: [67-66-3]
TWA : 10 ppm TWA : 49 mg/m^3
IDLH : 1000 ppm

TERM : 5.05E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 5.1E-03 mg/m^3 1.0E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	MAXIMUM CONCENTRATION ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.0078	0.0016	0:01	F
0.10	0.0020	0.00040	0:03	F
0.20	5.0E-04	1.0E-04	0:05	F
0.30	2.3E-04	4.7E-05	0:08	F
0.40	1.3E-04	2.7E-05	0:11	F
0.50	8.7E-05	1.8E-05	0:13	F
0.60	6.2E-05	1.3E-05	0:16	F
0.70	4.6E-05	9.5E-06	0:19	F
0.80	3.6E-05	7.4E-06	0:21	F
0.90	2.9E-05	6.0E-06	0:24	F
1.00	2.4E-05	4.9E-06	0:27	F
2.00	7.2E-06	1.5E-06	0:54	F
3.00	3.6E-06	7.4E-07	1:20	F
4.00	2.3E-06	4.7E-07	1:47	F
5.00	1.6E-06	3.3E-07	2:14	F
6.00	1.2E-06	2.5E-07	2:41	F
7.00	9.5E-07	1.9E-07	3:08	F
8.00	7.7E-07	1.6E-07	3:35	F
9.00	6.5E-07	1.3E-07	4:01	F
10.0	5.5E-07	1.1E-07	4:28	F
20.0	2.2E-07	4.5E-08	8:57	D
40.0	1.0E-07	2.1E-08	17:53	D
60.0	5.8E-08	1.2E-08	26:50	D
80.0	3.6E-08	7.3E-09	35:47	D
100	2.5E-08	5.1E-09	44:43	F

EPIcode 5.0 12767 8-03-1995 11:27
SUBSTANCE I.D. : CHLOROBENZENE Library-93
Molecular Weight : 112.56 gram/mole
CAS Number: [108-90-7]
TWA : 10 ppm TWA : 46 mg/m^3
IDLH : 2400 ppm

TERM : 1.13E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.1E-03 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.0018	0.00038	0:01	F
0.10	4.4E-04	9.6E-05	0:03	F
0.20	1.1E-04	2.5E-05	0:05	F
0.30	5.1E-05	1.1E-05	0:08	F
0.40	3.0E-05	6.4E-06	0:11	F
0.50	1.9E-05	4.2E-06	0:13	F
0.60	1.4E-05	3.0E-06	0:16	F
0.70	1.0E-05	2.3E-06	0:19	F
0.80	8.1E-06	1.8E-06	0:21	F
0.90	6.6E-06	1.4E-06	0:24	F
1.00	5.4E-06	1.2E-06	0:27	F
2.00	1.6E-06	3.5E-07	0:54	F
3.00	8.2E-07	1.8E-07	1:20	F
4.00	5.1E-07	1.1E-07	1:47	F
5.00	3.6E-07	7.8E-08	2:14	F
6.00	2.7E-07	5.9E-08	2:41	F
7.00	2.1E-07	4.6E-08	3:08	F
8.00	1.7E-07	3.8E-08	3:35	F
9.00	1.5E-07	3.2E-08	4:01	F
10.0	1.2E-07	2.7E-08	4:28	F
20.0	4.9E-08	1.1E-08	8:57	D
40.0	2.3E-08	4.9E-09	17:53	D
60.0	1.3E-08	2.8E-09	26:50	D
80.0	8.0E-09	1.7E-09	35:47	D
100	5.6E-09	1.2E-09	44:43	F

EPIcode 5.0 12767 8-02-1995 15:15
SUBSTANCE I.D. : CHLOROTRIFLUOROETHYLENE Library-
Molecular Weight : 116.47 gram/mole

TERM : 5.37E-01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 5.4E-04 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	8.3E-04	1.7E-04	0:01	F
0.10	2.1E-04	4.4E-05	0:03	F
0.20	5.4E-05	1.1E-05	0:05	F
0.30	2.4E-05	5.1E-06	0:08	F
0.40	1.4E-05	3.0E-06	0:11	F
0.50	9.2E-06	1.9E-06	0:13	F
0.60	6.6E-06	1.4E-06	0:16	F
0.70	4.9E-06	1.0E-06	0:19	F
0.80	3.9E-06	8.1E-07	0:21	F
0.90	3.1E-06	6.5E-07	0:24	F
1.00	2.6E-06	5.4E-07	0:27	F
2.00	7.6E-07	1.6E-07	0:54	F
3.00	3.9E-07	8.1E-08	1:20	F
4.00	2.4E-07	5.1E-08	1:47	F
5.00	1.7E-07	3.6E-08	2:14	F
6.00	1.3E-07	2.7E-08	2:41	F
7.00	1.0E-07	2.1E-08	3:08	F
8.00	8.2E-08	1.7E-08	3:35	F
9.00	6.9E-08	1.4E-08	4:01	F
10.0	5.9E-08	1.2E-08	4:28	F
20.0	2.3E-08	4.9E-09	8:57	D
40.0	1.1E-08	2.3E-09	17:53	D
60.0	6.1E-09	1.3E-09	26:50	D
80.0	3.8E-09	8.0E-10	35:47	D
100	2.6E-09	5.5E-10	44:43	F

EPIcode 5.0 12767 8-02-1995 15:17
SUBSTANCE I.D. : METHYLENE CHLORIDE Library-93
Molecular Weight : 84.93 gram/mole
CAS Number: [75-09-2]
TWA : 50 ppm TWA : 174 mg/m^3
IDLH : 5000 ppm

TERM : 1.75E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.8E-03 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.0027	0.00078	0:01	F
0.10	6.8E-04	2.0E-04	0:03	F
0.20	1.7E-04	5.0E-05	0:05	F
0.30	8.0E-05	2.3E-05	0:08	F
0.40	4.6E-05	1.3E-05	0:11	F
0.50	3.0E-05	8.7E-06	0:13	F
0.60	2.1E-05	6.2E-06	0:16	F
0.70	1.6E-05	4.6E-06	0:19	F
0.80	1.3E-05	3.6E-06	0:21	F
0.90	1.0E-05	2.9E-06	0:24	F
1.00	8.4E-06	2.4E-06	0:27	F
2.00	2.5E-06	7.2E-07	0:54	F
3.00	1.3E-06	3.6E-07	1:20	F
4.00	7.9E-07	2.3E-07	1:47	F
5.00	5.5E-07	1.6E-07	2:14	F
6.00	4.2E-07	1.2E-07	2:41	F
7.00	3.3E-07	9.5E-08	3:08	F
8.00	2.7E-07	7.7E-08	3:35	F
9.00	2.3E-07	6.5E-08	4:01	F
10.0	1.9E-07	5.5E-08	4:28	F
20.0	7.6E-08	2.2E-08	8:57	D
40.0	3.5E-08	1.0E-08	17:53	D
60.0	2.0E-08	5.7E-09	26:50	D
80.0	1.2E-08	3.6E-09	35:47	D
100	8.6E-09	2.5E-09	44:43	F

EPIcode 5.0 12767 8-02-1995 16:40
SUBSTANCE I.D. : PERCHLOROETHYLENE Library-93
Molecular Weight : 165.83 gram/mole
CAS Number: [127-18-4]
TWA : 50 ppm TWA : 339 mg/m^3
STEL : 200 ppm STEL : 1368 mg/m^3
IDLH : 500 ppm

TERM : 4.13E+04 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 4.1E+01 mg/m^3 6.1E+00 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	64	9.4	0:01	F
0.10	16	2.4	0:03	F
0.20	4.1	0.61	0:05	F
0.30	1.9	0.28	0:08	F
0.40	1.1	0.16	0:11	F
0.50	0.71	0.10	0:13	F
0.60	0.50	0.074	0:16	F
0.70	0.38	0.056	0:19	F
0.80	0.30	0.044	0:21	F
0.90	0.24	0.035	0:24	F
1.00	0.20	0.029	0:27	F
2.00	0.059	0.0086	0:54	F
3.00	0.030	0.0044	1:20	F
4.00	0.019	0.0027	1:47	F
5.00	0.013	0.0019	2:14	F
6.00	0.010	0.0014	2:41	F
7.00	0.0078	0.0011	3:08	F
8.00	0.0063	0.00093	3:35	F
9.00	0.0053	0.00078	4:01	F
10.0	0.0045	0.00067	4:28	F
20.0	0.0018	0.00027	8:57	D
40.0	8.3E-04	1.2E-04	17:53	D
60.0	4.7E-04	6.9E-05	26:50	D
80.0	2.9E-04	4.3E-05	35:47	D
100	2.0E-04	3.0E-05	44:43	F

EPIcode 5.0 12767 8-02-1995 15:18
SUBSTANCE I.D. : STYRENE, MONOMER Library-93
Molecular Weight : 104.15 gram/mole
CAS Number: [100-42-5]
TWA : 50 ppm TWA : 213 mg/m^3
STEL : 100 ppm STEL : 426 mg/m^3
IDLH : 5000 ppm

TERM : 1.55E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.6E-01 mg/m^3 3.7E-02 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stabilit
0.05	0.0024	0.00056	0:01	F
0.10	6.0E-04	1.4E-04	0:03	F
0.20	1.5E-04	3.6E-05	0:05	F
0.30	7.0E-05	1.6E-05	0:08	F
0.40	4.0E-05	9.5E-06	0:11	F
0.50	2.7E-05	6.2E-06	0:13	F
0.60	1.9E-05	4.4E-06	0:16	F
0.70	1.4E-05	3.3E-06	0:19	F
0.80	1.1E-05	2.6E-06	0:21	F
0.90	8.9E-06	2.1E-06	0:24	F
1.00	7.4E-06	1.7E-06	0:27	F
2.00	2.2E-06	5.1E-07	0:54	F
3.00	1.1E-06	2.6E-07	1:20	F
4.00	7.0E-07	1.6E-07	1:47	F
5.00	4.9E-07	1.1E-07	2:14	F
6.00	3.7E-07	8.6E-08	2:41	F
7.00	2.9E-07	6.8E-08	3:08	F
8.00	2.4E-07	5.6E-08	3:35	F
9.00	2.0E-07	4.7E-08	4:01	F
10.0	1.7E-07	4.0E-08	4:28	F
20.0	6.7E-08	1.6E-08	8:57	D
40.0	3.1E-08	7.3E-09	17:53	D
60.0	1.8E-08	4.1E-09	26:50	D
80.0	1.1E-08	2.6E-09	35:47	D
100	7.6E-09	1.8E-09	44:43	F

EPIcode 5.0 12767 8-02-1995 16:41
SUBSTANCE I.D. : TRICHLOROETHYLENE Library-93
Molecular Weight : 131.39 gram/mole
CAS Number: [79-01-6]
TWA : 50 ppm TWA : 269 mg/m^3
STEL : 200 ppm STEL : 1070 mg/m^3
IDLH : 1000 ppm

TERM : 2.17E+04 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 2.2E+01 mg/m^3 4.0E+00 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	33	6.2	0:01	F
0.10	8.4	1.6	0:03	F
0.20	2.2	0.40	0:05	F
0.30	1.0	0.18	0:08	F
0.40	0.57	0.11	0:11	F
0.50	0.37	0.069	0:13	F
0.60	0.26	0.049	0:16	F
0.70	0.20	0.037	0:19	F
0.80	0.16	0.029	0:21	F
0.90	0.13	0.023	0:24	F
1.00	0.10	0.019	0:27	F
2.00	0.031	0.0057	0:54	F
3.00	0.016	0.0029	1:20	F
4.00	0.010	0.0018	1:47	F
5.00	0.0069	0.0013	2:14	F
6.00	0.0052	0.0010	2:41	F
7.00	0.0041	0.00076	3:08	F
8.00	0.0033	0.00062	3:35	F
9.00	0.0028	0.00052	4:01	F
10.0	0.0024	0.00044	4:28	F
20.0	9.4E-04	1.8E-04	8:57	D
40.0	4.3E-04	8.1E-05	17:53	D
60.0	2.5E-04	4.6E-05	26:50	D
80.0	1.5E-04	2.8E-05	35:47	D
100	1.1E-04	2.0E-05	44:43	F

EPIcode 5.0 12767 8-02-1995 15:20
SUBSTANCE I.D. : TOLUENE Library-93
Molecular Weight : 92.14 gram/mole
CAS Number: [108-88-3]
  TWA : 50 ppm TWA : 188 mg/m^3
IDLH : 2000 ppm

TERM : 1.65E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.7E-03 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stabilit
0.05	0.0025	0.00068	0:01	F
0.10	6.4E-04	1.7E-04	0:03	F
0.20	1.6E-04	4.4E-05	0:05	F
0.30	7.5E-05	2.0E-05	0:08	F
0.40	4.3E-05	1.1E-05	0:11	F
0.50	2.8E-05	7.5E-06	0:13	F
0.60	2.0E-05	5.3E-06	0:16	F
0.70	1.5E-05	4.0E-06	0:19	F
0.80	1.2E-05	3.1E-06	0:21	F
0.90	9.5E-06	2.5E-06	0:24	F
1.00	7.9E-06	2.1E-06	0:27	F
2.00	2.3E-06	6.2E-07	0:54	F
3.00	1.2E-06	3.1E-07	1:20	F
4.00	7.4E-07	2.0E-07	1:47	F
5.00	5.2E-07	1.4E-07	2:14	F
6.00	3.9E-07	1.0E-07	2:41	F
7.00	3.1E-07	8.2E-08	3:08	F
8.00	2.5E-07	6.7E-08	3:35	F
9.00	2.1E-07	5.6E-08	4:01	F
10.0	1.8E-07	4.8E-08	4:28	F
20.0	7.2E-08	1.9E-08	8:57	D
40.0	3.3E-08	8.7E-09	17:53	D
60.0	1.9E-08	5.0E-09	26:50	D
80.0	1.2E-08	3.1E-09	35:47	D
100	8.1E-09	2.2E-09	44:43	F

EPIcode 5.0 12767 8-03-1995 12:34
SUBSTANCE I.D. : XYLENE Library-93
Molecular Weight : 106.16 gram/mole
CAS Number: [1330-20-7]
TWA : 100 ppm TWA : 434 mg/m^3
STEL : 150 ppm STEL : 651 mg/m^3
IDLH : 1000 ppm

TERM : 1.96E+00 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 2.0E-03 mg/m^3 < 0.001 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.0030	0.00070	0:01	F
0.10	7.6E-04	1.8E-04	0:03	F
0.20	2.0E-04	4.5E-05	0:05	F
0.30	8.9E-05	2.0E-05	0:08	F
0.40	5.1E-05	1.2E-05	0:11	F
0.50	3.4E-05	7.7E-06	0:13	F
0.60	2.4E-05	5.5E-06	0:16	F
0.70	1.8E-05	4.1E-06	0:19	F
0.80	1.4E-05	3.2E-06	0:21	F
0.90	1.1E-05	2.6E-06	0:24	F
1.00	9.4E-06	2.2E-06	0:27	F
2.00	2.8E-06	6.4E-07	0:54	F
3.00	1.4E-06	3.2E-07	1:20	F
4.00	8.8E-07	2.0E-07	1:47	F
5.00	6.2E-07	1.4E-07	2:14	F
6.00	4.7E-07	1.1E-07	2:41	F
7.00	3.7E-07	8.5E-08	3:08	F
8.00	3.0E-07	6.9E-08	3:35	F
9.00	2.5E-07	5.8E-08	4:01	F
10.0	2.1E-07	5.0E-08	4:28	F
20.0	8.5E-08	2.0E-08	8:57	D
40.0	3.9E-08	9.0E-09	17:53	D
60.0	2.2E-08	5.1E-09	26:50	D
80.0	1.4E-08	3.2E-09	35:47	D
100	9.6E-09	2.2E-09	44:43	F

EPIcode 5.0 12767 8-04-1995 9:22
SUBSTANCE I.D. : METHYL ISOBUTYL KETONE Library-93
Molecular Weight : 100.16 gram/mole
CAS Number: [108-10-1]
TWA : 50 ppm TWA : 205 mg/m^3
STEL : 75 ppm STEL : 308 mg/m^3
IDLH : 3000 ppm

TERM : 2.58E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 2.6E-02 mg/m^3 6.3E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stabilit
0.05	0.040	0.010	0:01	F
0.10	0.010	0.0025	0:03	F
0.20	0.0026	0.00063	0:05	F
0.30	0.0012	0.00029	0:08	F
0.40	6.7E-04	1.6E-04	0:11	F
0.50	4.4E-04	1.1E-04	0:13	F
0.60	3.1E-04	7.7E-05	0:16	F
0.70	2.4E-04	5.8E-05	0:19	F
0.80	1.8E-04	4.5E-05	0:21	F
0.90	1.5E-04	3.6E-05	0:24	F
1.00	1.2E-04	3.0E-05	0:27	F
2.00	3.7E-05	8.9E-06	0:54	F
3.00	1.9E-05	4.5E-06	1:20	F
4.00	1.2E-05	2.8E-06	1:47	F
5.00	8.2E-06	2.0E-06	2:14	F
6.00	6.1E-06	1.5E-06	2:41	F
7.00	4.8E-06	1.2E-06	3:08	F
8.00	4.0E-06	9.6E-07	3:35	F
9.00	3.3E-06	8.1E-07	4:01	F
10.0	2.8E-06	6.9E-07	4:28	F
20.0	1.1E-06	2.7E-07	8:57	D
40.0	5.2E-07	1.3E-07	17:53	D
60.0	2.9E-07	7.2E-08	26:50	D
80.0	1.8E-07	4.4E-08	35:47	D
100	1.3E-07	3.1E-08	44:43	F

EPIcode 5.0 12767 8-04-1995 9:23
SUBSTANCE I.D. : PERCHLOROETHYLENE Library-93
Molecular Weight : 165.83 gram/mole
CAS Number: [127-18-4]
TWA : 50 ppm TWA : 339 mg/m^3
STEL : 200 ppm STEL : 1368 mg/m^3
IDLH : 500 ppm

TERM : 4.13E+04 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 4.1E+01 mg/m^3 6.1E+00 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	64	9.4	0:01	F
0.10	16	2.4	0:03	F
0.20	4.1	0.61	0:05	F
0.30	1.9	0.28	0:08	F
0.40	1.1	0.16	0:11	F
0.50	0.71	0.10	0:13	F
0.60	0.50	0.074	0:16	F
0.70	0.38	0.056	0:19	F
0.80	0.30	0.044	0:21	F
0.90	0.24	0.035	0:24	F
1.00	0.20	0.029	0:27	F
2.00	0.059	0.0086	0:54	F
3.00	0.030	0.0044	1:20	F
4.00	0.019	0.0027	1:47	F
5.00	0.013	0.0019	2:14	F
6.00	0.010	0.0014	2:41	F
7.00	0.0078	0.0011	3:08	F
8.00	0.0063	0.00093	3:35	F
9.00	0.0053	0.00078	4:01	F
10.0	0.0045	0.00067	4:28	F
20.0	0.0018	0.00027	8:57	D
40.0	8.3E-04	1.2E-04	17:53	D
60.0	4.7E-04	6.9E-05	26:50	D
80.0	2.9E-04	4.3E-05	35:47	D
100	2.0E-04	3.0E-05	44:43	F

EPIcode 5.0 12767 8-04-1995 9:28
SUBSTANCE I.D. : TRICHLOROETHYLENE Library-93
Molecular Weight : 131.39 gram/mole
CAS Number: [79-01-6]
TWA : 50 ppm TWA : 269 mg/m^3
STEL : 200 ppm STEL : 1070 mg/m^3
IDLH : 1000 ppm

TERM : 2.17E+04 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 2.2E+01 mg/m^3 4.0E+00 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stabilit
0.05	33	6.2	0:01	F
0.10	8.4	1.6	0:03	F
0.20	2.2	0.40	0:05	F
0.30	1.0	0.18	0:08	F
0.40	0.57	0.11	0:11	F
0.50	0.37	0.069	0:13	F
0.60	0.26	0.049	0:16	F
0.70	0.20	0.037	0:19	F
0.80	0.16	0.029	0:21	F
0.90	0.13	0.023	0:24	F
1.00	0.10	0.019	0:27	F
2.00	0.031	0.0057	0:54	F
3.00	0.016	0.0029	1:20	F
4.00	0.010	0.0018	1:47	F
5.00	0.0069	0.0013	2:14	F
6.00	0.0052	0.0010	2:41	F
7.00	0.0041	0.00076	3:08	F
8.00	0.0033	0.00062	3:35	F
9.00	0.0028	0.00052	4:01	F
10.0	0.0024	0.00044	4:28	F
20.0	9.4E-04	1.8E-04	8:57	D
40.0	4.3E-04	8.1E-05	17:53	D
60.0	2.5E-04	4.6E-05	26:50	D
80.0	1.5E-04	2.8E-05	35:47	D
100	1.1E-04	2.0E-05	44:43	F

EPIcode 5.0 12767 8-04-1995 9:17
SUBSTANCE I.D. : TRANS 1,3-DICHLOROPROPENE Library-
Molecular Weight : 110.97 gram/mole

TERM : 1.03E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.0E-02 mg/m^3 2.3E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.016	0.0035	0:01	F
0.10	0.0040	0.00088	0:03	F
0.20	0.0010	0.00023	0:05	F
0.30	4.7E-04	1.0E-04	0:08	F
0.40	2.7E-04	5.9E-05	0:11	F
0.50	1.8E-04	3.9E-05	0:13	F
0.60	1.3E-04	2.8E-05	0:16	F
0.70	9.4E-05	2.1E-05	0:19	F
0.80	7.4E-05	1.6E-05	0:21	F
0.90	6.0E-05	1.3E-05	0:24	F
1.00	4.9E-05	1.1E-05	0:27	F
2.00	1.5E-05	3.2E-06	0:54	F
3.00	7.4E-06	1.6E-06	1:20	F
4.00	4.6E-06	1.0E-06	1:47	F
5.00	3.3E-06	7.2E-07	2:14	F
6.00	2.5E-06	5.4E-07	2:41	F
7.00	1.9E-06	4.3E-07	3:08	F
8.00	1.6E-06	3.5E-07	3:35	F
9.00	1.3E-06	2.9E-07	4:01	F
10.0	1.1E-06	2.5E-07	4:28	F
20.0	4.5E-07	9.9E-08	8:57	D
40.0	2.1E-07	4.5E-08	17:53	D
60.0	1.2E-07	2.6E-08	26:50	D
80.0	7.3E-08	1.6E-08	35:47	D
100	5.1E-08	1.1E-08	44:43	F

EPLcode 5.0 12767 8-04-1995 9:29
SUBSTANCE I.D. : VINYL CHLORIDE Library-93
Molecular Weight : 62.50 gram/mole
CAS Number: [75-01-4]
TWA : 5 ppm TWA : 13 mg/m^3

TERM : 1.86E+01 grams Release Duration : 6.00E+01 Minutes

HEIGHT-EFFECTIVE: 0 Feet
SURFACE WIND SPEED :2.2 Miles/hour
DEPOSITION VELOCITY: 0.100 cm/second
STABILITY CLASS : WORST CASE (A - F)
TERRAIN : CITY
RECEPTOR HEIGHT (z) : 0 Feet

LOCATION OF MAXIMUM CONCENTRATION LEVEL
Distance : < 0.06Mi
Level : > 1.9E-02 mg/m^3 7.3E-03 PPM

DOWNWIND Distance-Mi	MAXIMUM CONCENTRATION mg/m^3	ppm	ARRIVAL TIME hours:minutes	Stability
0.05	0.029	0.011	0:01	F
0.10	0.0072	0.0028	0:03	F
0.20	0.0018	0.00072	0:05	F
0.30	8.4E-04	3.3E-04	0:08	F
0.40	4.9E-04	1.9E-04	0:11	F
0.50	3.2E-04	1.2E-04	0:13	F
0.60	2.3E-04	8.9E-05	0:16	F
0.70	1.7E-04	6.7E-05	0:19	F
0.80	1.3E-04	5.2E-05	0:21	F
0.90	1.1E-04	4.2E-05	0:24	F
1.00	8.9E-05	3.5E-05	0:27	F
2.00	2.6E-05	1.0E-05	0:54	F
3.00	1.3E-05	5.2E-06	1:20	F
4.00	8.4E-06	3.3E-06	1:47	F
5.00	5.9E-06	2.3E-06	2:14	F
6.00	4.4E-06	1.7E-06	2:41	F
7.00	3.5E-06	1.4E-06	3:08	F
8.00	2.8E-06	1.1E-06	3:35	F
9.00	2.4E-06	9.3E-07	4:01	F
10.0	2.0E-06	8.0E-07	4:28	F
20.0	8.1E-07	3.2E-07	8:57	D
40.0	3.7E-07	1.5E-07	17:53	D
60.0	2.1E-07	8.3E-08	26:50	D
80.0	1.3E-07	5.1E-08	35:47	D
100	9.1E-08	3.6E-08	44:43	F

APPENDIX E

DAMES & MOORE REVIEW OF LOCKHEED SUBMITTALS

FINAL REPORT TO THE CITY OF BURBANK REGARDING THE LOCKHEED PLANT B-1 SOIL VAPOR EXTRACTION SYSTEM PROPOSED BY LOCKHEED ENVIRONMENTAL SYSTEMS AND TECHNOLOGY COMPANY

DAMES & MOORE

JOB NUMBER 00062-031-158
MAY 5, 1995

EXHIBIT B

DAMES & MOORE
8801 FOLSOM BOULEVARD, SUITE 200, SACRAMENTO, CALIFORNIA 95826
(916) 387-8800 FAX: (916) 387-0802

May 5, 1995

VIA OVERNIGHT MAIL

Mr. Rick Pruetz, AICP
Chief Assistant, Community Development
Director, City Planner
City of Burbank
275 East Olive Avenue
Burbank, California 91510-6459

RE: FINAL REPORT TO THE CITY OF BURBANK REGARDING THE LOCKHEED PLANT B-1 SOIL VAPOR EXTRACTION SYSTEM PROPOSED BY LOCKHEED ENVIRONMENTAL SYSTEMS AND TECHNOLOGY COMPANY
DAMES & MOORE JOB NO. 00062-031-158

Dear Mr. Pruetz:

Please find enclosed for your review two copies (one bound, one unbound) of Dames & Moore's Final Report to the City of Burbank Regarding the Lockheed Plant B-1 Soil Vapor Extraction System Proposed by Lockheed Environmental Systems and Technology Company dated May 5, 1995.

Should you have any questions, please do not hesitate to call any of the undersigned.

(...continued...)

B:\BURBANK.CTY\LOCKHEED.LTR
May 5, 1995

Sincerely,

DAMES & MOORE

Ijaz S. Jamall, Ph.D., DABT
Principal and Senior Toxicologist
(916) 387-7559

James J. Kang, Ph.D., P.E.
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(206) 727-3369

ISJ:JJK:LWS:CEA/fal
Enclosure

B:\BURBANK.CTY\LOCKHEED.LTR
May 5, 1995

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APPENDICES

Appendix A Dames & Moore Memoranda to City of Burbank

EXECUTIVE SUMMARY

Following a thorough review of all the documents provided to us by the City of Burbank on the proposed Enhanced Soil Vapor Extraction (ESVE) system for the Lockheed B-1 Plant site in Burbank, California, we make the following recommendations:

- The proposed ESVE system provides the best available true-and-tried technology for the intended remediation task.

- The proposed ESVE system will meet the environmental standards by which such systems are evaluated and potential risks posed by emissions from the system will be in the range considered acceptable for both cancer and non-cancer health effects regulatory practice.

- To compensate for uncertainties in the estimated emission rates and to ensure that public health concerns are satisfied, we recommend monitoring of the emissions during operation of the ESVE system with a program to address potential excursions of emissions outside the range estimated in the health risk assessments for the ESVE system.

- While deficiencies remain in the Cumulative Impact Analysis, these can be remedied and, from the data presented to us, would not add significantly to existing cancer risks in the project area.

1.0 INTRODUCTION

Dames & Moore was retained by the City of Burbank on October 25, 1994 to review the technical appropriateness and feasibility of the remediation technology, Enhanced Soil Vapor Extraction (ESVE) system, proposed by Lockheed to address soil contamination at its former B-1 Plant site in Burbank, California. In addition, Dames & Moore was tasked with reviewing the potential risks to human health from the operation of the proposed ESVE system and the Draft Cumulative Impact Analysis performed under the California Environmental Quality Act (CEQA). Over the past six months, Dames & Moore has reviewed several reports, engineering design drawings and had several discussions with Lockheed and their consultants to obtain the information we felt was required for a thorough and independent evaluation of the proposed ESVE system. In the course of our review, we prepared several interim technical memoranda to apprise the City of Burbank of our position on various technical issues and for clarification of information in the various reports submitted by Lockheed. Responses to the comments provided by Dames & Moore were received from Lockheed and its consultants and this Report presents our final comments to the latest round of responses provided by Lockheed. Earlier memoranda developed by Dames & Moore for the City of Burbank are provided in Appendix A.

2.0 FINAL COMMENTS AND SUGGESTIONS: ENGINEERING AND DESIGN ISSUES

After carefully reviewing the documents that were provided to us related to Lockheed's Enhanced Soil Vapor Extraction (ESVE) system, including Lockheed's April 12, 1995 letter and ICF Kaiser's March 30, 1995 letter, Dames & Moore has the following final comments on the ESVE system. Overall, Dames & Moore agrees that the proposed ESVE system will meet the stated environmental goals.

Final comments and suggestions are as follows:

2.1 AIR INJECTION MODELING

In view of the field pressure response data available for calibrating the venting model, Dames & Moore agrees that the modeling grids used by Lockheed's consultant are adequate and that air reinjection flow rates up to 70 percent of total extraction flow rates can be achieved.

2.2 WELL HEAD AND WELL FIELD DESIGN

According to the engineering drawings dated February 28, 1995, active air injection pressures or flow rates can only be modulated by a control valve located in each branch vault. No mechanisms are available to modulate the air pressures or flow rates to individual air injection wells. Although Lockheed's consultant used a 3-D venting model to demonstrate that the current vent field layout can capture all of the injected air up to a maximum of 70 percent, there are no sentry vapor probes installed in different stratigraphic zones (*i.e.*, Zones A, B, C, D, and Z) to confirm the modeling results. Dames & Moore is of the opinion that installation of vapor probes at strategic locations would serve to confirm the effectiveness of the vent field and to protect the human health.

2.3 VAPOR TREATMENT SYSTEM DESIGN

On Drawing 01-70-0528, there seems to be no analog output for analog input AI-001.

On Drawing 01-10-0102, several call out sections and details are not shown on the drawing.

On Drawing 02-70-0201, Dames & Moore suggests that a table be inserted which describes the function of each branch header to clarify the subsurface vapor flow paths.

On Drawings 01-60-0401 and 01-80-0203, Dames & Moore feels that the ratings of the pressure/vacuum breakers in Solvent Holding Tank T-1 need to be properly sized for venting the vapors in the tank back to the vapor treatment system. If the ratings are not properly sized, the liquid PCE (perchloroethene)/TCE (trichloroethene) stored in the tank would be volatilized to the air stream and to the suction side of the vacuum blowers. As a result, GAC regeneration frequency would increase.

At your request, Dames & Moore contacted Mr. Kevin Rochland, of the USEPA, Project Manager of the Commencement Bay Well 12A Superfund site in Tacoma, Washington. At the Tacoma site, a 3,000 cfm vapor extraction and treatment system which is very similar to the 6,000 cfm ESVE system proposed here by Lockheed, was designed by ESE earlier and later upgraded by Dow Chemical AWD. This ESVE system is currently being operated by AWD. The soils beneath this superfund site are contaminated with petroleum hydrocarbons (*e.g.*, diesel, gasoline, *etc.*) and chlorinated hydrocarbons (*e.g.*, PCE and TCE). The vapor treatment system used for this Superfund site in Tacoma consists of steam regenerated vapor phase granular activated carbon (GAC) adsorbers, condensers, phase separators, two batch-type air strippers in series, and water and solvent holding tanks. The GAC-treated air is discharged into the atmosphere without reinjection. Air emission standards were set forth by the regulatory Agency based on an EPA-approved air screening model. Since this was a Superfund site, an air emission permit was not required; however, the treatment system reportedly has met all the prescribed emission requirements. According to Mr. Rochland, the main problems associated with the vapor treatment system are as follows:

- Due to the intermixing of diesel with chlorinated hydrocarbons including PCE and TCE in the phase separator, the resulting specific gravity of the liquid mixture is very close to that of water, causing separation and solvent recovery problems.

- Due to the above-mentioned phase-separation problems, the contaminated water has to be batch treated with two air strippers connected in series several times prior to being discharged to a storm drain.

At your request, Dames & Moore also spoke to Mr. Michael Zettner, the inventor of a patented high-temperature plasma destruction system, manufactured by a German company. According to Mr. Zettner, the plasma system, generally operates at 3,000°C and can easily destroy all chlorinated hydrocarbons, including PCE and TCE to form relatively nontoxic or low toxicity compounds. The system can handle up to 2,000 lbs of chlorinated hydrocarbons per day.

3.0 FINAL COMMENTS AND SUGGESTIONS: HEALTH RISK ISSUES

In general, Dames & Moore is of the opinion that the health risks posed by the operation of the ESVE system are within the range commonly accepted by state and federal regulatory agencies.

In our letter of March 13, 1995 to the City of Burbank, Dames & Moore reported the results of our review of Montgomery Watson's Non-Cancer Health Risk Assessment and additional findings from our review of the Cancer Health Risk Assessment. Our review comments addressed two general categories:

1. Non-cancer health risk calculations and clerical/typographical errors; and

2. Emission assumptions used to determine cancer health risks for vinyl chloride.

Montgomery Watson responded to our comments in a letter to Lockheed Environmental Systems dated March 22, 1995. Dames & Moore has reviewed the responses provided by Montgomery Watson in the Lockheed letter, and accepts for closure the non-cancer health risk calculation and clerical errors that Montgomery Watson states have been corrected. Dames & Moore does not, however, concur with the responses to and resolution of our comments regarding emission rates and cancer risks posed by vinyl chloride. Our non-concurrence stems mainly from the use of emission rates for vinyl chloride under "high efficiency" control system operating conditions and inconsistent applications of vinyl chloride emission assumptions to risk calculations. We concur with Lockheed that the generation of vinyl chloride in soil from the degradation of PCE and TCE is likely to be very small relative to these compounds. However, in light of the fact that the proposed ESVE system is incapable of adsorbing vinyl chloride, we recommend that this compound be included in an emission monitoring program especially during the early phases of the operation of the proposed ESVE system to ensure that the emission rates are within the range estimated in the design stage and used to estimate risks to human health. Alternatively, in the early phases of operation, the potential for emission of vinyl chloride can be regulated by controlling the soil vapor extraction rate.

3.1 PERSISTENCE OF VINYL CHLORIDE

Montgomery Watson has asserted in its response letter that cancer risks are *overestimated* by the emission rate assumptions for vinyl chloride. One of the reasons given by Montgomery Watson for why the risks are overestimated is because "vinyl chloride concentrations are predicted to drop to zero within a few weeks" (Montgomery Watson, March 22, 1995). The emission estimate chronology for the anticipated operating life of the proposed soil vapor extraction system (Table 3, Montgomery Watson, December, 1994), however, shows that vinyl chloride emissions are estimated to be 0.010 lbs/day after nearly four years of operation and that influent concentrations of vinyl chloride are indeed 1.8 μg/L.

Elsewhere in their response letter, Montgomery Watson asserts that "vinyl chloride concentrations are expected to drop steeply within a few weeks of operation as anaerobic conditions in the soil disappear." The metabolic pathway for generation of vinyl chloride is through anaerobic biodegradation of TCE. Loss of anaerobic conditions will not in itself cause vinyl chloride concentrations to disappear but will cause the mechanism of vinyl chloride generation to disappear. The ICF Kaiser assumption that concentrations of vinyl chloride decline only at the same rate as the major chemical species is therefore not necessarily conservative. While Dames & Moore concurs that the amount of vinyl chloride generated by the proposed system will be low, it has not received evidence supporting the claim that vinyl chloride concentrations would be predicted to drop to zero with a few weeks.

3.2 SEPARATE TREATMENT OF VINYL CHLORIDE PROVIDES NO UNIQUE INSIGHTS

The text of Montgomery Watson's non-cancer risk assessment discussed the separate treatment of vinyl chloride in emissions calculations "since it can have a significant impact on risk." Vinyl chloride is significant in that it poses both cancer and non-cancer risks and is unaffected by the vapor extraction system.

In its review, Dames & Moore stated that the separate treatment of vinyl chloride did not appear to contribute any unique insights to a risk assessment of non-cancer effects, and it is not apparent that vinyl chloride received such treatment elsewhere in the report. Montgomery Watson has responded that vinyl chloride was treated separately due to its potential to pose significant risks and the public concern over

vinyl chloride emissions. Dames & Moore concurs that vinyl chloride can pose a significant impact on risk *if present in sufficient quantity* and that these risks can be a concern to the public. The appropriate format for raising these concerns, however, should have been limited to the cancer risk assessment document.

The absence of separate treatment of vinyl chloride in the non-cancer risk assessment document is further illustrated by Montgomery Watson's use of 1.08×10^{-3} g/s (0.206 lb/day) vinyl chloride emission rate in its "high efficiency" scenario in the non-cancer risk assessment document. Montgomery Watson has stated in its responses to our review of the cancer risk assessment that the 0.206 lb/day emission rate is inappropriate since ICF Kaiser's calculations yielded a rate of only 0.14 lb/day. Montgomery Watson calculated cancer risks from vinyl chloride using the 0.14 lb/day rate and calculated non-cancer risks from vinyl chloride using the 0.206 lb/day emission rate. These inconsistencies and their impacts are further discussed in the following section.

3.3 INCONSISTENCY OF VALUES FOR VINYL CHLORIDE EMISSIONS UNDER HIGH EFFICIENCY CONDITIONS

Dames & Moore's concerns over emission rate inconsistencies arose from the "separate treatment" conditions described in the preceding section. A review of the emission estimates in Table 4 of both the Cancer and Non-Cancer Health Risk Assessment Reports shows that PCE and TCE are the only soil contaminants whose emissions are actually reduced by increasing treatment efficiency. With the exception of vinyl chloride, all other substances are shown to increase in emission rates proportionate to the increase in loading rate from the "low efficiency" to "high efficiency" scenarios.

Montgomery Watson asserts that "ICF Kaiser has thoroughly engineered its estimate of both the flow and composition of soil gas over the lifetime of the project" to yield an emission rate for vinyl chloride under high efficiency conditions at 0.14 lb/day (Montgomery Watson, March 22, 1995). It is further asserted that this assumption is conservative since vinyl chloride concentrations "are expected to drop to zero within a few weeks" (Montgomery Watson, March 22, 1995). Montgomery Watson has not, however, provided any compelling support in its risk assessments to conclude why vinyl chloride emissions should not increase proportionately with the increase in loading at the same rate as the remaining pollutants. As previously discussed, the assertion that vinyl chloride concentrations drop to zero within a few weeks is

weak.

The treatment of all other pollutants in Table 4 provides compelling support that the increase in vinyl chloride from the "low efficiency" condition should be proportionate to the increase in the loading rate. This is calculated by multiplying the emission rate for vinyl chloride under this condition by the loading rate for the high efficiency condition and dividing by the loading rate for the low efficiency condition (*i.e.*, 4.22×10^{-4} g/s • 1410/548). The value for emissions of vinyl chloride should be 1.08×10^{-3} g/s as correctly indicated in Table 10 of the non-cancer risk assessment document.

As acknowledged in Montgomery Watson's response letter, treatment technologies typically pose a *range* of potential emissions due to the heterogeneity of contaminants and their concentrations in environmental media. This range is considered in the risk assessments through use of the high and low efficiency scenarios. When a range of potential operating parameters is posed by an emissions source, the South Coast Air Quality Management District (SCAQMD) requires the use of the most conservative annualized operating parameters to calculate health risks (telephone conversation with SCAQMD, April 28, 1995). Dames & Moore asserts that the appropriate value for vinyl chloride emissions should be 1.08×10^{-3} g/s to fulfill the purposes of the SCAQMD's requirements and does not concur with the cancer risk values estimated for the high efficiency scenario. The excess cancer risks calculated for the 99.2 percent control efficiency condition are not representative of conservative annualized operating parameters, and all excess cancer risk calculations for the "high efficiency" condition should be re-performed using the appropriate vinyl chloride emission rate.

3.4 T-BACT STATUS

It is our understanding that the South Coast Air Quality Management District (SCAQMD) has determined that the proposed ESVE system meets their T-BACT criteria. However, the proposed technology does not treat vinyl chloride. Therefore, we recommend an emission monitoring program for vinyl chloride particularly during the early phases of ESVE operation. If a problem is detected, appropriate measures to resolve the problem can be implemented such as temporary shutdown of the operations.

4.0 RESPONSES TO CUMULATIVE IMPACT ANALYSIS

Dames & Moore reviewed the January 1995 Draft Cumulative Impact Analysis prepared for Lockheed by Douglas Wood & Associates. Our comments were provided in a letter dated February 23, 1995 to the City of Burbank which addressed the lack of a cumulative impact analysis in the report as well as specific errors requiring correction.

A revised draft report dated March 1995 was submitted to the City of Burbank in response to review comments. We reviewed the revised report and provided our comments in a letter dated March 14, 1995 to the City of Burbank. We found that the report:

1. Adequately responded to our comments about project-specific reports;

2. Did not address cumulative impacts in Sections II through V; and

3. Did not provide any conclusions about cumulative impacts in Section VI.

A final draft report dated April 21, 1995 was submitted to the City of Burbank in response to review comments. We reviewed this report and found that it:

1. Did not address cumulative impacts in Sections II and III, despite statements in Section I that they would be addressed in this Section;

2. Added discussion of some future ESVE system in the area to Section IV, but did not identify other future projects in the area that could be sources of toxic emissions;

3. Failed to evaluate cumulative impacts in Section V (Cumulative Toxics Assessment) because it stated that insufficient information about other projects was available.

4. Presented unsubstantiated conclusion in Section VI that cumulative ROG emissions are below SCAQMD CEQA Handbook thresholds; and

5. Presented unsubstantiated conclusion in Section VI that cumulative health risk is minimal.

The final draft report does not adequately address cumulative impacts. It should be noted that existing health risk in the area is significant. Therefore, the proposed project would contribute to an existing significant cumulative impact. However, the contribution of the proposed project would be very small relative to the existing cancer risk in the area (greater than 1,300 in one million cancer risk).

APPENDIX A

DAMES & MOORE MEMORANDA TO CITY OF BURBANK

DAMES & MOORE
8801 FOLSOM BOULEVARD, SUITE 200, SACRAMENTO, CALIFORNIA 95826
(916) 387-8800 FAX: (916) 387-0802

January 26, 1995

Mr. William D. Jacobs
AICP
Community Development Department
City of Burbank
275 East Olive Avenue
Burbank, California 91510

Re: Preliminary Comments on Lockheed's Soil Vapor Extraction (SVE) System For Plant B-1, Burbank, California
Dames & Moore Job No. 00062-031-158

Dear Mr. Jacobs:

After reviewing Lockheed's modification to the May 1994 SCAQMD Permit Application document, and the December 13, 1994 video tape on Lockheed's Soil Vapor Extraction (SVE) System Study Session, Dames & Moore agrees that the technology proposed will meet the stated environmental goals. However, there are some technical and cost issues which may merit consideration as detailed below:

Health Risk Assessment:

- Dames & Moore has reviewed the Health Risk Assessment developed by Montgomery & Watson for the Enhanced Soil Vapor Extraction System and found it to be in accordance with Rule 1401 guidelines. Dames & Moore independently verified the calculations and risk estimates and found these to be accurate.

Vapor Treatment System Design

- According to the ICF KE's May 13, 1994 Feasibility Study (FS) Report (Pages ES-1 and 2-1), PCE and TCE were the primary constituents considered in selecting the vapor treatment system.

- The proposed VES system uses Granulated Activated Carbon (GAC) which is effective in removing most volatile organic compounds (VOCs), other than vinyl chloride (VC), from the vapor stream. Potential cost savings could be realized if other innovative vapor treatment technologies, such as synthetic resin

adsorption (Purus Air Treatment System) were considered as a component of the polishing system or as alternate treatment systems.

- Lockheed's Enhanced SVE System was developed by modifying the operating conditions and process flow of the originally designed system. These changes include:

  - Reducing the air discharge flow rate by half;
  - Reinjecting 50 percent of the GAC-treated vapors into the subsurface; and
  - Changing out the spent GAC more frequently to ensure that the high adsorptivity of the GAC is retained.

- Dames & Moore will be pleased to assist the City of Burbank to perform the independent vapor emission monitoring program, if requested by the City.

Air Emission Permitting

- The approach to the Reactive Organic Gas (ROG) emission estimates depends on the system instruments and controls to deliver the stated emission control. In other words, the programmable logic controller (PLC) is set to reduce or redirect exhaust flow and even shut down the system if the FID sensors indicate emissions exceed preset thresholds.

- While not relevant from a health risk perspective under current emission assumptions, it should be recognized that the proposed VES system containing GAC cannot capture VC. Therefore, monitoring for VC should be conducted to ensure that VC emissions do not exceed those assumed in the proposed VES system.

- BACT for ROG is assumed for the entire system with the programmed logic, instrumentation and controls. However, the entire system design and emission estimates depend on the occasional use of a disposable activated carbon bed for "polishing". Full-time use of the polishing bed might result in lower emissions than that proposed and, thus, would represent a better BACT than the Enhanced VES proposed BACT system.

- Page 2-2 , third paragraph, third sentence states that the "poundage loading of carbon will vary". A description on how this would occur and the range of variability would be helpful. These design details should be fully defined in order

to estimate the system emissions. The fourth sentence of this same paragraph should be explained in greater detail.

- Figure 1 should include additional data presented: (a) a north direction arrow; (b) a scale; and (c) a 1000-foot radius from the emission points. According to Page 1-2 of the May 13, 1994 FS Report, there is a school located within 500 feet of the southern boundary of the site.

- The Appendix D calculations indicate a 26-inch carbon depth but the text on page 2-2 indicates 30 inches and the density and quantity are reversed in item "a". These should be corrected.

Process Flow Diagram

- The pressure unit in the mass balance data sheet appears to be inaccurate. For example, the design pressure of Stream No. 6 (GAC Effluent to the Stack) is listed at 14.49 psia, which is less than the atmospheric pressure (14.7 psia). In other words, the stream pressure is slightly under vacuum. As a result, reverse air flow will occur. In fact, the stack discharge pressure in Stream No. 17 is 14.35 psia, which is under vacuum, suggesting that no air emission will ever occur. We seek clarification of this point.

- Please explain why a packed tower air stripper at air flow rate of 50 scfm was selected to treat 1-2 gpm of wastewater. For such a low flow rate, would a low profile air stripper or even liquid-phase GAC alone be more cost-effective than the packed tower stripper which is prone to scaling?

- Is liquid phase GAC adsorber A-4 high-pressure rated? If not, a pressure regulator would serve to protect the GAC adsorber. What maximum pressures could the vessel experience? Please provide any information you might have on this issue.

- In Figure 3A, according to Page 2-3 of the text, the blower discharge pressure should be 40 inch water column (w.c.). Why is the pressure of Stream Nos. 3A and 3B at 428 inch w.c.? Please explain.

- While the average ROG emission rate was estimated to be less than 9.8 lb/day, based on the mass balance data of Stream No. 17, the anticipated VOC emission rate including ROG is calculated to be approximately 13 lb/day. We would like a clarification on how the ROG daily emission rate of 9.8 lb/day was obtained.

- According to Chapter 3 of the text, there should be two demisters in the process train. The drawings do not show these demisters. Please clarify?

P&ID Diagram

- In Figure 4B, an isolation valve appears to be missing between the inlet and outlet of the GAC polish unit (see Figure 3A). Please include.

- In Figure 4B, no sampling valves were shown to the two on-line FID analyzer. Please include.

- Please explain the reliability of using an on-line FID analyzer to monitor low concentration of chlorinated hydrocarbon vapor at the GAC outlets? No hydrogen gas, hydrocarbon-free air, and calibration gas streams are shown on the P&ID. No pipe connections to the FID analyzers are shown on the P&ID. Please include or explain.

- Since GAC adsorption is an exothermic reaction, a need for installing a high temperature shut-off switch in each GAC adsorber (A-1/A-2) to prevent the GAC from overheating and posing a fire hazard should be evaluated.

Information Needed

- ICF KE's plans and technical specifications for the pilot SVE system

- ICF KE's 5-year SVE Pilot Test Reports at Lockheed Plant B-1 site

- Revised D size engineering drawings and technical specifications

- PLC control algorithm for the GAC regeneration and overall venting systems

We trust the above preliminary comments meet your current needs. Please send the above-requested documents to us at your earliest convenience so that we can complete our engineering review. Please call the undersigned if you have questions or need more information.

Sincerely yours,

DAMES & MOORE

Ijaz Jamall, Ph.D., DABT
Project Manager

for Jim Kang

Jim Kang, Ph.D., P.E.
Senior Chemical Engineer

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February 3, 1995

VIA FAX (818) 953-9609

Mr. Rick Pruetz, AICP
Chief Assistant, Community Development
Director, City Planner
Community Development Department
City of Burbank
275 East Olive Avenue
Burbank, California 91510-6459

RE: Additional Data Needed for Preparing Final Review of Lockheed SVE System Plant B-1, Burbank, California
Dames & Moore Job Number 00062-031-158

Dear Mr. Pruetz:

In an effort to finalize the review comments on the Lockheed's SVE system, please provide us with the following information:

SENSITIVITY ANALYSIS

- **Carcinogens:** While the December 1994 version of the Rule 1401 risk assessment discusses emissions from perchlorethylene (PCE), it does not include the unit risk factor (URF)/carcinogenic slope factor (SF) for this compound in Table 2, presumably because PCE is not listed under Rule 1401. However, PCE is a major contaminant at the Lockheed B-1 site and its carcinogenic potency is of the same order of magnitude as TCE. Therefore, it would be useful to include the estimate of excess cancer risks from PCE in the revised HRA.

OFFICES WORLDWIDE

- Noncarcinogens: Rule 1401 does not address the potential noncarcinogenic effects of chemicals of potential concern. However, an evaluation of the noncarcinogenic effects in terms of quantifying a hazard index would allay some of the community concerns about the possible noncancer impacts of the emissions from the proposed Enhanced VES system.
- **BACT Designation:** Of the handful of carcinogens (benzene, carbon tetrachloride, chloroform, 1,1-dichloroethane, methylene chloride, trichloroethylene, and vinyl chloride) addressed in the risk assessment, vinyl chloride is one of the more potent carcinogens. The fact that vinyl chloride is essentially untreated by the Enhanced VES (treatment efficiency is zero) suggests that the VES might not be considered a T-BACT. Rule 1401 allows only a Maximum Individual Cancer Risk (MICR) of one in one million if the permitted unit is not constructed with the best available control technology for toxics (T-BACT). The risk assessment might include a range of risk impacts posed by use of T-BACT alternatives and whether or not the VES may be considered to be T-BACT for this application.

- **Stack Height:** The stack height has a significant impact on the dispersion and downwind concentrations of pollutants. A higher stack typically allows for greater dispersion and smaller downwind concentrations of air pollutants. The risk assessment might be revised to include consideration of other stack heights that might plausibly be envisioned for this project to illustrate the optimum stack height from a community health concern perspective, *e.g.*, 35 feet, 50 feet, *etc.*

- **Exit Velocities:** The risk assessment currently assumes a minimum exit velocity of 30 ft/second. The exit velocity value impacts the calculations made by the ISCST2 model in its determination of downwind pollutant concentrations. If the exit velocity is not absolutely establishable at a minimum of 30 ft/s, other model runs should be performed for a range of possible exit velocities.

- **Meteorological Data:** Air modeling upon which the risk assessment is based uses a 1981 meteorological data file covering conditions for a single year. According the meteorologist at SCAQMD, this is the only data file for the District area that is in a data format suitable for direct input into the ISCST2 model and is the only data file typically used for permitting activities in the District. Meteorological data are available in ASCII format for the City of Burbank from 1979 to present, representing a potentially much larger data source. The use of meteorological data over a range of years would certainly provide greater confidence about the range of risks which might result from differences

in meteorological conditions.

- VOC Loading Rates: Emission calculations are based on the ICF Kaiser-specified VOC effluent loading rates of less than 9.8 lbs/day and address two emission profiles:

  1. High flow with low concentration gases that result in a control efficiency of 97% of the major components of the gas stream, allowing the unit to process up to 548 lbs/day of influent while maintaining an effluent loading of 9.8 lbs/day; and

  2. An operating extreme in which influent flow and concentrations effect a very high control efficiency (98.2%) to allow influent loading up to 1410 lbs/day while maintaining an effluent loading of 9.8 lbs/day.

  This suggests that control efficiencies increase with the VOC influent concentrations, allowing the influent loading to be increased at a constant effluent loading of 9.8 lbs/day. Results of the air modeling and risk assessment would greatly impacted by a variation in these assumptions, and the risk assessment ought to include a range of efficiencies attributable to the proposed VES operation.

SVE SYSTEM DESIGN ISSUES

- Please provide us with detailed drawings of the proposed vapor extraction and reinjection well field layout, including screen intervals for both vapor extraction and reinjection wells.

- Dames & Moore would like to know the impacts of reinjecting 50% (or approximately 3,000 cfm) of the treated air to the subsurface on the radius of vacuum influence. Please address the potential of spreading the plume.

- Dames & Moore would like to know that given the complex geology of the site soils beneath the B-plant site whether reinjecting 50% of treated air is feasible without pushing and/or spreading the plume. If it is, is it feasible to reinject 100% of the air extracted? According the Building 112 SVE pilot test report, only up to 30% of the treated air was reinjected. Are there documented field data to demonstrate that all the air reinjected was captured? On the five-year SVE pilot test performed in Building 175 area, 100% of the air treated was reinjected into the subsurface through air injection wells placed out of the

capture zone of the vapor extraction wells. Dames & Moore would like to know the rationale for designing and installing this total closed loop system. Are there any field data demonstrating that all the injected air was completely captured by the SVE wells?

- Please provide us the design criteria for selecting a total vapor extraction rate of 6,247 cfm and the basis for quantifying influent Vapor Stream No. 4.

We anticipate providing a written report within three to four weeks of obtaining the above information.

Sincerely,

DAMES & MOORE

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Principal and Manager
Toxicology, Risk Assessment and
Environmental Statistics Group
(916) 387-7559

James J. Kang, Ph.D., P.E.
Senior Chemical Engineer
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ISJ/JJK:fal
cc: Mr. Craig Voiland
The Peartree Group, Inc.
Kansas City, Kansas

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February 3, 1995

DAMES & MOORE
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February 23, 1995

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Mr. Rick Pruetz, AICP
Chief Assistant, Community Development
Director, City Planner
City of Burbank
275 East Olive Avenue
Burbank, California 91510-6459

RE: Review of Cumulative Impact Analysis and Acoustical Analysis Reports Submitted by Lockheed Corporation

Dear Mr. Pruetz:

Acoustical Analysis: The Acoustical Analysis was conducted in a reasonable manner, and we concur with the conclusion that the project would not have significant noise impacts. Although the report does not explicitly state this, information in the appendices indicates that project-related noise increases at sensitive receptor locations would be less than 5 dB above measured ambient levels (5 dB increase limitation is a City of Burbank ordinance requirement).

Cumulative Impact Analysis: In general, there is useful information presented for the project itself. However, we were unable to find much information pertinent to the evaluation of the cumulative impacts with other reasonably foreseeable future projects. We do not believe that this report adequately addresses the issue of cumulative impacts. Specific comments are presented below.

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Section II (AQMP)

The objective of this section is to show project compliance with the Air Quality Management Plan (AQMP). This objective is not achieved for the following reasons:

(1) Project emissions are not accounted for in the 1994 AQMP or the 1990 emissions inventory.

(2) Year 2000 short and intermediate control measures in the 1994 AQMP do not apply to the project.

(3) Year 2010 control measures in the 1994 AQMP do not apply to the project because the project will not exist at that time.

(4) Burbank example implies that decreases in project emissions resulting from declining level of operation over the life of the project are consistent with expected reductions resulting from application of control technologies in 1994 AQMP. Declining operations are not the same as control technologies.

The above points do not demonstrate that the project is consistent with 1994 AQMP control measures and goals. Furthermore, cumulative impacts are not mentioned or addressed.

Section III (New Pollutant Generators)

The following comments pertain to the discussion of offsets:

(1) Former Plant B-1 emission sources for ROG (pounds per day) are identified as motor vehicles (541), natural gas combustion (1), and electric generation (1); these are implied to be sources of Emissions Reductions Credits (ERCs) for offsets. No documentation is provided to demonstrate that these sources are eligible as ERC; normally, these types of sources are not eligible.

(2) The project requires 12.2 pounds of offsets; where will they come from?

(3) Relationship to cumulative impacts is not explained.

Section IV (Comparative)

This section should be revised to address the following points:

(1) It is implied that failure of the City of Burbank to build planned houses would represent offsets for the project. This is an incorrect assumption; offsets are typically based on shutting down existing sources of pollutant emissions.

(2) First paragraph, line 9 should be 62% not 52%.

(3) Relationship to cumulative impacts is not explained.

Section V (Cumulative)

This section should be revised to address the following points:

(1) Second paragraph mistakenly identifies perchloroethylene as being included in the cancer risk evaluation for the Rule 1401 analysis.

(2) The additional health risk assessment is not for the Maximum Individual Cancer Risk, as stated, because the 70-year lifetime exposure was not used. The presentation is not very helpful.

(3) Impact conclusions are for the project only; no cumulative analysis is presented.

Section VI (Conclusions)

The following points need to be addressed:

(1) Conclusion (4), consistency with AQMP, is not supported by discussion in Section II.

(2) Conclusion (5), emissions credits for Plant B-1 site closure, is not supported by discussion in Section III.

(3) Conclusion (6), low cancer risk, erroneously uses term Maximum Individual Cancer Risk.

(4) No cumulative conclusions are presented.

-oOo-

It was a pleasure to perform this review for you. Should you have any questions, please call Dr. Les Senger at (714) 433-2000 or Dr. Ijaz Jamall at (916) 387-8800.

Sincerely,

DAMES & MOORE

ISJ for Leslie Senger

Leslie W. Senger, Ph.D.
Associate/Senior Project Manager
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February 23, 1995

DAMES & MOORE

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March 6, 1995

Mr. Rick Pruetz, AICP
Chief Assistant, Community Development
Director, City Planner
City of Burbank
P.O. Box 6459
275 East Olive Avenue
Burbank, California 91510-6459

RE: Comments on Lockheed's Soil Vapor Extraction (SVE) System For Plant B-1, Burbank, California
Dames & Moore Job Number 00062-031-158

Dear Mr. Pruetz:

After reviewing all the documents related to Lockheed's Enhanced Soil Vapor Extraction (ESVE) system, Dames & Moore has the following comments on the ESVE system. Overall, Dames & Moore agrees that the proposed ESVE system will meet the stated environmental goals. Our comments and suggestions are discussed in detail as follows:

Venting and Air Injection Well Field Design

- According to the Plant B-1 SVE pilot test report dated September 8, 1994, no pressure response data from the vapor probes and monitoring wells were documented during the active air injection pilot tests (Stage III). Therefore, the actual impacts of air injection into various strata (*i.e.*, Zones B, C, D, and Z) on the SVE capture zones (or radii of vacuum influence) cannot be evaluated. The discussions on full-scale flow simulations for evaluation of maximum air reinjection rates described in ICF Kaiser's February 14, 1995 letter and Attachment 1 are not clear. Based on the horizontal and vertical air permeability data for Zones A, B, C, D, and Z presented in Table 4-1 of the B-1 SVE pilot test report, the average vertical air permeability in each strata is generally two to 300 times lower than its horizontal air permeability, suggesting that during the

active air injection, air would preferentially travel horizontally rather than upward (or vertically). Dames & Moore would like to know whether or not this information was considered when evaluating the vapor transport phenomena in the heterogenous subsurface soils during the active air injection simulations. The color figures in Attachment 1 need further interpretation. It is not clear how the total maximum air injection rate was estimated without knowing the actual pressure response data which would have been obtained from the active air injection pilot tests. Additionally, the figures in Attachment 1 did not show the locations of injection wells. This makes it difficult to assess the impact, if any, of active air injection on the SVE capture zones.

- The air injection pressure used for the above simulation was inconsistent with the designed values (8 psig in Stream No. 44 of the Process Flow Diagram dated 1/19/95 and 10 psig on Page 2-3 of Modified SCAQMD Application). Dames & Moore would like to know what injection pressure(s) were used for the above-mentioned air injection simulation. The air pressure contours showing both extraction and injection wells would be very helpful to document the effectiveness of the SVE capture zone when active air injection is used.

- It is Dames & Moore's understanding that the current SVE well field design was based on a radius of vacuum influence (ROVI) of 150 feet when no air reinjection was assumed. It is not known whether the same ROVI will be used in the final design when 50 percent of treated vapor is to be reinjected into the subsurface. It is our opinion that the ROVI would be reduced when active air injection is implemented. For example, in the Plant B-1 SVE pilot test report, when 275 cfm of soil vapor was extracted from Zone D and 45 cfm (or 16 percent of the total extraction rate) of ambient air was injected into Zone C, the vacuum induced in the D zone was reduced.

- According to Attachment C of ICF Kaiser's January 25, 1995 letter entitled, "SVE Technology Decision Matrix," Page 3 Item 11, the SVE headers and vaults will be installed 10 feet below grade to accommodate future site development. A one inch per 40-foot slope will be used to install the collection headers from the well heads to the above-ground vapor extraction and treatment plant to be located on far southeastern corner of the site. Dames & Moore could not find the active air injection well field layout information. If all the headers and vaults will be placed 10 feet below grade, Dames & Moore recommends that a pipe-leak

detection measure be developed, or seismic-proof pipe connection fittings be considered in the final design. Additionally, the impacts of differential settlement due to loss of soil moisture during SVE on the header stress should be factored into the design. If well vaults are 10 feet below grade, would it trigger confined space entry requirements when conducting well head vapor sampling or maintenance?

- Since the air discharge design pressure from the Air Injection Blowers: B-5, B-6, and B-7 is 8 psig (or 221" water column) @ 3,707 cfm and air delivery design pressure to the Zone D (top layer) is less than 1" water column and a few psig to deeper zones, Dames & Moore would like to know the control mechanism for splitting the reinjecting air at two different air injection pressures.

Vapor Treatment System Design

- According to ICF Kaiser's May 13, 1994 Feasibility Study (FS) Report (Pages ES-1 and 2-1), PCE and TCE were the primary constituents considered in selecting the vapor treatment system. This assumption was verified by the baseline vapor sampling results, which show PCE and TCE are the predominant VOCs in the soil vapors with only traced amount of vinyl chloride (VC) in few vapor samples. VC was believed to be generated from anaerobic biodegradation of PCE and TCE in deeper zones. VC production can be avoided by maintaining the subsurface at aerobic conditions which, in turn, can be achieved by initiating the soil vapor extraction (SVE) with simultaneous air injection.

- Dames & Moore agrees that steam-regeneration GAC adsorption is the best available technology to date for treating the extracted chlorinated hydrocarbon-laden vapors at the Lockheed B-1 Plant site for the following reasons:

  - Although synthetic resin (Purus Air Treatment System) has a slightly higher adsorption capacity (or efficiency) and is less sensitive to humid air streams than GAC, its use in soil remediation on such a large scale has not been demonstrated.

- Although synthetic resin offers better adsorption efficiency for VC than GAC, it is very difficult to condense VC. As a result, the VC vapor has to be bled out of the condenser for treatment with chemical oxidation using bromine-impregnated carbon or thermal oxidation using a catalytic oxidizer equipped with a scrubber. VC treatment with bromine-impregnated carbon has not been field tested on a large scale, and treatment with a catalytic oxidizer was proven to be problematic and labor intensive based on the field logs presented in Appendix B of the B-1 plant SVE pilot test report.

- Dames & Moore agrees that GAC as a polishing unit is a more cost-effective vapor treatment system than synthetic resin due to its availability for off-site regeneration. Currently, the spent synthetic resin has to be disposed of in a hazardous waste landfill.

- Dames & Moore believes that the loading capacities of vapor-phase GAC provided by VARA International are typical and conservative. A VOC removal efficiency of 99.65 using steam-regeneration GAC was documented when treating soil vapors containing primarily PCE and TCE at the Lockheed AquaDetox/SVE system test site in Building 175 area in 1990.

Air Emission Permitting

- The approach to the Reactive Organic Gas (ROG) emission estimates depends on the system instruments and controls to deliver the stated emission control. In other words, the programmable logic controller (PLC) is set to reduce or redirect exhaust flow and even shut down the system if the FID sensors indicate emissions are exceeding preset thresholds.

- While not relevant from a health risk perspective under current emission assumptions, it should be recognized that the proposed VES system containing GAC cannot capture VC. Therefore, monitoring for VC should be conducted to ensure that VC emissions do not exceed those assumed in the proposed EVES system.

- BACT for ROG is assumed for the entire system with the programmed logic instrumentation and controls. However, the entire system design and emission estimates depend on the occasional use of a disposable activated carbon bed for "polishing". Full-time use of the polishing bed might result in lower emissions than those proposed and, thus, would represent a better BACT than the currently proposed BACT system.

- Figure 1 of the Modification to the May 1994 SCAQMD Permit Application should include the following additional data: (a) a north direction arrow; (b) a scale; and (c) a 1000-foot radius from the emission points. According to Page 1-2 of the May 13, 1994 FS Report, there is a school located within 500 feet of the southern boundary of the site.

- Appendix D of the SCAQMD permit application calculations indicate a 26-inch carbon depth but the text on page 2-2 indicates 30 inches and the density and quantity are reversed in item "a". These should be corrected.

- According to Chapter 3 of the permit application, the demister configuration is still unclear. Dames & Moore understand that Lockheed's consultants are waiting for its vendor to provide such information.

Process Flow Diagram

- There are still some minor conversion errors in the stream mass balance spreadsheet which ought to be corrected.

- Some unit components are still not defined on the PFD.

- On the air stripper (S-1), should the influent wastewater (Stream No. 12) be directed to the top of stripping tower, instead of clean water (Stream No. 20)?

8.5 Year Mass Removal Chronology

- Dames & Moore believes that Lockheed and its consultant did a thorough job in estimating the mass removal decay rates and the overall mass removed over the 8.5 years of SVE operation. The assumptions and conclusions made were all valid.

We trust the above comments meet your needs. Please call the undersigned if you have questions.

Sincerely,

DAMES & MOORE

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March 6, 1995

DAMES & MOORE
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March 7, 1995

Mr. William D. Jacobs, AICP
Assistant Planner, Planning Division
Community Development Department
City of Burbank
P.O. Box 6459
275 East Olive Avenue
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SUBJECT: Comparison of VOC/ROG Emissions for City of Burbank and Lockheed

Dear Mr. Jacobs:

The memorandum provides a comparison of air emissions from Lockheed's Vapor Extraction System (VES) to air emissions for the City of Burbank as presented in your attached fax dated February 23, 1995. Some key points to consider when using this data are:

1. ROGs are a large subset of VOCs and considered to be ozone precursors. The subset of chemicals considered to be VOCs but not ROGs are classified as "Exempt Compounds" by the SCAQMD. The SCAQMD further separates the Exempt Compounds into two groups – Group 1 and Group 2. Group 2 compounds are considered to be potential ozone depleters and are in the process of being regulated.

2. The TRI data may not provide a comprehensive list of all VOC emissions for the City of Burbank. As such, the percent contribution by Lockheed's VES is probably overestimated using the TRI data.

Basis for Comparison

1. City of Burbank Emissions (1992)

VOCs	139,828 lb/yr
ROGs	35,517 lb/yr

2. SCAQMD Exempt Compounds and Amounts

Group 1	HCL @ 255 lb/yr
Group 2	1,1,1-trichloroethane @ 84,960 lb/yr
	Freon 113 @ 19,100 lb/yr

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March 7, 1995

3. Emission amounts in the TRI table are for lb/yr.

4. The Lockheed VES emission amounts are assumed to be for ROGs.

Lockheed Proposal	VOC (lb/yr)	ROG (lb/yr)	Percent of Total as	
			VOCs	ROGs
Original	—	14,600	10.4%	41.1%
Revised	—	3,577	2.6%	10.1%

Please give us a call if you have any questions or comments.

Sincerely,

DAMES & MOORE

Ijaz S. Jamall, Ph.D., DABT
Principal and Manager
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Gary W. Gruwell, P.E.
Senior Engineer
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ISJ:fal
Attachment

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March 7, 1995

DAMES & MOORE

8801 FOLSOM BOULEVARD, SUITE 200, SACRAMENTO, CALIFORNIA 95826
(916) 387-8800 FAX: (916) 387-0802

March 13, 1995

Mr. Rick Pruetz, AICP
Chief Assistant, Community Development
Director, City Planner
City of Burbank
P.O. Box 6459
275 East Olive Avenue
Burbank, California 91510-6459

RE: Review of Risk Assessments for the Proposed Lockheed Plant B-1 Soil Vapor Extraction System
Dames and Moore Job Number 00062-031-158

Dear Mr. Pruetz:

This correspondence presents the results of our review of the Non-Cancer Health Risk Assessment prepared by Montgomery Watson and dated February, 1995 for the Lockheed Plant B-1 Enhanced Soil Vapor Extraction System (ESVE).

Our review indicates that the calculations of non-cancer health effects posed by the ESVE appear to be accurate and reflect site- and system-specific conditions for residential populations, but appear to have underestimated impacts to non-residential populations by a factor of 0.15. This report contains other relatively minor errors that should be corrected to ensure the overall quality of the Risk Assessment Report.

Some of the errors in the Non-Cancer Health Risk Assessment prompted us to revisit our review of the Rule 1401 Health Risk Assessment prepared by Montgomery Watson, dated December, 1994. Our review of the calculations performed in this report to determine cancer risks indicates that the Maximally Exposed Individual Worker (MEIW) and Maximally Exposed Individual Resident (MEIR) values were *underestimated* in the report and that all risk calculations performed for the vapor extraction system under "high efficiency" conditions should be recalculated. The remainder of this correspondence discusses specific findings and recommendations resulting from our review of both reports.

Treatment of Vinyl Chloride

Table 4 of the Non-Cancer Health Risk Assessment lists incorrect values for emissions of vinyl chloride under high efficiency conditions (0.14 lbs/day or 7.36×10^{-4} g/s). Perchloroethylene (PCE) and trichloroethylene (TCE) are the only substances considered for non-cancer health effects whose emissions are actually reduced by increasing treatment efficiency. Vinyl chloride emissions should therefore increase proportionately with the increase in loading at the same rate as the remaining pollutants. This increase in vinyl chloride from the "low efficiency" condition would be determined by multiplying the emission rate for vinyl chloride under this condition by the loading rate for the high efficiency condition and dividing by the loading rate for the low efficiency condition [*i.e.*, 4.22×10^{-4} g/s x (1410/548)]. The value for emissions of vinyl chloride should be 1.08×10^{-3} g/s as correctly indicated in Table 10. Subsequent risk calculations performed in the non-cancer health risk assessment correctly use the 1.08×10^{-3} g/s emission rate for vinyl chloride, but incorrectly use a correction factor of 0.15 for non-residential populations (see below). The incorrect emission rate in Table 4 should be corrected.

This same incorrect value was used in the Health Risk Assessment for cancer effects in Table 10 of the December 1994 report, leading to an underestimation of cancer risk posed by vinyl chloride under the "high efficiency" conditions. Use of the correct emissions rate of 0.00108 g/s to calculate excess cancer risk under these conditions would yield a 1.21×10^{-6} excess cancer risk for the MEIR. All of the excess cancer risk values calculated for the 99.2% control efficiency condition, therefore, are incorrect since they are based on the wrong vinyl chloride emission rate. All excess cancer risk calculations for the "high efficiency" condition should be re-performed using the correct vinyl chloride value.

The exceedance of the 10^{-6} Maximum Individual Cancer Risk (MICR) indicates, under SCAQMD Rule 1401, that a permit to operate the vapor extraction system would be denied unless the unit is constructed with T-BACT. The proposed vapor extraction system has no impact on the most carcinogenic pollutant in contaminated soils at Lockheed's Plant B-1 site and actually produces an *increase* in emissions of most carcinogens under conditions considered to be "high efficiency." The shortcomings of this system with regard to control of carcinogens should be critically reviewed in the assignment of T-BACT status to this technology.

Errors and Omissions in the Non-Cancer Risk Assessment

- The Health Risk Assessment for chronic non-cancer health effects uses a correction factor of 0.15 to differentiate risks for commercial zones versus residential zones (based on the differential in exposures for each type of receptor). The use of the 0.15 multiplier is inappropriate for calculation of non-cancer health effects per CAPCOA guidelines. The hazard indices for the MEIW and all other non-residential hazard indices should be recalculated per the CAPCOA guidelines.

- The executive summary and introductory paragraphs state that chronic and acute health effects were considered for "1,1,1-trichloroethylene." Dames & Moore believes that Montgomery Watson is actually referring to 1,1,1-trichloroethane. If this is correct, then this change should be reflected in a revised risk assessment document.

- The executive summary also states that the ISCST2 model was tested for its integrity in calculations by running sample files with known results; these integrity test results should be provided in the report as an appendix to verify the accuracy of model runs.

- The report states that the maximum acute hazard index yielded by risk calculations is 0.0013, but Table 12 indicates that the actual maximum acute hazard index is 0.00173. We recognize that this is well below the hazard index of 1.0 considered as a benchmark for non-cancer health effects by the regulatory agencies.

- Table 4 omits an influent concentration for vinyl chloride and should be 1.8 ug/L if information provided in Table 1 is correct.

- The title of Table 11 is given as "Excess cancer risk at all receptors resulting from emissions from the Lockheed Plant B-1 SVE system." If these values are actual excess cancer risks, then the risks for the MEIR and MEIW are orders of magnitude greater than acceptable excess cancer risk levels. We believe, however, that Montgomery Watson intended for the title of this table to be "Excess non-cancer risk at all receptors resulting from emissions from the Lockheed Plant B-1 SVE system."

- The text of the risk assessment discusses the separate treatment of vinyl chloride in emissions calculations "since it can have a significant impact on risk." Vinyl chloride is significant in that it poses both cancer and non-cancer risks and is unaffected by the vapor extraction system. In the case of non-cancer effects, however, carbon tetrachloride is considered by CAPCOA to be more toxic than vinyl chloride; the chronic reference exposure level (REL) for carbon tetrachloride is 2.4 ug/m^3, while the chronic REL for vinyl chloride is 26.0 ug/m^3 (CAPCOA, Air Toxics "Hot Spots" Program, October, 1993 cf. Table III-8.) [Note: The lower the value of the reference level, the more potent it is in its ability to produce non-cancer health effects than another chemical, under the same exposure conditions.] Both substances increase in emissions under "high efficiency" conditions. The separate treatment of vinyl chloride would not appear to contribute any unique insights to a risk assessment of non-cancer effects, and it is not apparent that vinyl chloride received such treatment elsewhere in the report.

Conclusion

While the calculations of non-cancer health risks posed by the system appear to be accurate for residential populations, the non-cancer health risk assessment report contains errors that should be corrected to ensure its quality. A major shortcoming of the risk assessment of non-cancer health effects includes the inappropriate use of a 0.15 correction factor for determining risks posed to non-residential populations. Per CAPCOA guidelines, this correction factor is appropriate only for cancer risks posed to non-residential populations. Some of the errors in the non-cancer risk assessment prompted further review of the Rule 1401 health risk assessment prepared by Montgomery Watson in December, 1994. Because an incorrect emissions rate was used for vinyl chloride in the "high efficiency" condition, MEIR and MEIW values were underestimated. The MEIR value exceeds 10^{-6} when the correct emission rate is used. All risk calculations performed for this condition should be recalculated, and assignment of T-BACT status to this system should be carefully considered.

Please contact us if you have any questions.

Sincerely,

DAMES & MOORE

Craig E. Armstrong, M.P.H.
Senior Air Modeler
Telephone (206) 727-3369

Ijaz S. Jamall, Ph.D., DABT
Principal and Manager
Toxicology, Risk Assessment and
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CEA/ISJ:fal

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March 13, 1995

DAMES & MOORE
8801 FOLSOM BOULEVARD, SUITE 200, SACRAMENTO, CALIFORNIA 95826
(916) 387-8800 FAX: (916) 387-0802

March 14, 1995

Mr. Rick Pruetz, AICP
Chief Assistant, Community Development
Director, City Planner
City of Burbank
P.O. Box 6459
275 East Olive Avenue
Burbank, California 91510-6459

RE: REVIEW OF LOCKHEED RESPONSE TO COMMENTS ON CUMULATIVE IMPACT ANALYSIS

Dear Mr. Pruetz:

The revised draft Cumulative Impact Analysis adequately responds to comments that dealt with impacts specific to the project. However, no new information was provided to demonstrate the relationship of analyses in Sections II, III, and IV to cumulative impacts. All of the analyses presented in these sections are project-specific, not cumulative with other projects. This contradicts statements in Section I that Sections II, III, and IV are cumulative impact analyses.

Section V (Cumulative Toxics Assessment) presents results of health risk assessments for the project only. The position is taken that there is no cumulative impact health risk because no other projects similar to the proposed project have applied for permits in the Burbank area. In our experience, this is an extremely limited definition of what projects would contribute to cumulative impacts. A more realistic definition would include any proposed project in the Burbank area that would be a source of toxic air emissions. For the latter reason, we do not believe this section adequately addresses cumulative impacts.

Section VI contains no conclusions regarding cumulative impacts. This is surprising, given that the report is a Cumulative Impact Analysis.

It was a pleasure to perform the review for you. Should you have any questions, please call Dr. Les Senger at (714) 433-2000.

Sincerely,

DAMES & MOORE

ISJ for Leslie Senger

Leslie W. Senger, Ph.D.
Associate
(714) 433-2000

Ijaz S. Jamall, Ph.D., DABT
Principal
(916) 387-7559

LWS/ISJ:fal

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March 14, 1995

OBJECTS TO COLLECTION

DAMES & MOORE
8801 FOLSOM BOULEVARD, SUITE 200, SACRAMENTO, CALIFORNIA 95826
(916) 387-8800 FAX: (916) 387-0802

March 15, 1995

Mr. Rick Pruetz, AICP
Chief Assistant, Community Development
Director, City Planner
City of Burbank
P.O. Box 6459
275 East Olive Avenue
Burbank, California 91510-6459

RE: REVIEW OF ODOR EVALUATION DOCUMENTATION SUBMITTED BY LOCKHEED CORPORATION

Dear Mr. Pruetz:

The odor evaluation documentation (three letters) submitted by Lockheed relating to the potential odors from the proposed soil VES contains conclusions that are reasonable. Specifically, anticipated odor concentrations within the exhaust gas were: (1) at worst-case, a factor of two below reasonable odor thresholds for the various compounds, and (2) actual ground-level concentrations would be significantly lower than those found in the exhaust gas, based upon the data presented.

We concur with these conclusions. However, since the documentation was provided as a series of discrete letter responses, the information would need to be consolidated and supplemented with backup detailed information in order to be included in formal environmental review documentation. Methodology and backup information would be needed to define inlet and exhaust concentrations and explain the use of different odor threshold values for comparison (*i.e.*, the Montgomery Watson thresholds versus the ones reported in the two Lockheed letters). In particular, the basis for variations in anticipated concentrations and threshold values between the Lockheed and Montgomery Watson documents and definitions of maximum hourly concentrations in the Montgomery Watson submittal (source concentration or modeled ground-level concentration) needs to be clarified. Due to the overall magnitude of the anticipated concentrations versus the magnitude of the odor thresholds, the variations stated above would not change the overall conclusion that there is not expected to be an odor concern from the proposed vapor extraction system.

If you have any questions, please call Dr. Les Senger at (714) 433-2000.

Sincerely,

DAMES & MOORE

Leslie W. Senger, Ph.D.
Associate/Senior Project Manager
(714) 433-2000

DAMES & MOORE

Ijaz S. Jamall, Ph.D., DABT
Principal
(916) 387-7559

LWS/ISJ:fal

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March 16, 1995

DAMES & MOORE
8801 FOLSOM BOULEVARD, SUITE 200, SACRAMENTO, CALIFORNIA 95826
(916) 387-8800 FAX: (916) 387-0802

March 28, 1995

Mr. William D. Jacobs, AICP
Assistant Planner, Planning Division
Community Development Department
City of Burbank
P.O. Box 6459
275 East Olive Avenue
Burbank, California 91510-6459

SUBJECT: Comparison of VOC/ROG Emissions for City of Burbank and Lockheed

Dear Mr. Jacobs:

The revised memorandum provides a comparison of air emissions from Lockheed's Vapor Extraction System (VES) to air emissions for the City of Burbank as presented in your attached fax dated February 23, 1995 (Attachment A). Some key points to consider when using this data are:

1. ROGs are a large subset of VOCs and considered to be ozone precursors. The subset of chemicals considered to be VOCs but not ROGs are classified as "Exempt Compounds" by the SCAQMD. The SCAQMD further separates the Exempt Compounds into two groups – Group 1 and Group 2. Group 2 compounds are considered to be potential ozone depleters and are in the process of being regulated.

2. The TRI data may not provide a comprehensive list of all VOC emissions for the City of Burbank. As such, the percent contribution by Lockheed's VES is probably overestimated using the TRI data.

Basis for Comparison

1. City of Burbank Emissions (1992)

VOCs	139,828 lb/yr
ROGs	35,517 lb/yr

2. SCAQMD Exempt Compounds and Amounts

Group 1	HCL @ 255 lb/yr
Group 2	1,1,1-trichloroethane @ 84,960 lb/yr
	Freon 113 @ 19,100 lb/yr

3. Emission amounts in the TRI table are for lb/yr.

4. Revised ROG emissions are 3,577 lb/year (or 9.8 lb/day) as presented in Attachment A.

5. The Lockheed VES VOC emissions as presented for Year 0 to 0.5 in Table 3 of the Non-Cancer Health Risk Assessment (Montgomery-Watson, February 1995) were adjusted proportionally such that the emissions of the ROG component were 9.8 lb/day (*i.e.*, 3,577 lb/year). In Table 3, ROG emissions constitute 98.5 percent of total VOC emissions. Therefore, ROG emissions of 3,577 lb/day similarly constitute 98.5 percent of VOC emissions of 3,633 lb/day.

6. The original VOC emission rates assume the same speciation of compounds as the revised emission estimates.

Lockheed Proposal	VOC (lb/yr)	ROG (lb/yr)	Percent of Total as	
			VOCs	ROGs
Original	14,822	14,600	10.4%	41.1%
Revised	3,633	3,577	2.6%	10.1%

Please give us a call if you have any questions or comments.

Sincerely,

DAMES & MOORE

Ijaz S. Jamall, Ph.D., DABT
Principal and Manager
Toxicology, Risk Assessment and
Environmental Statistics Group
Telephone (916) 387-7559

Gary W. Gruwell, P.E.
Senior Engineer
Telephone (916) 387-7565

ISJ:fal
Attachment

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March 28, 1995

To: Dr. Ijaz Jamal, Dames and Moore

Fax #: (916) 387-0802

From: William D. Jacobs, AICP, Burbank Planning Div - Community Development Dept.

Date: February 23, 1995

Pages: 2, including this cover sheet

fax

Ijaz-

The Peartree Group provided the attached list of TRI data for VOC emissions in Burbank. However, it is our understanding that Lockheed's HRA focuses on ROG's. To clarify the difference between VOC' and ROG's, would it be possible for you to do a table comparing the output of each in both the original (5/94) and revised proposals (12/94), i.e.:

	VOC (lbs/day)	ROG (lbs/day)	Percentage
Original proposal	?	40	
Revised proposal	?	9.8	

Thank you for your assistance.

From the desk of...

William D. Jacobs, AICP
Assistant Planner
Burbank Planning Div - Community Development Dept.
P.O. Box 6459; 275 East Olive Ave.
Burbank,CA. 91510

tel: 818-953-8609
fax: 818-953-4348

Significant VOC Emissions 1987-92
(stated in pounds/year)
Pounds Reported by Industry
in Zip Codes
9102, 91503, 91504, 91506

Chemical Name	1987	1988	1989	1990	1991	1992*
1,1,1, -Trichloroethane	412,761	690,265	120,423	163,655	126,770	84,960
Dichloromethane	12,905	1,850	10,147	18,897	9,300	0
Freon 113	79,900	6,560	53,200	47,736	40,885	19,100
Methyl Ethyl Ketone	67,900	87,000	27,038	0	0	0
Methyl Isobutyl Ketone	62,719	22,400	33,500	0	0	0
Tetrachloroethylene (PCE)	340,037	559,819	180,500	40,090	21,203	27,517
Toluene	31,679	5,700	8,950	0	0	0
Trichloroethylene (TCE)	26,789	37,232	0	0	0	0
Hydrochloric Acid	500	750	32,250	760	250	250
Acetone	0	7,600	0	0	18,000	8,000
Methanol	0	10,100	0	0	0	0
Total Significant VOC Emissions	1,035,190	1,429,276	466,008	271,138	216,408	139,827

Source: The Right to Know (RTK)net -EPA
• Most recent numbers available from EPA

PROVIDED LOCKHEED RIVET MAIN

Original Report: 40 lbs/Day = 14,600 lbs/yr.

Revised Report* 9.8 lbs/Day = 3,577 lbs/yr

* 12/94 Enhanced VES submittal

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APPENDIX F

THE PEARTREE GROUP, INC.
REVIEW OF
LOCKHEED SUBMITTALS

THE PEARTREE GROUP, INC.
701 Jackson - Suite 220
Topeka, Kansas 66603

March 8, 1995

Report to The City of Burbank Regarding the Lockheed Plant B-1 Soil Vapor Extraction System Remediation Project Proposed by Lockheed Environmental Systems & Technologies Company

EXHIBIT C

THE PEARTREE GROUP, INC.

701 Jackson - Suite 220
Topeka, Kansas 66603

March 8, 1995

Report to The City of Burbank Regarding the Lockheed Plant B-1 Soil Vapor Extraction System Remediation Project Proposed by Lockheed Environmental Systems & Technologies Company

The traditional role of THE PEARTREE GROUP, INC. has been as an advocate for the public interest. In this case, it is our understanding that doing nothing is not an option, and that clean up and development of this site will be a significant benefit to the community for generations to come. Therefore our focus is to review the proposed remediation technology, make recommendations, and ensure that the collection of contaminants by the proposed system will be done in such a manner as to reduce the risk to the public by the greatest extent practicable.

Summary

Lockheed implemented extensive testing of the remediation of contaminants at the Building 175 site from 1988 to 1993. They also conducted extensive tests at the proposed B-1 remediation site in 1994. This information was very helpful in assessing the proposed full-scale SVE system. The geology and contaminants at both sites are similar and both are amenable to operation of a SVE system.

Having evaluated the substantial documentation on this site, we agree with Lockheed that soil vapor extraction (SVE) is the best technology to remove the contaminants found in the zone between the groundwater and the surface. We also agree with the choice of granular activated carbon (GAC) adsorption as the primary treatment technology to capture contaminants at this site.

The addition of a GAC adsorption polishing unit to handle peak concentrations will maintain the release of volatile organic compounds (VOCs) into the air at or below the levels anticipated by the Rule 1401 Health Risk Assessment (HRA). However, the polishing unit will have little or no effect on low parts per million and parts per billion levels of both major (perchloroethylene and trichloroethylene) and minority species (vinyl chloride, benzene, and dichloroethenes, etc.) of contaminants in the anticipated emissions. Thus we agree there would be **no** advantage to placing the polishing unit on-line all of the time. In fact, polishing unit efficiency data (see Appendix 1) suggests that there may be a negative impact on removal efficiency by using the polishing unit on-line.

Perchloroethylene (PCE) and Trichloroethylene (TCE) are the primary contaminants of concern at the B-1 site. To address contaminants other than PCE and TCE, (minor species), the applicant has chosen to assign conservative estimates of removal efficiency. In the case of trace vinyl chloride the applicant assumes a capture rate of zero for the risk assessment.

The applicant has also demonstrated the ability to reinject 100% of the treated air from the Building 175 Soil Vapor Extraction system, and the applicant's consulting engineer, ICF-Kaiser, has stated that 70% reinjection at the B-1 site is feasible. This can be done at minimal additional cost, and will result in an additional 40% reduction in emissions from the plant. **Therefore, we conclude that primary treatment with granular activated carbon adsorption followed by reinjection of 70% of the treated air is T-BACT for the proposed SVE system.**

The applicant has used conservative assumptions in some parts of the Health Risk Assessment, but not in others. An inherent uncertainty exists as to the mix of contaminants that will be presented to the treatment system and the rate they will be extracted. Accordingly, we are recommending that the applicant's HRA emission estimates be used as permit limits, and that certain weekly or monthly full spectrum VOC monitoring requirements be added to the permit protocol.

It is highly unlikely that the emissions from the proposed SVE system will, by themselves, cause a single case of cancer. However, Burbank residents have been exposed in other ways to the same pollution episode for many years. Therefore, it is our opinion that Burbank residents are entitled to special consideration beyond what might be required for Rule 1401 compliance. That is the maximum feasible reinjection of treated air from the SVE system. The City should also require additional analysis of acute impacts under stagnant meteorological conditions before allowing redevelopment construction to begin.

Characterization of the Site

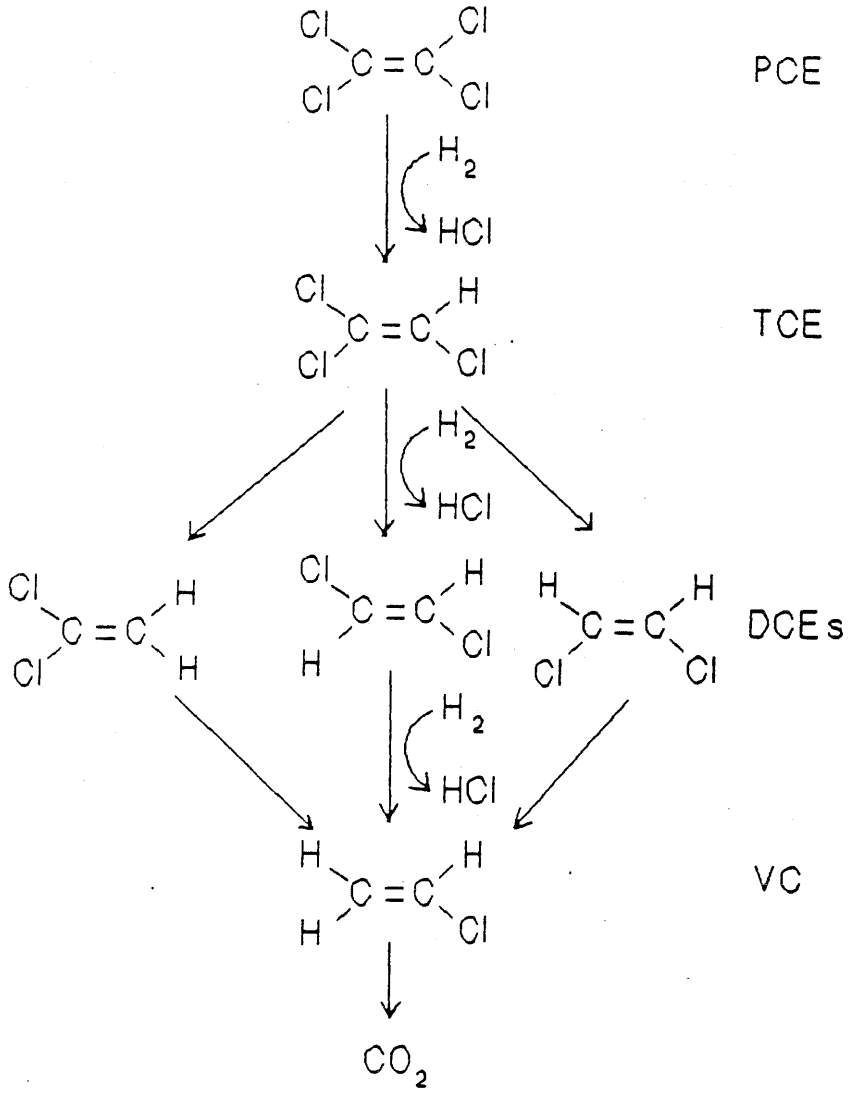
In general, the site is well characterized. Extensive testing of the soils and soil vapors provide a reasonable amount of certainty that the location of the subsurface contamination has been sufficiently identified to allow proper placement of the remediation system. With respect to the goal of the remediation project, which is the protection of groundwater, the data provided by the applicant also shows that perchloroethylene (PCE) and trichloroethylene (TCE) are by far the most common and important contaminants of concern at this site.

Minor Species - Vinyl Chloride

The presence of dichloroethylene isomers (DCE) and vinyl chloride (VC), however, is consistent with *in situ* biological transformation of PCE under anaerobic conditions. Shown in Figure 1 is the process of degradation of PCE to "Minor Species." This degradation appears to be occurring primarily, but not exclusively, in the shallow strata (10-35 feet below the surface).

Figure 1

Biological Degradation of Tetrachloroethylene (PCE)



Source: ref. 10

The rate and extent of this phenomenon is not as well characterized. From test reports on the Building 175 remediation project, we note that DCE was found in both the soil vapor and in groundwater under the site, indicating that the degradation process was occurring. The fact that vinyl chloride was not detected in baseline testing at the Building 175 site may be a result of insufficiently sensitive levels of analytical detection. We asked for additional information on the detection of minor species at the proposed B-1 site, and this is further addressed in the Health Risk Assessment section of this report.

Selection of Recovery Technology

We concur with the selection of soil vapor extraction for the remediation of this site. The lithology, with relatively permeable strata, accommodates the use of this technology. We also concur that, mechanically speaking, SVE can be characterized as a proven technology. This technology has been widely applied in the State of California. The 6000 cfm capacity of the system is somewhat larger than most systems that have been operated in the past. However this rate of extraction is well within the capability of individual system components.

Nonetheless, the inherent variability of subsurface geology, hydrology, and the interaction with contaminants presents a significant degree of uncertainty regarding the rate and timing of contaminant removal. The applicant has allowed for this variability in terms of mechanical limits to total VOC output - ie, emissions are limited to 9.8 pounds per day as a 30 day average. However, the mix of individual contaminant species, may vary significantly. A few of the minor contaminant species (Benzene, Carbon Tetrachloride, and Vinyl Chloride) are significant to the assessment of risk.

Selection of Treatment Technology

To date, a Best Available Control Technology (BACT) has not been designated for use with SVE, though granular activated carbon adsorption has been considered BACT for recovery of VOC's in general. Our review of EPA's RACT, BACT, LAER Clearinghouse data[1] indicated routine use of activated carbon filters, thermal oxidation, and catalytic oxidation to treat extracted soil vapors, with a range of efficiency from 97 to 99%. A slightly higher efficiency (99.7-99.80) was listed in two cases with the use of internal combustion engines. These were substantially smaller projects. A review of other SVE projects in the recent literature[2,3] suggested a preference for granular activated carbon. We found no mention of the use of resin adsorbents.

We agree that granular activated carbon adsorption is a reasonable selection as a first stage or primary treatment technology to remove VOC's from the extracted air. However results from the Building 175 pilot plant indicate that placing ***on-line*** a secondary GAC polisher would be of limited benefit in further reducing emissions of PCE and TCE, other than to handle spikes of these contaminants as presently proposed. Neither a primary nor a secondary GAC adsorber would consistently achieve control of the minor species VOCs at low ppm and at ppb levels. See Appendix 1 spreadsheet of pilot plant results.[4,5,6]

Very little data exists in the general literature regarding the efficiency of GAC adsorption on low ppm and ppb concentrations of the VOC's present at the site, probably because removal of contaminants at this level has rarely been required. Thus the data from Building 175 and the 1994 extraction tests at the B-1 site appear to be the best available information to judge the proposed treatment system design.

In response to our request for additional information in this regard, ICF Kaiser stated that the GAC units on the SVE test trailer, used for the 1994 SVE pilot work at the B-1 site, were not being pilot tested for efficiency, and that very little analytical testing of these units was performed. Nonetheless this data is instructive with regard to performance of granular activated carbon adsorption on the minor species. The AWD Technologies, Inc. carbon adsorption and Purus, Inc. resin adsorption pilot tests were run from April 1 to April 5, 1994 at the B-1 site. The carbon adsorption treatment results (detected minor species only) are shown in Table 2.

Table 2

Date of run		Minor Species	Influent conc. (µg/l)	Effluent conc.(µg/l)
4-01-94	#1	1,1,1-TCA	0.24	[0.1]
	#2	1,1-DCE	0.23	[0.1]
	#4	1,1,1-TCA	0.19	[0.1]
4-02-94	#5	1,2-DCE (total)	0.16	[0.1]
		Chloroform	0.22	[0.1]
		1,1,1-TCA	2.03	[0.1]
		1,1-DCE	0.63	[0.1]
4-04-94	#6	ethyl benzene	0.32	[0.2]
		xylene	5.39	[0.2]
		1,2-DCE (total)	47.86	[0.1]
		chloroform	0.13	[0.1]
	#7	1,2-DCE (total)	7.93	[0.1]
4-05-94	#8	1,2-DCE (total)	0.45	[0.1]
		1,1,1-TCA	0.16	[0.1]
		Vinyl Chloride	0.42	[0.3]
		1,1, DCE	0.86	[0.1]

Note: Not detected, brackets denote limits of detection.

In this case the carbon adsorber was a primary unit only. Effluent was vented to the catalytic oxidation pilot unit which was being tested at other times. The Purus resin adsorption unit demonstrated the same or less efficiency in treating the minor organic species.

The primary carbon adsorption unit used for the April '94 pilot test was more efficient in the removal of the minor species than was the two-stage (primary plus polisher) system used at Building 175. We suspect that the negative removals in the Building 175 polisher resulted from air, substantially cleaned in the primary unit, stripping contaminants previously captured in the polisher. Based on these results, one is better off using only a primary unit except, as the applicant has planned, when peak levels of the major species need to be captured.

Synthetic Resins

Appendix 2 compares the isotherm for vinyl chloride, provided by PURUS for the 1994 pilot test, with literature values for activated carbon. An isotherm shows the adsorption capacity of a particular sorbent at a given temperature and concentration of the chemical being captured. This comparison indicates that neither resin nor carbon will provide much treatment for the low parts per million or parts per billion concentrations of vinyl chloride found at the site.

ICF Kaiser has also described potential problems associated with regenerating the resin column to recover the adsorbed vinyl chloride, which has a low boiling point. If the spent resin is shipped off site and incinerated, it presents a problem for some other community. Thus we agree with the applicant's decision not to use synthetic resin adsorption.

For the purposes of the Health Risk Assessment, the applicant has assigned suitably low treatment efficiencies for the minor VOC species, including a zero removal efficiency for vinyl chloride. This is a conservative assumption since Table 2 indicates carbon adsorption may achieve some removal of the minor species VOC's.

Other treatment alternatives considered by the applicant included thermal and catalytic oxidation (incineration). These would achieve a removal efficiency comparable to activated carbon for the principal pollutants, PCE and TCE. These would also destroy a significant portion of the minor species. However, we do not recommend the incineration of chlorinated hydrocarbons due to the potential for formation of dioxins and furans and other highly toxic products of incomplete combustion.

Designation of T-BACT

Accordingly we believe that T-BACT in this case should be primary treatment by activated carbon plus the reinjection of as much of the stack gas as possible. In response to our questions regarding reinjection of 100% of the air collected at Building 175, and maximum feasible reinjection at this project, Kaiser Engineers conclude that, "on the order of 80% reinjection is the practical limit" for this site.[7] Some caution is appropriate to ensure that reinjected vapors are actually recovered by the SVE and not vented to the atmosphere through diffusion to the surface or horizontal migration off site. Thus we would concur with the injection of an amount of air equal to 70% of extraction volume, already provided for in the current SVE design, except that all of the injection volume must be ***treated air.***

This will require treatment plant recycle piping and control valving to be enlarged to accommodate this volume, since it is currently designed to recycle and reinject a maximum of only 50%. This will result in an additional 40% reduction in daily emissions. Since this can be done with a modest additional cost, this designation of T-BACT will not place an undue financial burden on the applicant.

Under rule 1401, T-BACT means:

> the most stringent emissions limitation or control technique which has been ***achieved in practice***..., or is any other emissions limitation or control technique.... found by the Executive Officer to be ***technologically feasible*** for such class or category of sources, or for a specific source.

Since the applicant has demonstrated this reinjection technique for 5 years at Building 175, it has been achieved in practice. Further, ICF Kaiser agrees that up to 80% reinjection is technologically feasible at the proposed B-1 site. **Hence we conclude that T-BACT for the SVE treatment system is activated carbon adsorption as primary treatment along with reinjection of 70% of the treated air.**

Satisfied Need for Pilot Testing

The use of SVE and carbon adsorption both require site specific pilot testing before designing a large scale facility such as the 6000 cfm system proposed for the B-1 site. We feel that the applicant has adequately accomplished this requirement. Lockheed conducted an extensive 200 cfm demonstration at Building 175 (at the west end of B-1 site) from 1988 to 1993. They also conducted a pilot extraction test at the site of the proposed facility from February through June of 1994. Although we would have preferred more extensive testing of the treatment system with regard to the removal of the minor species present on the site, Lockheed has addressed this by assigning conservative treatment efficiencies.

The Health Risk Assessment (HRA)

The Rule 1401 Health Risk Assessment, dated December, 1994 produced by the applicant was essentially a regulatory compliance document, not a thorough assessment of the risks. We asked that this HRA and the Project Life HRA produced in January, 1995 be upgraded to provide for a sensitivity or "worst case" analysis. Since credibility with the public is a major objective, we felt that the applicant should go a step beyond the requirements of a Rule 1401 HRA. We recommended as follows:

a. Five years of meteorological data should be used as called for by EPA guidelines. This is particularly appropriate due to the prevalence of stagnation in the area and due to potential single year anomalies such as from Santa Anna winds and El Nino effects.

b. Input of worst case emission rate estimates to produce worst case impact analyses for both acute and chronic exposure.

c. An additional table comparing worst case one hour average (output) concentrations with regulatory acute toxicity criteria for each chemical and with odor thresholds.

d. A worst case estimate for the length of time the facility will be in operation, in case it takes longer than 8.5 years to meet the 1500 µg/l PCE soil vapor rernediation goal.

e. Use of the Complex and/or an Intermediate Terrain model to account for the rise of the terrain to the northeast of the site, and comparison of the impacts to the ISCST2 results.

f. Analysis of short term exposures adjacent to the site under stagnant conditions and determination of what, if any, limitations should be placed on the type of redevelopment allowed prior to the completion of remediation.

g. Analysis of any chronic exposures from changes in receptor location due to commercial or residential redevelopment commenced prior to the conclusion of the SVE project.

h. Estimate of total cancers attributable to the facility, even if the number is a very small fraction of one in one million and below the Rule 1401 requirement threshold. To the public this would be a more meaningful number.

The applicant responded only in part to our recommendations. A more detailed explanation for our request and a reply to Montgomery-Watson's response is included in appendix three.

The applicant did provide a non-cancer risk assessment which showed hazard indexes for both chronic and acute effects well below levels of concern. The applicant also demonstrated that levels of emissions were well below odor thresholds for the chemicals of interest. However the model does not treat stagnant conditions which will be discussed later.

The applicant calculated that the cancer risk increases about 2% if the project lasts 13 years instead of 8.5 years. However they assumed that emissions during the extended period would be the same as the low emissions of the 9th year. If the project took 4 more years to achieve the 1500 µg/l PCE soil vapor cleanup goal, the chances are that emissions in the earlier years would be higher than originally estimated. Thus the applicant's assumption is not "worst case."

The applicant calculated that the total excess cancers from the project would be 0.00015, which, if we were talking about a worst case estimate, would constitute essentially zero additional risk to the residents in the vicinity of the site.

Worst Case Emissions Estimates.

The applicant did not document the method by which they selected the influent contaminant concentrations for Table 1 in the Health Risk Assessments, nor did they specify that these were worst case assumptions. They provided only soil vapor test data conducted throughout the site, summaries of which are included in Appendix 4. In particular, they stated that "efficiencies provided in the Base and Mass transient cases are considered by ICF Kaiser to be achievable and sustainable. These efficiencies are not 'assumptions' to which ranges must be applied."[7]

We have several concerns with this position. First, the totals of these emission estimates were presented as 30 day averages which suggested that, at times, these values must be higher than the average.[8] Secondly, minor species like vinyl chloride are not captured in the treatment system to a significant extent, and thus these emissions cannot be "capped" by the control system. Finally, no provisions have been made to measure them at the stack. Accordingly we conducted our own analysis of the available data.

The applicant conducted pilot extraction tests at the B-1 site from February through June of 1994. We felt that this extracted soil vapor data would best represent the range of contaminants that would present to the full scale treatment operation.

In Table 1 of the Health Risk Assessment (HRA), the minor organic species total about 22 µg/l, the question being ... are these worst case assumptions? From the Soil Vapor Extraction Pilot Test Report, we found that out of 231 extracted vapor and rebound tests only 20% of the "other" category (minor species) values exceeded 10 µg/l and only 12% exceeded the 22 µg/l HRA assumption. Rebound tests are those performed on soil vapor after the extraction equipment has been turned off. These concentration values are less diluted by injection air and thus tend to be higher than the values during extraction. From this perspective the HRA estimates appear to represent values near the upper bound of the data range.

As a further check we asked for additional analytical data on the worst case contaminant concentrations measured on February 17 and 18, 1994 during the tests of individual vent, B140-EP01D, where the total of minor species ranged from 119 to 205 µg/l. The contaminants detected are shown in Table 3.

Table 3

Concentration (µg/l)

Minor Species	2-17-94 at vent head	2-17-94 40min. rebound	2-18-94 1 day rebound
Benzene	0.63	ND	0.95
Chlorobenzene	ND	ND	1.77
1,1-DCE*	ND	0.11	0.19
1,2-DCE (total)*	110.71	128.21	191.13
Ethyl Benzene	0.97	ND	0.58
Freon 11	0.69	0.91	1.35
Toluene	0.28	ND	0.17
Vinyl chloride*	1.82	3.43	4.14
Xylene	3.50	ND	3.28
Major Species:			
Perchloroethylene	17.15	3.73	23.37
Trichloroethylene*	33.69	23.36	52.01

* products of biological degradation of PCE.

This profile is highly suggestive of late stage biological transformation of PCE to TCE, DCE isomers, and vinyl chloride, perhaps because of the presence in this case of large amounts of general hydrocarbons providing food to anaerobic organisms. Interestingly, this profile of contaminants is similar to the influent presented to the carbon adsorption unit during pilot tests conducted on April 4, shown in Table 2. It turns out that operators were extracting from the same vent that day, and significant general hydrocarbons were also detected. This data demonstrates the potential for spikes of these biological degradation products.

Overall, DCE isomers appear to be much more important biological byproducts, than vinyl chloride, having been found in as many as 375 of 910 samples throughout the site at concentrations up to 862 µg/l. Vinyl chloride has been detected in only 37 of 910 soil vapor samples, at values as high as 255 µg/l. Neither isomer of 1,2-DCE is a listed carcinogen, and little information has been developed in this regard. 1,1-DCE is listed as a Class C carcinogen with insufficient human data and limited animal data. However, one of the more complete animal tests indicated a cancer potency greater than vinyl chloride. Other tests were inconclusive[9,10].

This analysis, combined with that in the treatment technology section, indicates that the applicant's estimates of emissions of the minor species, if not worst case, are conservative.

Permit Limits

The potential still exists for surprises in emissions of certain of the more important minor species when the full scale facility begins operation. As an added precaution we recommend that the applicant's emissions estimates be used as permit limits with monitoring specified later in this report.

Complex Terrain

The applicant stated that running a complex terrain model is unnecessary because the ISCST2 model predicted risks at the more distant, elevated receptors to be less than 1×10^{-8}. Had the applicant used five years of meteorological data we would agree.

Meteorological data

The applicant declined to run the dispersion model with 5 years of meteorological data, stating that qualified data is not available for any other year but 1981 at the Burbank station. The nearest complete five year set of data for the Los Angeles area is available from LAX airport. Finally they stated, "since 1981 was a bad year in terms of air quality, SCAQMD feels that this is representative of worst case stagnant conditions." We agree that it's better to use data from the Burbank station rather than LAX airport. However one year is still inadequate. We are not in a position to evaluate SCAQMD's judgement in this regard, since, apparently, qualified data has not been collected for other years. Furthermore we do not believe one can predict what a set of data will tell us until it is actually run through the model.

Acute impacts during periods of stagnation

The applicant did not respond to our request for an analysis of short term (acute) impacts during periods of stagnation, acknowledging that such an analysis was not possible with the ISCST2 model, which does not handle wind data of a speed less than one meter per second. Thus, in evaluating stagnation, it makes little difference whether SCQAMD's 1981 data set is worst case or not. While we were not provided such information for the Los Angeles Basin, extended periods of stagnation do occur elsewhere. In the Kent-Auburn valley in Washington State, over 80% of the reported winds during a 9-day stagnation episode were at or below 1 m/s.[11]

In such a case, particularly on hot days where the temperature of the stack gas (100°F) is the same or less than ambient air, the stack gas would rise a short distance straight up, and then begin to diffuse in all directions including straight down, in this case the shortest distance to a receptor. Contaminants of sufficient concentration that are heavier than air will

also begin to fall due to gravity. This situation would be aggravated if new construction at the site has the effect of bottling up these falling emissions. Such a scenario was, in fact, proposed by ICF-Kaiser[12], wherein a shopping mall was to surround the treatment facility, located in the back parking lot.

In this case, PCE is the contaminant of particular interest. The applicant has estimated that total reactive organic gas emissions would never exceed 9.8 pounds per day in terms of a ***30 day average*** measured by two flame ionization detectors (FIDs). The applicant has not estimated the emission rate relevant to the acute, stagnation case, which would be one hour average spikes, when emissions consist entirely of PCE. This would be derived from operational experience with this type of system, ie, the highest possible concentration of PCE that could result from a spike, or breakthrough in the primary adsorber, which passes through before the secondary polisher is brought on line. We assume this number could be larger than 9.8 pounds per day or else the applicant would designate the number in terms of an average of shorter duration.

The analysis of a worst case stagnation episode could then proceed by the assuming no dilution of the aforementioned hourly peak stack emissions of PCE before reaching the nearest receptor near the base of the stack (plant worker or shopper). Such an analysis would not require a dispersion model. We could not recommend that redevelopment construction commence before such an analysis is completed.

Monitoring

NPDES monitoring data for the Building 175 SVE demonstration showed considerable variation in PCE and TCE removal efficiency, (See 1991, 1992 and 1993 figures in Appendix 5). This demonstrates the potential for reduced removal efficiencies from operating variables, and particularly, the need for real time monitoring for total VOC's.

While we feel the applicant's estimates of emissions are conservative, there is still a potential for surprises in the amount of vinyl chloride that might show up as the full scale project comes on line. Accordingly we recommend that the operator monitor weekly for the entire family of chlorinated ethenes, plus benzene, until the actual mix and its variability is verified. Six month's should be adequate in this regard. It is particularly important to verify that vinyl chloride extraction will be completed in the first three years of the project as predicted. Thus, after the first six months, monthly monitoring is recommended. The use of total reactive organic gases as a surrogate parameter is insufficient for this purpose.

Cumulative Impact Analysis

The Draft Cumulative Impact Analysis prepared for the City of Burbank by Douglas Wood and Associates analyzed both reactive organic gases, in relation to tropospheric ozone, and air toxics. In general the reactive organic gases that will be generated by this project are insignificant in comparison to those being generated by point and mobile sources in Burbank and the Los Angeles Basin. These new reactive organic gas emissions are also insignificant compared to the reductions gained when Plant B-1 was closed. However the analysis of cumulative toxic exposures is, in our view, incomplete.

First, the analysis did not address other current and recent past toxic air emission exposures ***to residential receptors near the site***, as documented by the Toxic Release Inventory and the SCAQMD Multiple Air Toxics Exposure Study (MATES). Secondly, the analysis did not address past exposures to these receptors who might have consumed water from municipal services relying on contaminated groundwater from the immediate area. In this respect Lockheed's previous activities could be considered under CEQA guidelines as "related past projects." Though this is a gray area in interpreting CEQA guidelines, it should be done in the interests of full disclosure to the public. Finally, we feel that the author should have presented a detailed review of the MATES ambient air data from the Burbank monitor.

In the 1950's '60's and 70's it was common for manufacturers to dispose of spent solvents in the ground on and off site. After this practice was found to be creating serious groundwater pollution, it was prohibited by state and federal regulators beginning in the late 1970's. Coupled with "land ban" regulations in RCRA Reauthorization in 1984, many manufacturers responded by releasing their waste solvents to the air or by burning them in industrial furnaces. The widespread practice of direct release was exposed to the public by the Superfund Ammendments and Reauthorization Act (right-to-know provisions) that required reporting of certain chemicals, (including solvents) beginning in 1987. The law required that this information be made available to the public and to Local Emergency Planning Agencies. Direct release of solvents to the air is now being phased out by many companies.

While it is beyond the scope of our assignment to reconstruct this pollution process in detail, we feel that Lockheed's pollution of the air, groundwater and soil at the B-1 site is essentially all one episode. Since the soil at the B-1 bomber site is quite permeable, the episode probably began shortly after Lockheed began using the solvents in question in their manufacturing processes.

Past Exposures to Air Toxics in Burbank

The "The Draft Cumulative Impact Analysis" made brief reference to the SCAQMD Multiple Air Toxics Exposure Study (MATES) which showed a maximum individual cancer risk of 1300 in one million at the Burbank monitoring site. The author then compared this figure to the 0.08 per million risk calculated for the duration of the B-1 project and stated that it was, therefore, insignificant. Even if we assume the 0.08 figure is accurate, interpretation of this

data should be tempered by the fact that citizens in Burbank have already been exposed to significant levels of risk from these same chemicals. The question should be asked, how long has this exposure being going on and was the source(s) of this exposure located near the B-1 site receptors in question? In the latter case, these receptors' exposure could have been much higher than the average exposure to Burbank residents denoted by the MATES monitoring data.

To investigate these issues more fully, we obtained a copy of SCAQMD's MATES Working Paper No. 3[13] and their "Hot Spots" analysis[14]. Table 4 shows chemicals emitted to the air by point sources in Burbank in 1984, and we compare these to data from the Toxic Release Inventory (TRI). The two sets of data are very consistent. We know from the TRI facility data that Lockheed emitted the bulk of the PCE, 1,1,1-Trichloroethane (TCA) and Dichloromethane in 1987 and 1988, (See TRI data in Appendix 6). In Appendix 7 is a spatial distribution of 1984 point sources which shows a cluster in the Burbank area.

We can reasonably infer that, at least back to 1984, several large sources were emitting certain toxic organic chemicals to the air in Burbank, and that one of these was Lockheed. Of all the monitoring stations in the Los Angeles Basin, the Burbank station showed the highest ambient concentrations of PCE, TCE and benzene during the May, 1986 - April, 1987 MATES testing period, and the second highest concentrations of 1,1,1-TCA. TCE is considered an area source, derived from a large number of unidentified small sources.

Table 4

Past Point Source Toxic Air Emissions in Burbank (lb/yr)

Toxic Release Inventory

Chemical	MATES(1984)[13]	1987	1988	1989	1990	1991	1992
Dichloromethane	51,512	12,905	1,850	10,147	18,897	9,300	0
PCE	619,866	340,037	559,819	180,500	40,090	21,203	27,517
1,1,1-TCA	361,089	412,761	690,265	120,423	163,655	126,770	84,960
TCE	0	26,789	37,232	0	0	0	0

MATES(1984): Point sources in Burbank, grid 3780-85 northing, 375-80 easting.
TRI: Sum of zip codes 91502,03,04,05,06.

SCAQMD's "Hot Spots" report contained ambient data from both the SCAQMD monitoring network station in Burbank and a special site set up for the MATES study at the Burbank police station, (See Appendix 7). The risks derived from this data are compared to Lockheed's Project Life Health Risk Assessment, for the residential receptors, in Table 5. The SCAQMD data was adjusted to reflect the more recent unit risk factors used in the Lockheed HRA. These increased for TCE and PCE and decreased for benzene.

Table 5
Comparison of B-1 Site Calculated Cancer Risk
to 1986/87 Background Risk in Burbank
(in one million)

	SCAQMD		
Chemical	Network Monitor	Police Sta. Monitor	B-1 calculated(MEIR) Risk
Benzene	462	646	.0007
Carbon Tetrachloride	80	80	.002
PCE	285	163	.051
TCE	9	5	.0091

Note: The SCAQMD assumes 70 years exposure; The B-1 risk assumes 8½ years exposure.

Taken together with the previous table, this data indicates that the citizens of Burbank have already been exposed to a significant amount of risk from point sources of PCE air emissions in the area. The residential receptors in the immediate vicinity of the B-1 site may also have been exposed to a higher risk from PCE than shown in Table 5. **Contrary to the Draft Cumulative Impact Study, one could interpret this data to mean Lockheed should make every reasonable effort to minimize future emissions.** The past exposure to benzene has been almost entirely from mobile sources. There has been little or no known past exposure from vinyl chloride.

Consumption of Contaminated Groundwater

In 1982 the City of Burbank shut down their supply wells down gradient of the Lockheed facilities. It is unclear how long, prior to that time, receptors near the B-1 site may have consumed water contaminated with VOC's. However, certain known and probable mitigating factors would have diffused or restricted contaminants generated from the B-1 site. Known factors were (1) the blending at the central plant prior to distribution, of any contaminated well water, with water from the Metropolitan Water District and water from wells upgradient from sources of contamination, and (2), retrieval of water from deep, cleaner zones in the contaminated well fields. A probable mitigating factor would have been the tendency of Lockheed's own wells to restrict the migration of contaminants off site. See Appendix 8 for more detail, including a map of the Hollywood well field. These wells lie to the west, west southwest and southwest of Building 175 on the far western end of the B-1 site. Down gradient presumably would be to the south and southwest toward the Los Angeles River. Quantifing the impact and extent of exposure due to the contamination of these well fields is a major undertaking, well beyond the scope of the assessment of the proposed SVE system, the HRA, and the Draft Cumulative Impact Study.

Future Projects

SCAQMD staff[15] stated that, normally, an applicant need not analyze possible impacts from future projects in the area, if such projects were not far enough along to generate a reasonable estimate of emissions. This subject came up repeatedly at the public information meetings in January of 1995. We think it would be a good idea for the City to obtain a list, location, and general description of any other Lockheed remediation projects planned for the area.

Conclusions and Recommendations

1. SVE is the best method to remediate the site.

2. T-BACT for treatment of extracted solvents is primary treatment by carbon adsorption followed by reinjection of at least 70% of the treated air.

3. Permit limits, based on one hour average concentration, for each contaminant should be set equal to the highest number listed in Table 4 of the Non Cancer Health Risk Assessment (Feb. '95), ie. higher of emissions listed for either the low efficiency or high efficiency condition. Permit limits, based on a 30 day average, should be set equal to those listed in Table 4 in the Rule 1401 Health Risk Assessment (Dec.'94).

4. Monitoring requirements. In addition to the real time monitoring of total VOCs proposed by the applicant, weekly monitoring for the full spectrum of organic species should be done for the first six months of operation, and monthly thereafter.

5. Overall impacts of the proposed SVE system using GAC and reinjection of 70% of the treated air would be very low, particularly compared to recent air exposures from TRI emissions. It is highly unlikely that these emissions, alone, would produce a single case of cancer or chronic non-cancer toxicity. However, since residents of Burbank have been exposed in other ways from this same pollution episode for many years, and the Health Risk Assessments performed in connection with the permit application are not necessarily worst case analyses, they are entitled to special consideration beyond what might be required under Rule 1401.

The City should not accept from SCAQMD or the applicant a T-BACT determination less stringent that we have recommended, ie, 70% reinjection of treated air. Also the City should insist on the more intensive monitoring regime outlined above and frequent, public reporting of same.

6. The City should not allow ***redevelopment*** construction to begin on the site until the applicant performs the aforementioned analysis of acute impacts under stagnant conditions.

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7. ICF Kaiser letter of Feb. 14, 1995 to Lockheed.

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12. ICF-Kaiser, Letter dated, March 30, 1994, to Lockheed, RE: Soil Vapor Extraction System Technology Design Matrix.

13. SCAQMD, 1987 Air Quality Management Plan Revision Working Paper No. 3, The Magnitude of Ambient Air Toxics Impacts From Existing Sources in the South Coast Air Basin, June, 1987.

14. SCAQMD, Analysis of Ambient Data From Potential Toxics "Hot Spots" in the South Coast Air Basin, Sept. 1988.

15. Telephone conversation with Christine Brenck of the CEQA office.

Appendix 1

VOC Removal Efficiency Data

Building 175 - Two Stage Carbon Adsorption

Date	Chemical	Influent ppb	Effluent ppb	% Removal
8-88	PCE	59,000	150	99.7
10-88	PCE	1,300,000	8,000	99.4
	TCE	930,000	4,000	99.6
	1,1,1-TCA	2,000	1,000	50.0
	Methylene Chloride	2,000	3,000	neg
	1,1-DCE	1,000	[1,000]	NA
12-88	PCE	4,400,000	94,000	97.9
	TCE	[10,000]	48,000	neg
	Benzene	1,000	[1,000]	NA

Note: Not detected - brackets denote limit of detection

Source: [ref. 4]

Appendix 1 (cont.)

EPA Site Demonstration - September 1990
Building 175 - Two Stage Carbon Adsorption

Test No.	PCE % Removal	TCE % Removal
1	99.9	99.5
2	99.9	99.8
3	99.8	99.6
4	98.3	96.1
5.	100	99.7
6	99.5	92.7
7	99.6	91.4
8	99.7	96.1
11	98.5	94.2
12	99.3	96.8
13	99.7	94.2
14	99.9	99.5
15	99.8	99.3
16	98.6	93.3
17	99.4	97.0
18	99.3	95.0
19	99.5	93.7
20	99.5	94.3
21	99.3	97.3

Source: [ref. 5]

Appendix 1 (cont.)

EPA Site Demonstration Continued
GAC Polisher Efficiencies

September 1990

Summary of Total Soil-Gas TCE and PCE Concentrations and Percent Removal Data

Run No.	Primary GAC Bed Conditions			Secondary GAC Bed Conditions			Total
	Influent (ppmv)	Effluent (ppmv)	%Removal	Influent (ppmv)	Effluent (ppmv)	%Removal	%Removed
1	643	0.00	100.	0.00	1.74	neg[a]	99.7
2	968	5.53	99.4	5.53	1.23	77.8	99.9
3	566	3.04	99.5	3.04	1.32	56.6	99.8
4	922	0.938	99.9	0.938	13.0	neg	98.6
5	1270	5.77	99.5	5.77	0.706	87.8	99.9
6	864	1.79	99.8	1.79	6.37	neg	99.3
7	1080	1.35	99.9	1.35	7.95	neg	99.3
8	1210	1.24	99.9	1.24	6.13	neg	99.5
9[b]	--	--	--	--	--	--	--
10[b]	--	--	--	--	--	--	--
11	675	15.6	97.7	15.6	8.25	47.1	98.8
12	588	6.80	98.8	6.80	5.94	12.6	99.0
13	1190	3.80	99.7	3.80	6.24	neg	99.5
14	606	17.4	97.1	17.4	0.884	94.9	99.9
15	730	15.6	97.9	15.6	1.69	89.2	99.8
16	726	0.930	99.9	0.930	14.4	neg	98.0
17	586	6.80	98.8	6.80	5.94	12.6	99.0
18	993	1.33	99.9	1.33	12.6	neg	98.7
19	1030	0.800	99.9	0.800	12.3	neg	98.8
20	1350	1.04	99.9	1.04	11.7	neg	99.1
21	846	1.41	99.8	1.41	8.16	neg	99.0
GAC-A	863	4.11	99.5	4.11	57.1	neg	93.4
GAC-B	389	3.37	99.1	3.37	13.0	neg	96.7

[a] Concentrations were higher in the secondary GAC bed effluent, resulting in negative removal efficiencies

[b] These runs were not performed because the desired conditions could not be attained.

Appendix 1 (cont.)

California Department of Health Services
Full Scale Demonstration of AquaDetox SVE Technology
Building 175 - Two Stage Carbon Adsorption

Date	Chemical	Influent (ppb)	Effluent (ppb)	% Removal
1-90	PCE	441,143	588	99.87
	TCE	8,952	240	97.32
	PCE	290,000	300	99.90
	TCE	7,000	300	95.71
	Minor Species	[3,000]	2,270	neg
2-5-90	PCE	331,710	281	99.92
	TCE	7,900	184	97.67
2-13-90	PCE	295,000	285	99.90
	TCE	7,000	195	97.47
	Minor Species	[2,500]	4,990	neg
2-20-90	PCE	24,000	950	96.04
	TCE	1,500	[50]	96.67
	Minor Species	1,550	4,383	neg
2-26-90	PCE	331,500	286	99.91
	TCE	9,065	176	98.06
	Minor Species	1,660	550	66.87
3-5-90	PCE	333,240	2,694	99.19
	TCE	6,754	42	99.38
	PCE	47,500	77	99.83
	TCE	[2,500]	115	NA
	Minor Species	[2,500]	4,803	neg

Note: Not detected - brackets denote limit of detection

Source: [ref. 6]

Appendix 2

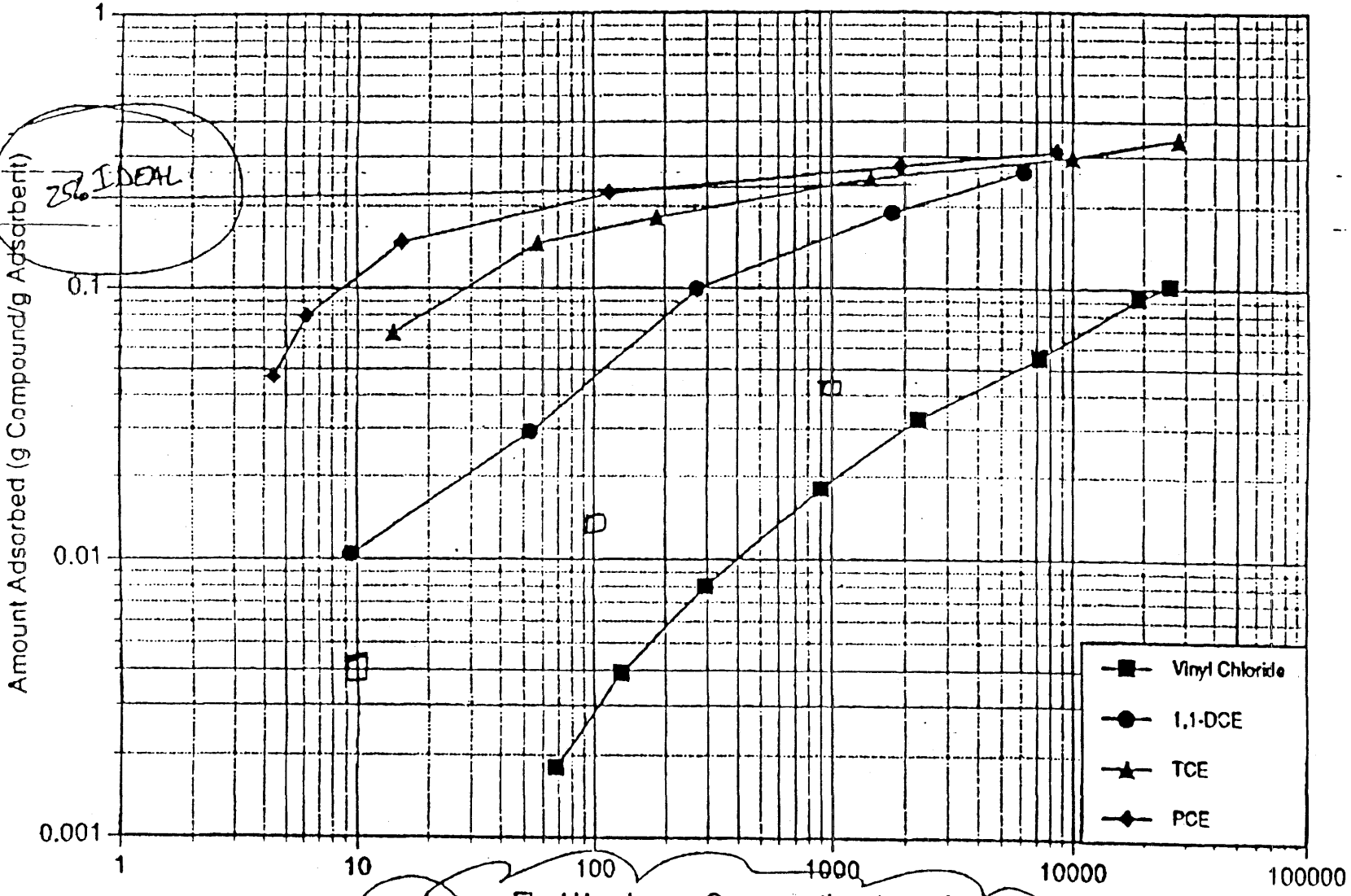
Adsorption Isotherms for Chlorinated Olefins
on
PurSorb™ 200
Purus, Inc.

Note: Predicted is Typically 50% of Ideal

□ = Vinyl Chloride - carbon adsorption @ 25° C at Equilibrium. Actual Typically ⅓ of expected equilibrium

Source: Pollution Engineering, Feb, 1995

Adsorption Isotherms for Chlorinated Olefins on PuriSorb™ 200
30°C, 100% RH



NOTE: PREDICTED IS TYPICALLY 50% OF IDEAL

PADRE™

Purus, Inc.

Appendix 3

Modeling Concerns

The role of The Peartree Group, Inc. in this matter was, in part, to provide a bridge between the concerns expressed by the citizens through the council, on the one hand, and the presenters acting on behalf of Lockheed, on the other, regarding the technologies and risks associated with the project. The Peartree Group, Inc. did not propose an assessment limited to just to a regulatory compliance review. Trust and confidence in the chosen design alternative is founded on the credibility of the regulatory and management processes and their responsiveness to the public's concerns. To this end, we looked to identify the uncertainties and alternatives associated with the project design as well as its intrinsic appropriateness.

This underlying rationale of responding to public concerns was the genesis of many of the questions we posed to the Lockheed engineers. Our questions took a broad approach to the project. Some of the questions were asked to elicit information that may have, after review, been negligible in its impact on design parameters, but is quite important as part of the assurance to the public that the risks associated with the project were fully explored and that the final management and regulatory decisions could be based on fully informed judgments.

Air Toxics Dispersion Modeling

Modeling is an art. The process involves the structuring of mathematical formulas (algorithms), to reflect real world phenomena. These are always approximations and idealizations and are inherently flawed. This results in intrinsic uncertainties in a model's ability to predict outcomes. The uncertainty is compounded by the errors and uncertainties in the external data that the models manipulate to produce their predictions. These include measurement errors, sampling errors, missing data, etc. Therefore, even the best models cannot predict accurately. Only through an analysis of uncertainty can a "best estimate" give a decision maker a basis for a rational judgment on the value of a model's predicted outcomes.

The use of ISC2ST as an approved regulatory model is postulated upon establishing a common starting point for regulatory procedures and cross-site comparisons, **not** because it is superior in all cases to other models or because it accurately predicts future outcomes. It, too, suffers from the uncertainties of all models. It is because of this that other models are considered acceptable on a case by case basis. This includes the WYNDvalley model for air stagnations and CTDMPLUS model for complex terrains.

The Gaussian models (such as ISC2ST) break down at wind speeds of less that one meter per second. The Eulerian models, such as WYNDvalley, are more structurally appropriate for those stagnation wind velocity regimes. The reference (Harrison) used by Montgomery Watson, compared a Gaussian model, RAM (similar to ISC2ST) with WYNDvalley at a site in Washington state. The parameter of concern here was PM_{10}. The authors used various criteria in comparing model predictions and found that for many of the comparisons "WYNDvalley scores significantly better than RAM". Since the purpose of the WYNDvalley model is to include the effects of diffusion, its predictive ability is likely to be better in modeling VOCs than particulates. At any rate, Peartree's point was not that WYNDvalley is

necessarily to be depended on as superior, but that given the significance of calms for potential health impacts, it is important to use robust methods that consider the range of possible outcomes.

The Peartree Group, Inc. recommendation for further study was **not** solely for purposes of meeting the minimum standards for obtaining a SCAQMD permit, but rather to assure the public that worst case conditions were looked at and that the council and city had used the best information available as the basis for their public policy decisions. Running WYNDvalley and the complex terrain model would serve that end. Similarly, the request to use five years data rather than one year, would provide a more extensive basis for the model's predictions because it would capture a larger spectrum of weather variations that occur at the site. This is also the rationale used by EPA in requiring five years of off-site data if at least one year of on-site data is not available, as is the case at the Lockheed site.

In addition, since there is concern for non-carcinogenic health effects, it is appropriate to look at maximum short term exposures that would occur in the immediate vicinity of the source. In particular, expressed plans for the site include construction of a shopping mall that would act as a collection and concentration basin for contaminants during wind calms or stagnations. This would exacerbate the exposure levels. The parking and auto starts at a mall would also produce VOC emissions that would co-concentrate with the SVE system emissions, compounding potential health risks.

We continue to believe that the information that could be obtained from running these models with appropriate meteorological and emissions data sets (worst case) would describe the critical extreme conditions that the project may present. If, under these extremes, the risks are acceptable, than a decision to seek additional remediation would not be necessary. On the other hand, if these extremes represent an unacceptable risk, then additional alternatives (eg: land use controls, emissions trade offs, operating condition or design restrictions in the permits) could be considered. The city must determine if this information is of sufficient merit to warrant pursuing the matter with Lockheed and SCAQMD.

Quotations from various EPA guidance on Air Quality Modeling

Application of ISC

The ISC is general enough to apply to a broad category of toxic pollutant releases, but Supplement B will only indicate that ISC has been selected for some specific regulatory programs; it will not be generically recommended for air pathway analyses... Nevertheless, where Gaussian models are applied to conventional source types for risk assessment, there is little basis for concern about overestimates; these models have consistently demonstrated a tendency to greater underestimates with longer averaging times.[3]

Choice of Meteorological period

If the air quality analyses are conducted using the period of meteorological input data recommended in Section 9.3.1.2 (e.g., 5 years of NWS data or 1 year of site-specific data), then the design concentration based on the highest, second-highest short term concentration

or long term average, whichever is controlling, should be used to determine emission limitations to assess compliance with the NAAQS and to determine PSD increments.[2]

When sufficient and representative data exist for less than a 5-year period from a nearby NWS site, or when on-site data have been collected for less than a full continuous year, or when it has been determined that the on-site data may not be temporally representative, then the highest concentration estimate should be considered the design value. This is because the length of the data record may be too short to assure that the conditions producing worst-case estimates have been adequately sampled. The highest value is then a surrogate for the concentration that is not to be exceeded more than once per year (the wording of the deterministic standards). Also, the highest concentration should be used whenever selected worst-case conditions are input to a screening technique. This specifically applies to the use of techniques such as outlined in "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised". Specific guidance for CO may be found in the "Guideline for Modeling Carbon Monoxide from Roadway Intersections".[2]

EXAMPLE AIR QUALITY ANALYSIS CHECKLIST[2]

4. *Air quality monitoring data:*

   Summary of existing observations for latest five years (including any additional quality assured measured data which can be obtained from any state or local agency or company)[1].....

   Comparison with standards

   Discussion of background due to uninventoried sources and contributions from outside the inventoried area and description of the method used for determination of background (should be consistent with the Guideline on Air Quality Models)

5. *Meteorological data:*

   Five consecutive years of the most recent representative sequential hourly National Weather Service (NWS) data, or one or more years of hourly sequential on-site data

   Discussion of meteorological conditions observed (as applied or modified for the site-specific area, i.e., identify possible variations due to difference between the monitoring site and the specific site of the source)

Stagnations

Stagnation conditions are characterized by calm or very low wind speeds, and variable wind directions. These stagnant meteorological conditions may persist for several hours to several days. During stagnation conditions, the dispersion of air pollutants, especially those from

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[1] *See footnote 2 of this checklist.*

low-level emissions sources, tends to be minimized, potentially leading to relatively high ground-level concentrations.[2]

When stagnation periods such as these are found to occur, they should be addressed in the air quality modeling analysis. WYNDvalley, listed in Appendix B, may be applied on a case-by-case basis for stagnation periods of 24 hours or longer in valley-type situations...[2]

Application of Models

There is no one model capable of properly addressing all conceivable situations even within a broad category such as point sources. Meteorological phenomena associated with threats to air quality standards are rarely amenable to a single mathematical treatment; thus, case-by-case analysis and judgment are frequently required.[1]

The model that most accurately estimates concentrations in the area of interest is always sought. However, it is clear from the needs expressed by the States and EPA Regional Offices, by many industries and trade associations, and also by the deliberations of Congress, that ***consistency in the selection and application of models and data bases should also be sought, even in case-by-case analyses. Consistency ensures that air quality control agencies and the general public have a common basis for estimating pollutant concentrations, assessing control strategies and specifying emission limits. Such consistency is not, however, promoted at the expense of model and data base accuracy.*** *This guide provides a consistent basis for selection of the most accurate models and data bases for use in air quality assessments.[1]*

Suitability of Models

The extent to which a specific air quality model is suitable for the evaluation of source impact depends upon several factors. These include: (1) the meteorological and topographic complexities of the area; (2) the level of detail and accuracy needed for the analysis; (3) the technical competence of those undertaking such simulation modeling; (4) the resources available; and (5) the detail and accuracy of the data base, i.e., emissions inventory, meteorological data, and air quality data. Appropriate data should be available before any attempt is made to apply a model. A model that requires detailed, precise, input data should not be used when such data are unavailable. However, assuming the data are adequate, ***the greater the detail with which a model considers the spatial and temporal variations in emissions and meteorological conditions, the greater the ability to evaluate the source impact and to distinguish the effects of various control strategies.****[1]*

Air quality models have been applied with the most accuracy or the least degree of uncertainty to simulations of long term averages in areas with relatively simple topography. Areas subject to major topographic influences experience meteorological complexities that are extremely difficult to simulate. Although models are available for such circumstances, they are frequently site specific and resource intensive. In the absence of a model capable of simulating such complexities, only a preliminary approximation may be feasible until such time as better models and data bases become available.[1]

Models are highly specialized tools. Competent and experienced personnel are an essential prerequisite to the successful application of simulation models. The need for specialists is critical when the more sophisticated models are used or the area being investigated has complicated meteorological or topographic features. ***A model applied improperly, or with inappropriately chosen data, can lead to serious misjudgments regarding the source impact or the effectiveness of a control strategy.****[1]*

The resource demands generated by use of air quality models vary widely depending on the specific application. The resources required depend on the nature of the model and its complexity, the detail of the data base, the difficulty of the application, and the amount and level of expertise required. The costs of manpower and computational facilities may also be important factors in the selection and use of a model for a specific analysis. However, it should be recognized that under some sets of physical circumstances and accuracy requirements, no present model may be appropriate. Thus, consideration of these factors should not lead to selection of an inappropriate model.[1]

Stagnant conditions, including extended periods of calms, often produce high concentrations over wide areas for relatively long averaging periods. The standard short term Gaussian models are often not applicable to such situations. When stagnation conditions are of concern, other modeling techniques should be considered on a case-by-case basis.*[1]*

ACCURACY AND UNCERTAINTY OF MODELS

Discussion

Increasing reliance has been placed on concentration estimates from models as the primary basis for regulatory decisions concerning source permits and emission control requirements. In many situations, such as review of a proposed source, no practical alternative exists. Therefore, there is an obvious need to know how accurate models really are and how any uncertainty in the estimates affects regulatory decisions. EPA recognizes the need for incorporating such information and has sponsored workshops on model accuracy, the possible ways to quantify accuracy, and on considerations in the incorporation of model accuracy and uncertainty in the regulatory process. The Second (EPA) Conference on Air Quality Modeling, August 1982,[75] was devoted to that subject.[1]

Overview of Model Uncertainty

Dispersion models generally attempt to estimate concentrations at specific sites that really represent an ensemble average of numerous repetitions of the same event. The event is characterized by measured or "known" conditions that are input to the models, e.g., wind speed, mixed layer height, surface heat flux, emission characteristics, etc. However, in addition to the known conditions, there are unmeasured or unknown variations in the conditions of this event, e.g., unresolved details of the atmospheric flow such as the turbulent velocity field. These unknown conditions, may vary among repetitions of the event. As a

result, deviations in observed concentrations from their ensemble average, and from the concentrations estimated by the model, are likely to occur even though the known conditions are fixed. Even with a perfect model that predicts the correct ensemble average, there are likely to be deviations from the observed concentrations in individual repetitions of the event, due to variations in the unknown conditions. The statistics of these concentration residuals are termed "inherent" uncertainty. ***Available evidence suggests that this source of uncertainty alone may be responsible for a typical range of variation in concentrations of as much as ±50 percent.****[1]*

Moreover, there is "reducible" uncertainty associated with the model and its input conditions; neither models nor data bases are perfect. Reducible uncertainties are caused by: (l) uncertainties in the input values of the known conditions--emission characteristics and meteorological data; (2) errors in the measured concentrations which are used to compute the concentration residuals; and (3) inadequate model physics and formulation. The "reducible" uncertainties can be minimized through better (more accurate and more representative) measurements and better model physics.[1]

To use the terminology correctly, reference to model accuracy should be limited to that portion of reducible uncertainty which deals with the physics and the formulation of the model. The accuracy of the model is normally determined by an evaluation procedure which involves the comparison of model concentration estimates with measured air quality data. The statement of accuracy is based on statistical tests or performance measures such as bias, noise, correlation, etc. However, information that allows a distinction between contributions of the various elements of inherent and reducible uncertainty is only now beginning to emerge. As a result most discussions of the accuracy of models make no quantitative distinction between (1) limitations of the model versus (2) limitations of the data base and of knowledge concerning atmospheric variability. The reader should be aware that statements on model accuracy and uncertainty may imply the need for improvements in model performance that even the "perfect" model could not satisfy.[1]

Studies of Model Accuracy

A number of studies have been conducted to examine model accuracy, particularly with respect to the reliability of short-term concentrations required for ambient standard and increment evaluations. The results of these studies are not surprising. Basically, they confirm what leading atmospheric scientists have said for some time: (l) models are more reliable for estimating longer time-averaged concentrations than for estimating short-term concentrations at specific locations; and (2) the models are reasonably reliable in estimating the magnitude of highest concentrations occurring sometime, somewhere within an area. For example, ***errors in highest estimated concentrations of ± 10 to 40 percent are found to be typical, i.e., certainly well within the often quoted factor-of-two accuracy that has long been recognized for these models.*** *However, estimates of concentrations that occur at a specific time and site, are poorly correlated with actually observed concentrations and are much less reliable.[1]*

As noted above, poor correlation's between paired concentrations at fixed stations may be due to "reducible" uncertainties in knowledge of the precise plume location and to unquantified inherent uncertainties. For example, Pasquill estimates that, apart from data

input errors, maximum ground-level concentrations at a given hour for a point source in flat terrain could be in error by 50 percent due to these uncertainties. Uncertainty of five to 10 degrees in the measured wind direction, which transports the plume, can result in concentration errors of 20 to 70 percent for a particular time and location, depending on stability and station location. Such uncertainties do not indicate that an estimated concentration does not occur, only that the precise time and locations are in doubt.[1]

Use of Uncertainty in Decision-Making

The accuracy of model estimates varies with the model used, the type of application, and site-specific characteristics. Thus, it is desirable to quantify the accuracy or uncertainty associated with concentration estimates used in decision-making. *Communications between modelers and decision-makers must be fostered and further developed. Communications concerning concentration estimates currently exist in most cases, but the communications dealing with the accuracy of models and its meaning to the decision-maker are limited by the lack of a technical basis for quantifying and directly including uncertainty in decisions. Procedures for quantifying and interpreting uncertainty in the practical application of such concepts are only beginning to evolve; much study is still required.[1]*

In all applications of models an effort is encouraged to identify the reliability of the model estimates for that particular area and to determine the magnitude and sources of error associated with the use of the model. *The analyst is responsible for recognizing and quantifying limitations in the accuracy, precision and sensitivity of the procedure. Information that might be useful to the decision-maker in recognizing the seriousness of potential air quality violations includes such model accuracy estimates as accuracy of peak predictions, bias, noise, correlation, frequency distribution, spatial extent of high concentration, etc. Both space/time pairing of estimates and measurements and unpaired comparisons are recommended. Emphasis should be on the highest concentrations and the averaging times of the standards or increments of concern. Where possible, confidence intervals about the statistical values should be provided. However, while such information can be provided by the modeler to the decision-maker, it is unclear how this information should be used to make an air pollution control decision. Given a range of possible outcomes, it is easiest and tends to ensure consistency if the decision-maker confines his judgment to use of the "best estimate" provided by the modeler (i.e., the design concentration estimated by a model recommended in this guideline or an alternate model of known accuracy). This is an indication of the practical limitations imposed by current abilities of the technical community.[1]*

To improve the basis for decision-making, EPA has developed and is continuing to study procedures for determining the accuracy of models, quantifying the uncertainty, and expressing confidence levels in decisions that are made concerning emissions controls. However, work in this area involves "breaking new ground" with slow and sporadic progress likely. As a result, it may be necessary to continue using the "best estimate" until sufficient technical progress has been made to meaningfully implement such concepts dealing with uncertainty.[1]

Sources and References:

1- EPA-450/2-78-027R, GUIDELINE ON AIR QUALITY MODELS, (REVISED), (Appendix W of 40 CFR Part 51), July 1986, U.S. ENVIRONMENTAL PROTECTION AGENCY, Office of Air and Radiation, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711

2- SUPPLEMENT B TO THE GUIDELINE ON AIR QUALITY MODELS (REVISED), (Appendix W of 40 CFR Part 51), FEBRUARY 1993

3- SUMMARY OF PUBLIC COMMENTS AND EPA RESPONSES ON THE FIFTH CONFERENCE ON AIR QUALITY MODELING: MARCH 1991, February 1993

Harrison, H., C. Bowman, G. Pade, R. Wilson, 1990. Air quality during stagnations: a comparison of RAM and WYNDvalley with PM-10 measurements at five sites, *Journal Air and Waste Management Association* 40:47-52.

Appendix 4

Volatile Organic Compound Data Provided to B-1 Pilot Plant Treatment System Vendors

Source: "Volatile Organic Compound Remediation Feasibility Study Commercial Redevelopment Program for Plant B-1," May 13,1994

Prepared for:

Lockheed Environmental Systems & Technologies Company
Burbank, California

Prepared by:

ICF Kaiser Engineers
1800 Harrison Street
Oakland, California 94612

TABLE 1

Compound	Frequency of Detection	Concentrations (ug/l) Startup	Intermediate	Low
PCE	903/910	11,900	3,500	350
TCE	889/910	5,100	1,500	150
Vinyl Chloride	37/910	95	28	3
Methylene Chloride	50/910	6	2	0.5
Benzene	60/910	8	2	0.5
Chlorofrom	375/910	7	2	0.5
1,2-Dichloroethane	8/910	2	1	0.5
Carbon Tetrachloride	152/910	6	2	0.5

TABLE 2
OTHER COMPOUNDS DETECTED IN SOIL GAS

Compound	Frequency of Detection	Concentrations (ug/l) Maximum	Average
Freon-113	66/910	33	8
Freon-11	611/910	212	3
Toluene	49/910	11	1
Ethyl Benzene	13/910	24	11
Xylenes (total)	15/910	50	13
Acetone	22/910	685	23
1,1,1-Trichloroethane	528/910	48	2
1,1,-Dichloroethene	375/910	10	1.4
1,2-Dichloroethene (total)	269/910	862	31
1,1,2-Trichloroethane	5/910	3	1.6
1,1-Dichloroethane	5/910	0.3	0.2
1,2-Dichloropropane	4/910	0.4	0.3
Bromodichloromethane	4/910	0.4	0.3
4-Methyl-2-Pentanone	3/910	69	26.0
2-Butanone	2/910	290	168
2-Hexanone	1/910	1	1
Chlorobenzene	1/910	0.4	0.4
Dibromochloromethane	1/910	11	11

NPDES PERMIT NO. CA0060534 (SITE 005)
TABULAR SUMMARY OF 1991 VES MONITORING DATA

Sample Date	Influent Concentration (ppmv) PCE	TCE	TPH	Effluent Concentration (ppmv) PCE	TCE	TPH
04/30	571.59	59.47	638.08	1.12	0.45	3.09
05/20	462.68	106.10	578.34	35.36	29.32	68.16
06/03	462.56	22.83	507.60	125.78	97.47	236.25
06/10				43.19	18.99	65.84
07/11	253.60	12.22	290.79	5.63	3.70	10.43
08/05	234.07	10.15	264.82	5.90	4.14	11.98
09/03	238.13	5.37	258.49	1.90	0.41	4.11
10/01	1.40	0.33	3.54	203.73	5.25	222.57
11/04	196.23	6.30	214.56	23.33	16.08	42.84
11/18	128.81	5.21	143.68	2.04	0.62	4.49
12/03	88.34	2.36	100.79	1.30	0.35	3.27

Footnotes:

– not sampled
ppmv – parts per million by volume
TPH – total petroleum hydrocarbons

NPDES PERMIT NO. CA0060534 (SITE 005)
TABULAR SUMMARY OF 1992 VES MONITORING DATA

Sample Date	Influent Concentration (ppmv) PCE	TCE	THC	Effluent Concentration (ppmv) PCE		TCE		THC
01/06	82.15	0.97	84.82	13.67	83.3%	75.25	NEG	93.13
02/04	213.53	17.54	245.82	2.23	99.0	0.43	97.5%	4.56
03/09	331.38	19.46	364.35	0.66	99.8	0.04	99.8	2.59
03/26	69.59	0.97	74.27	4.13	94.1	0.68	29.9	6.82
04/06	540.83	42.05	590.14	9.37	98.3	0.69	98.4	13.68
05/04	85.85	2.42	91.95	1.95	97.7	0.48	80.2	4.19
05/28	67.60	1.59	72.60	1.53	97.7	0.42	73.6	4.06
06/11	231.85	9.40	268.30	1.67	99.3	0.39	95.9	4.09
06/25	9.04	2.35	95.49	1.51	83.3	0.33	86.0	3.77

Footnotes:

ppmv – parts per million by volume
THC – total hydrocarbons

TABLE 2-1
COMPOUNDS DETECTED IN SOIL VAPOR

Compound	Frequency of Detection	Concentrations (µg/L)	
		Maximum	Average
PCE	903/910	38,240	2,248
TCE	889/910	44,430	1,170
Vinyl Chloride	37/910	255	22.7
Methylene Chloride	50/910	6	0.7
Benzene	60/910	8	1
Chloroform	375/910	7	1
1,2-Dichloroethane	8/910	2	0.6
Carbon Tetrachloride	152/910	6	1
Freon-113	66/910	33	8
Freon-11	611/910	212	2.3
Toluene	49/910	11	1.2
Ethyl Benzene	13/910	24	11
Xylenes (total	15/910	50	13.5
Acetone	22/910	685	73.1
1,1,1-Trichloroethane	528/910	48	1.7
1,1-Dichloroethene	375/910	10	1.4
1,2-Dichloroethene (total)	269/910	862	30.8
1,1,2-Trichloroethane	5/910	3	1.6
1,1-Dichloroethane	5/910	0.3	0.2
1,2-Dichloropropane	4/910	0.4	0.3
Bromodichloromethane	4/910	0.4	0.3
4-Methyl-2-Pentanone	3/910	69	26.2
2-Butanone	2/910	290	168
2-Hexanone	1/910	1.1	1.1
Chlorobenzene	1/910	0.4	0.4
Dibromochloromethane	1/910	11	11

Appendix 5

NPDES Water Discharge Monitoring Data 1991-93

Source: Lockheed Environmental Systems & Technology Company
Burbank, California

NPDES PERMIT NO. CA0060534 (SITE 005)
TABULAR SUMMARY OF 1991 VES MONITORING DATA

Sample Date	Influent Concentration (ppmv) PCE	TCE	TPH	Effluent Concentration (ppmv) PCE	TCE	TPH
04/30	571.59	59.47	638.08	1.12	0.45	3.09
05/20	462.68	106.10	578.34	35.36	29.32	68.16
06/03	462.56	22.83	507.60	125.78	97.47	236.25
06/10				43.19	18.99	65.84
07/11	253.60	12.22	290.79	5.63	3.70	10.43
08/05	234.07	10.15	264.82	5.90	4.14	11.98
09/03	238.13	5.37	258.49	1.90	0.41	4.11
10/01	1.40	0.33	3.54	203.73	5.25	222.57
11/04	196.23	6.30	214.56	23.33	16.08	42.84
11/18	128.81	5.21	143.68	2.04	0.62	4.49
12/03	88.34	2.36	100.79	1.30	0.35	3.27

Footnotes:

– not sampled
ppmv – parts per million by volume
TPH – total petroleum hydrocarbons

Significant VOC Emissions 1987-92

Pounds Reported by Industry
in Zip Codes
91502, 91503, 91504, 91504, and 91506

Chemical Name	1987	1988	1989	1990	1991	1992
1,1,1,-Trichloroethane	412,761	690,265	120,423	163,655	126,770	84,960
Dichloromethane	12,905	1,850	10,147	18,897	9,300	0
Freon 113	79,900	6,560	53,200	47,736	40,885	19,100
Methyl Ethyl Ketone	67,900	87,00	27,038	0	0	0
Methyl Isobutyl Ketone	62,719	22,400	33,500	0	0	0
Tetrachloroethylene (PCE)	340,037	559,819	180,500	40,090	21,203	27,517
Toluene	31,679	5,700	8,950	0	0	0
Trichloroethylene (TCE)	26,789	37,232	0	0	0	0
Hydrochloric Acid	500	750	32,250	760	250	250
Acetone	0	7,600	0	0	18,000	8,000
Methanol	0	10,100	0	0	0	**0**

Source: The Right To Know (RTK)net - EPA

Zip	91502					
Sum of TRI Pounds	Year					
Chemical Name (truncated)	1987	1988	1989	1990	1991	1992
1,1,1-TRICHLOROETHANE	78440	96077	21358	58385	45000	8800
ACETONE	0	0	0	0	8000	8000
ALUMINUM OXIDE (FIBROUS FORM)	0	0	0	0	0	0
AMMONIA	0	0	0	25000	14000	16000
AMMONIUM NITRATE (SOLUTION)	0	0	0	10	0	0
CADMIUM	0	0	0	10	0	0
CHLORINE	0	0	0	255	0	0
CHLOROACETIC ACID	0	0	0	0	0	0
CHROMIUM	0	0	0	10	0	0
COPPER	0	0	0	10	0	0
DICHLOROMETHANE	0	0	0	7036	0	0
Zip	91503					
Sum of TRI Pounds	Year					
Chemical Name (truncated)	1987	1988	1989	1990	1991	1992
1,1,1-TRICHLOROETHANE	0	0	0	10000	0	7848
BARIUM COMPOUNDS	0	0	0	0	0	150
CHROMIUM	0	0	0	0	0	0
COBALT	0	0	0	0	0	0
COPPER	0	0	0	0	0	0
HYDROCHLORIC ACID	500	500	0	500	250	250
LEAD	0	0	0	0	0	0
MANGANESE	0	0	0	0	0	0
METHYLENEBIS(PHENYLISOCYANATE)	0	750	750	0	0	0
NICKEL	0	0	0	0	0	0
Zip	91504					
Sum of TRI Pounds	Year					
Chemical Name (truncated)	1987	1988	1989	1990	1991	1992
1,1,1-TRICHLOROETHANE	252685	504827	27200	36800	28517	23100
ACETONE	0	7600	0	0	10000	0
CADMIUM COMPOUNDS	0	0	0	0	0	0
CHROMIUM	0	1300	0	5	0	0
DICHLOROMETHANE	12905	1850	10147	11861	0	0
FREON 113	79900	6560	53200	40700	40885	19100
ISOPROPYL ALCOHOL (MANUFACTURI	0	37000	0	0	0	0
LEAD	0	0	0	0	5	0
LEAD COMPOUNDS	0	0	250	0	0	0
METHANOL	0	10100	0	0	0	0
METHYL ETHYL KETONE	67900	87000	27038	0	0	0
METHYL ISOBUTYL KETONE	62719	22400	33500	0	0	0
N-BUTYL ALCOHOL	0	28200	0	0	0	0
NICKEL	0	0	750	250	0	0
NITRIC ACID	0	750	0	0	5	5
PHOSPHORIC ACID	0	0	0	0	0	0
SODIUM HYDROXIDE (SOLUTION)	0	0	0	0	0	0
SULFURIC ACID	0	0	0	0	0	0
TETRACHLOROETHYLENE	303000	525250	130590	250	8503	18228
TOLUENE	31679	5700	8950	0	0	0
TRICHLOROETHYLENE	26789	36482	0	0	0	0
ZINC (FUME OR DUST)	0	0	0	500	0	0
ZINC COMPOUNDS	0	0	250	0	0	0
Zip	91505					
Sum of TRI Pounds	Year					
Chemical Name (truncated)	1987	1988	1989	1990	1991	1992
1,1,1-TRICHLOROETHANE	81636	89361	38264	25297	37624	19259
ALUMINUM OXIDE	0	0	0	0	0	0
DICHLOROMETHANE	0	0	0	0	9300	0
SODIUM SULFATE (SOLUTION)	0	0	0	0	0	0
SULFURIC ACID	0	0	0	0	0	0
TETRACHLOROETHYLENE	23821	20007	36710	39840	12700	9289

Zip	91506					
Sum of TRI Pounds	Year					
Chemical Name (truncated)	1987	1988	1989	1990	1991	1992
1,1,1-TRICHLOROETHANE	0	0	33601	33173	15629	25953
DICHLOROMETHANE	0	0	0	0	0	0
HYDROCHLORIC ACID	0	0	0	0	0	0
NICKEL	0	0	250	5	5	5
NITRIC ACID	250	24	0	10	5	5
PHOSPHORIC ACID	0	0	0	0	0	0
SODIUM HYDROXIDE (SOLUTION)	1000	1157	0	0	0	0
SULFURIC ACID	500	250	250	0	0	0
TETRACHLOROETHYLENE	1103	1362	0	0	0	0
TRICHLOROETHYLENE	0	750	0	0	0	0
Zip	(All)					
Sum of TRI Pounds	Year					
Chemical Name (truncated)	1987	1988	1989	1990	1991	1992
1,1,1-TRICHLOROETHANE	412761	690265	120423	163655	126770	84960
ACETONE	0	7600	0	0	18000	8000
ALUMINUM OXIDE	0	0	0	0	0	0
ALUMINUM OXIDE (FIBROUS FORM)	0	0	0	0	0	0
AMMONIA	0	0	0	25000	14000	16000
AMMONIUM NITRATE (SOLUTION)	0	0	0	10	0	0
BARIUM COMPOUNDS	0	0	0	0	0	150
CADMIUM	0	0	0	10	0	0
CADMIUM COMPOUNDS	0	0	0	0	0	0
CHLORINE	0	0	0	255	0	0
CHLOROACETIC ACID	0	0	0	0	0	0
CHROMIUM	0	1300	0	15	0	0
COBALT	0	0	0	0	0	0
COPPER	0	0	0	10	0	0
DICHLOROMETHANE	12905	1850	10147	18897	9300	0
FREON 113	79900	6560	53200	47736	40885	19100
HYDROCHLORIC ACID	500	750	32250	760	250	250
ISOPROPYL ALCOHOL (MANUFACTURI	0	37000	0	0	0	0
LEAD	0	0	0	0	5	0
LEAD COMPOUNDS	0	0	250	0	0	0
MANGANESE	0	0	0	10	0	0
METHANOL	0	10100	0	0	0	0
METHYL ETHYL KETONE	67900	87000	27038	0	0	0
METHYL ISOBUTYL KETONE	62719	22400	33500	0	0	0
METHYLENEBIS(PHENYLISOCYANATE)	0	750	750	0	0	0
N-BUTYL ALCOHOL	0	28200	0	0	0	0
NICKEL	0	0	1000	265	5	5
NITRIC ACID	250	774	0	20	10	10
PHOSPHORIC ACID	0	0	0	0	0	0
SODIUM HYDROXIDE (SOLUTION)	1000	1657	0	0	0	0
SODIUM SULFATE (SOLUTION)	0	0	0	0	0	0
SULFURIC ACID	500	750	750	255	1000	1000
TETRACHLOROETHYLENE	340037	559819	180500	40090	21203	27517
TOLUENE	31679	5700	8950	0	0	0
TRICHLOROETHYLENE	26789	37232	0	0	0	0
ZINC (FUME OR DUST)	0	0	0	500	0	0
ZINC COMPOUNDS	0	0	250	0	0	0

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Air TRI Data in Burbank
Selected Chemicals

Year	(All)											
Sum of	TRI Pounds		Chemical Name (truncated)									
Zip	Facility Name	SIC	1,1,1-TRICHLOROETHANE	ACETONE	CHLORINE	DICHLOROMETHANE	FREON 113	METHYL ETHYL KETONE	METHYL ISOBUTYL KETONE	TETRACHLOROETHYLENE	TOLUENE	TRICHLOROETHYLENE
91502	ALL METALS PROCESSING CO. INC.	3471	8005	0	255	0	0	0	0	0	0	0
	ALL METALS PROCESSING CO. INC.	Total	8005	0	255	0	0	0	0	0	0	0
	BURBANK STEEL TREATING INC.	3398	37000	0	0	0	0	0	0	0	0	0
		3399	31000	0	0	0	0	0	0	0	0	0
	BURBANK STEEL TREATING INC.	Total	68000	0	0	0	0	0	0	0	0	0
	INTERNATIONAL ELECTRONIC	3674	0	0	0	0	0	0	0	38513	0	0
	INTERNATIONAL ELECTRONIC	Total	0	0	0	0	0	0	0	38513	0	0
	ITT AEROSPACE CONTROLS	3491	0	0	0	7036	7036	0	0	0	0	0
	ITT AEROSPACE CONTROLS	Total	0	0	0	7036	7036	0	0	0	0	0
	K & L ANODIZING CORP.	3471	22800	16000	0	0	0	0	0	0	0	0
	K & L ANODIZING CORP.	Total	22800	16000	0	0	0	0	0	0	0	0
	ZERO CORP.	3443	36738	0	0	0	0	0	0	0	0	0
	ZERO CORP.	Total	36738	0	0	0	0	0	0	0	0	0
	ZERO-WEST	3443	172517	0	0	0	0	0	0	0	0	0
	ZERO-WEST	Total	172517	0	0	0	0	0	0	0	0	0
91502	Total		308060	16000	255	7036	7036	0	0	38513	0	0
91503	AVIBANK MFG. INC.	3452	17848	0	0	0	0	0	0	0	0	0
	AVIBANK MFG. INC.	Total	17848	0	0	0	0	0	0	0	0	0
91503	Total		17848	0	0	0	0	0	0	0	0	0
91504	CRANE CO.	3728	115617	0	0	0	153885	0	0	0	0	0
	CRANE CO.	Total	115617	0	0	0	153885	0	0	0	0	0
	HYDRO-AIRE DIV.	3728	90000	0	0	0	79900	0	0	0	0	0
	HYDRO-AIRE DIV.	Total	90000	0	0	0	79900	0	0	0	0	0
	LOCKHEED AERONAUTICAL SYSTEMS	3830	547331	7600	0	14755	0	155218	118619	867640	46329	0
	LOCKHEED AERONAUTICAL SYSTEMS	Total	547331	7600	0	14755	0	155218	118619	867640	46329	0
	MEL BERNIE & CO.	3471	9870	0	0	22008	6560	0	0	0	0	0
	MEL BERNIE & CO.	Total	9870	0	0	22008	6560	0	0	0	0	0
	NOVACAP	3675	26496	0	0	0	0	0	0	0	0	63271
	NOVACAP	Total	26496	0	0	0	0	0	0	0	0	63271
	STAINLESS STEEL PRODS. INC.	3728	0	10000	0	0	0	0	0	43181	0	0
	STAINLESS STEEL PRODS. INC.	Total	0	10000	0	0	0	0	0	43181	0	0
	STAINLESS STEEL PRODUCTS INC.	3728	0	0	0	0	0	0	0	75000	0	0
	STAINLESS STEEL PRODUCTS INC.	Total	0	0	0	0	0	0	0	75000	0	0

	SURFACE FINISHING	3479	37482	0	0	0	0	6938	0	0	0	0
	SURFACE FINISHING	Total	37482	0	0	0	0	6938	0	0	0	0
	SURFACE FINISHING INC.	3479	46333	0	0	0	0	19782	0	0	0	0
	SURFACE FINISHING INC.	Total	46333	0	0	0	0	19782	0	0	0	0
91504	Total		873129	17600	0	36763	240345	181938	118619	985821	46329	63271
91505	AVIALL - BURBANK FACILITY	3728	48088	0	0	0	0	0	0	43828	0	0
	AVIALL - BURBANK FACILITY	Total	48088	0	0	0	0	0	0	43828	0	0
	BARRY CONTROLS	3728	168859	0	0	0	0	0	0	0	0	0
	BARRY CONTROLS	Total	168859	0	0	0	0	0	0	0	0	0
	IMAGE TRANSFORM LABORATORY	2791	22110	0	0	0	0	0	0	0	0	0
	IMAGE TRANSFORM LABORATORY	Total	22110	0	0	0	0	0	0	0	0	0
	IMAGE TRANSFORM LABS.	7812	34199	0	0	0	0	0	0	0	0	0
	IMAGE TRANSFORM LABS.	Total	34199	0	0	0	0	0	0	0	0	0
	RYDER AVIALL INC.	3728	18185	0	0	9300	0	0	0	98539	0	0
	RYDER AVIALL INC.	Total	18185	0	0	9300	0	0	0	98539	0	0
91505	Total		291441	0	0	9300	0	0	0	142367	0	0
91506	BURMAR FINISHING CORP.	3479	0	0	0	0	0	0	0	1103	0	0
	BURMAR FINISHING CORP.	Total	0	0	0	0	0	0	0	1103	0	0
	BURMAR METAL FINISHING	3479	14082	0	0	0	0	0	0	0	0	0
	BURMAR METAL FINISHING	Total	14082	0	0	0	0	0	0	0	0	0
	BURMAR METAL FINISHING CORP.	3479	0	0	0	0	0	0	0	1362	0	750
	BURMAR METAL FINISHING CORP.	Total	0	0	0	0	0	0	0	1362	0	750
	SPENCE ELECTRO PLATING CO.	3471	0	0	0	0	0	0	0	0	0	0
	SPENCE ELECTRO PLATING CO.	Total	0	0	0	0	0	0	0	0	0	0
	WESTLAND GRAPHICS	2752	94274	0	0	0	0	0	0	0	0	0
	WESTLAND GRAPHICS	Total	94274	0	0	0	0	0	0	0	0	0
91506	Total		108356	0	0	0	0	0	0	2465	0	750
Grand	Total		1598834	33600	255	53099	247381	181938	118619	1169166	46329	64021

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Year	1987											
Sum of	TRI Pounds		Chemical Name (truncated)									
Zip	Facility Name	SIC	1,1,1-TRICHLOROETHANE	DICHLOROMETHANE	FREON 113	METHYL ETHYL KETONE	METHYL ISOBUTYL KETONE	TETRACHLOROETHYLENE	TOLUENE	TRICHLOROETHYLENE		
91502	INTERNATIONAL ELECTRONIC	3674	0	0	0	0	0	12113	0	0		
	INTERNATIONAL ELECTRONIC	Total	0	0	0	0	0	12113	0	0		
	ZERO-WEST	3443	78440	0	0	0	0	0	0	0		
	ZERO-WEST	Total	78440	0	0	0	0	0	0	0		
91502 Total			78440	0	0	0	0	12113	0	0		
91504	HYDRO-AIRE DIV.	3728	48800	0	79900	0	0	0	0	0		
	HYDRO-AIRE DIV.	Total	48800	0	79900	0	0	0	0	0		
	LOCKHEED AERONAUTICAL SYSTEMS	3830	144331	12905	0	48118	62719	303000	31679	0		
	LOCKHEED AERONAUTICAL SYSTEMS	Total	144331	12905	0	48118	62719	303000	31679	0		
	NOVACAP	3675	13221	0	0	0	0	0	0	26789		
	NOVACAP	Total	13221	0	0	0	0	0	0	26789		
	SURFACE FINISHING INC.	3479	46333	0	0	19782	0	0	0	0		
	SURFACE FINISHING INC.	Total	46333	0	0	19782	0	0	0	0		
91504 Total			252685	12905	79900	67900	62719	303000	31679	26789		
91505	AVIALL - BURBANK FACILITY	3728	29926	0	0	0	0	23821	0	0		
	AVIALL - BURBANK FACILITY	Total	29926	0	0	0	0	23821	0	0		
	BARRY CONTROLS	3728	29600	0	0	0	0	0	0	0		
	BARRY CONTROLS	Total	29600	0	0	0	0	0	0	0		
	IMAGE TRANSFORM LABORATORY	2791	22110	0	0	0	0	0	0	0		
	IMAGE TRANSFORM LABORATORY	Total	22110	0	0	0	0	0	0	0		
91505 Total			81636	0	0	0	0	23821	0	0		
91506	BURMAR FINISHING CORP.	3479	0	0	0	0	0	1103	0	0		
	BURMAR FINISHING CORP.	Total	0	0	0	0	0	1103	0	0		
91506 Total			0	0	0	0	0	1103	0	0		
Grand Total			412761	12905	79900	67900	62719	340037	31679	26789		

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Year	1988											
Sum of	TRI Pounds		Chemical Name (truncated)									
Zip	Facility Name	SIC	1,1,1-TRICHLOROETHANE	ACETONE	DICHLOROMETHANE	FREON 113	METHYL ETHYL KETONE	METHYL ISOBUTYL KETONE	TETRACHLOROETHYLENE	TOLUENE	TRICHLOROETHYLENE	
91502	ALL METALS PROCESSING CO. INC.	3471	2000	0	0	0	0	0	0	0	0	
	ALL METALS PROCESSING CO. INC.	Total	2000	0	0	0	0	0	0	0	0	
	INTERNATIONAL ELECTRONIC	3674	0	0	0	0	0	0	13200	0	0	
	INTERNATIONAL ELECTRONIC	Total	0	0	0	0	0	0	13200	0	0	
	ZERO-WEST	3443	94077	0	0	0	0	0	0	0	0	
	ZERO-WEST	Total	94077	0	0	0	0	0	0	0	0	
91502	Total		96077	0	0	0	0	0	13200	0	0	
91504	HYDRO-AIRE DIV.	3728	41200	0	0	0	0	0	0	0	0	
	HYDRO-AIRE DIV.	Total	41200	0	0	0	0	0	0	0	0	
	LOCKHEED AERONAUTICAL SYSTEMS	3830	403000	7600	1850	0	87000	22400	450250	5700	0	
	LOCKHEED AERONAUTICAL SYSTEMS	Total	403000	7600	1850	0	87000	22400	450250	5700	0	
	MEL BERNIE & CO.	3471	9870	0	0	6560	0	0	0	0	0	
	MEL BERNIE & CO.	Total	9870	0	0	6560	0	0	0	0	0	
	NOVACAP	3675	13275	0	0	0	0	0	0	0	36482	
	NOVACAP	Total	13275	0	0	0	0	0	0	0	36482	
	STAINLESS STEEL PRODUCTS INC.	3728	0	0	0	0	0	0	75000	0	0	
	STAINLESS STEEL PRODUCTS INC.	Total	0	0	0	0	0	0	75000	0	0	
	SURFACE FINISHING	3479	37482	0	0	0	0	0	0	0	0	
	SURFACE FINISHING	Total	37482	0	0	0	0	0	0	0	0	
91504	Total		504827	7600	1850	6560	87000	22400	525250	5700	36482	
91505	AVIALL - BURBANK FACILITY	3728	18162	0	0	0	0	0	20007	0	0	
	AVIALL - BURBANK FACILITY	Total	18162	0	0	0	0	0	20007	0	0	
	BARRY CONTROLS	3728	37000	0	0	0	0	0	0	0	0	
	BARRY CONTROLS	Total	37000	0	0	0	0	0	0	0	0	
	IMAGE TRANSFORM LABS.	7812	34199	0	0	0	0	0	0	0	0	
	IMAGE TRANSFORM LABS.	Total	34199	0	0	0	0	0	0	0	0	
91505	Total		89361	0	0	0	0	0	20007	0	0	
91506	BURMAR METAL FINISHING CORP.	3479	0	0	0	0	0	0	1362	0	750	
	BURMAR METAL FINISHING CORP.	Total	0	0	0	0	0	0	1362	0	750	
91506	Total		0	0	0	0	0	0	1362	0	750	
Grand	Total		690265	7600	1850	6560	87000	22400	559819	5700	37232	

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Year	1989											
Sum of	TRI Pounds		Chemical Name (truncated)									
Zip	Facility Name	SIC	1,1,1-TRICHLOROETHANE	DICHLOROMETHANE	FREON 113	METHYL ETHYL KETONE	METHYL ISOBUTYL KETONE	TETRACHLOROETHYLENE	TOLUENE			
91502	INTERNATIONAL ELECTRONIC	3674	0	0	0	0	0	13200	0			
	INTERNATIONAL ELECTRONIC	Total	0	0	0	0	0	13200	0			
	ZERO CORP.	3443	21358	0	0	0	0	0	0			
	ZERO CORP.	Total	21358	0	0	0	0	0	0			
91502	Total		21358	0	0	0	0	13200	0			
91504	CRANE CO.	3728	27200	0	53200	0	0	0	0			
	CRANE CO.	Total	27200	0	53200	0	0	0	0			
	LOCKHEED AERONAUTICAL SYSTEMS	3830	0	0	0	20100	33500	114390	8950			
	LOCKHEED AERONAUTICAL SYSTEMS	Total	0	0	0	20100	33500	114390	8950			
	MEL BERNIE & CO.	3471	0	10147	0	0	0	0	0			
	MEL BERNIE & CO.	Total	0	10147	0	0	0	0	0			
	STAINLESS STEEL PRODS. INC.	3728	0	0	0	0	0	16200	0			
	STAINLESS STEEL PRODS. INC.	Total	0	0	0	0	0	16200	0			
	SURFACE FINISHING	3479	0	0	0	6938	0	0	0			
	SURFACE FINISHING	Total	0	0	0	6938	0	0	0			
91504	Total		27200	10147	53200	27038	33500	130590	8950			
91505	BARRY CONTROLS	3728	38264	0	0	0	0	0	0			
	BARRY CONTROLS	Total	38264	0	0	0	0	0	0			
	RYDER AVIALL INC.	3728	0	0	0	0	0	36710	0			
	RYDER AVIALL INC.	Total	0	0	0	0	0	36710	0			
91505	Total		38264	0	0	0	0	36710	0			
91506	BURMAR METAL FINISHING	3479	1089	0	0	0	0	0	0			
	BURMAR METAL FINISHING	Total	1089	0	0	0	0	0	0			
	WESTLAND GRAPHICS	2752	32512	0	0	0	0	0	0			
	WESTLAND GRAPHICS	Total	32512	0	0	0	0	0	0			
91506	Total		33601	0	0	0	0	0	0			
Grand	Total		120423	10147	53200	27038	33500	180500	8950			

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Air TRI Data in Burbank
Selected Chemicals

Year	1990											
Sum of	TRI Pounds		Chemical Name (truncated)									
Zip	Facility Name	SIC	1,1,1-TRICHLOROETHANE	CHLORINE	DICHLOROMETHANE	FREON 113	TETRACHLOROETHYLENE					
91502	ALL METALS PROCESSING CO. INC.	3471	6005	255	0	0	0					
	ALL METALS PROCESSING CO. INC. Total		6005	255	0	0	0					
	BURBANK STEEL TREATING INC.	3398	37000	0	0	0	0					
	BURBANK STEEL TREATING INC. Total		37000	0	0	0	0					
	ITT AEROSPACE CONTROLS	3491	0	0	7036	7036	0					
	ITT AEROSPACE CONTROLS Total		0	0	7036	7036	0					
	ZERO CORP.	3443	15380	0	0	0	0					
	ZERO CORP. Total		15380	0	0	0	0					
91502 Total			58385	255	7036	7036	0					
91503	AVIBANK MFG. INC.	3452	10000	0	0	0	0					
	AVIBANK MFG. INC. Total		10000	0	0	0	0					
91503 Total			10000	0	0	0	0					
91504	CRANE CO.	3728	36800	0	0	40700	0					
	CRANE CO. Total		36800	0	0	40700	0					
	MEL BERNIE & CO.	3471	0	0	11861	0	0					
	MEL BERNIE & CO. Total		0	0	11861	0	0					
	STAINLESS STEEL PRODS. INC.	3728	0	0	0	0	250					
	STAINLESS STEEL PRODS. INC. Total		0	0	0	0	250					
91504 Total			36800	0	11861	40700	250					
91505	BARRY CONTROLS	3728	25297	0	0	0	0					
	BARRY CONTROLS Total		25297	0	0	0	0					
	RYDER AVIALL INC.	3728	0	0	0	0	39840					
	RYDER AVIALL INC. Total		0	0	0	0	39840					
91505 Total			25297	0	0	0	39840					
91506	BURMAR METAL FINISHING	3479	12993	0	0	0	0					
	BURMAR METAL FINISHING Total		12993	0	0	0	0					
	SPENCE ELECTRO PLATING CO.	3471	0	0	0	0	0					
	SPENCE ELECTRO PLATING CO. Total		0	0	0	0	0					
	WESTLAND GRAPHICS	2752	20180	0	0	0	0					
	WESTLAND GRAPHICS Total		20180	0	0	0	0					
91506 Total			33173	0	0	0	0					
Grand Total			163655	255	18897	47736	40090					

Terry Shistar,
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Air TRI Data in Burbank
Selected Chemicals

Year	1991											
Sum of	TRI Pounds		Chemical Name (truncated)									
Zip	Facility Name	SIC	1,1,1-TRICHLOROETHANE	ACETONE	CHLORINE	DICHLOROMETHANE	FREON 113	TETRACHLOROETHYLENE				
91502	ALL METALS PROCESSING CO. INC.	3471	0	0	0	0	0	0				
	ALL METALS PROCESSING CO. INC. Total		0	0	0	0	0	0				
	BURBANK STEEL TREATING INC.	3399	31000	0	0	0	0	0				
	BURBANK STEEL TREATING INC. Total		31000	0	0	0	0	0				
	K & L ANODIZING CORP.	3471	14000	8000	0	0	0	0				
	K & L ANODIZING CORP. Total		14000	8000	0	0	0	0				
91502 Total			45000	8000	0	0	0	0				
91504	CRANE CO.	3728	28517	0	0	0	40885	0				
	CRANE CO. Total		28517	0	0	0	40885	0				
	STAINLESS STEEL PRODS. INC.	3728	0	10000	0	0	0	8503				
	STAINLESS STEEL PRODS. INC. Total		0	10000	0	0	0	8503				
91504 Total			28517	10000	0	0	40885	8503				
91505	BARRY CONTROLS	3728	20924	0	0	0	0	0				
	BARRY CONTROLS Total		20924	0	0	0	0	0				
	RYDER AVIALL INC.	3728	16700	0	0	9300	0	12700				
	RYDER AVIALL INC. Total		16700	0	0	9300	0	12700				
91505 Total			37624	0	0	9300	0	12700				
91506	WESTLAND GRAPHICS	2752	15629	0	0	0	0	0				
	WESTLAND GRAPHICS Total		15629	0	0	0	0	0				
91506 Total			15629	0	0	0	0	0				
Grand Total			126770	18000	0	9300	40885	21203				

Terry Shistar,
Peartree Group

Year	1992											
Sum of	TRI Pounds		Chemical Name (truncated)									
Zip	Facility Name	SIC	1,1,1-TRICHLOROETHANE	ACETONE	CHLORINE	FREON 113	TETRACHLOROETHYLENE					
91502	ALL METALS PROCESSING CO. INC.	3471	0	0	0	0	0					
	ALL METALS PROCESSING CO. INC. Total		0	0	0	0	0					
	K & L ANODIZING CORP.	3471	8800	8000	0	0	0					
	K & L ANODIZING CORP. Total		8800	8000	0	0	0					
91502 Total			8800	8000	0	0	0					
91503	AVIBANK MFG. INC.	3452	7848	0	0	0	0					
	AVIBANK MFG. INC. Total		7848	0	0	0	0					
91503 Total			7848	0	0	0	0					
91504	CRANE CO.	3728	23100	0	0	19100	0					
	CRANE CO. Total		23100	0	0	19100	0					
	STAINLESS STEEL PRODS. INC.	3728	0	0	0	0	18228					
	STAINLESS STEEL PRODS. INC. Total		0	0	0	0	18228					
91504 Total			23100	0	0	19100	18228					
91505	BARRY CONTROLS	3728	17774	0	0	0	0					
	BARRY CONTROLS Total		17774	0	0	0	0					
	RYDER AVIALL INC.	3728	1485	0	0	0	9289					
	RYDER AVIALL INC. Total		1485	0	0	0	9289					
91505 Total			19259	0	0	0	9289					
91506	WESTLAND GRAPHICS	2752	25953	0	0	0	0					
	WESTLAND GRAPHICS Total		25953	0	0	0	0					
91506 Total			25953	0	0	0	0					
Grand Total			84960	8000	0	19100	27517					

Year	Chemical Name (truncated)	SIC	Zip	Facility Name	Env. Medium	TRI Pounds
1987	1,1,1-TRICHLOROETHANE	2791	91505	IMAGE TRANSFORM LABORATORY	FUGITIVE AIR	0
1987	1,1,1-TRICHLOROETHANE	2791	91505	IMAGE TRANSFORM LABORATORY	STACK AIR	22110
1987	1,1,1-TRICHLOROETHANE	3443	91502	ZERO-WEST	FUGITIVE AIR	78440
1987	1,1,1-TRICHLOROETHANE	3443	91502	ZERO-WEST	STACK AIR	0
1987	1,1,1-TRICHLOROETHANE	3479	91504	SURFACE FINISHING INC.	FUGITIVE AIR	9266
1987	1,1,1-TRICHLOROETHANE	3479	91504	SURFACE FINISHING INC.	STACK AIR	37067
1987	1,1,1-TRICHLOROETHANE	3675	91504	NOVACAP	STACK AIR	13221
1987	1,1,1-TRICHLOROETHANE	3728	91504	HYDRO-AIRE DIV.	FUGITIVE AIR	48800
1987	1,1,1-TRICHLOROETHANE	3728	91504	HYDRO-AIRE DIV.	STACK AIR	0
1987	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	FUGITIVE AIR	0
1987	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	STACK AIR	29600
1987	1,1,1-TRICHLOROETHANE	3728	91505	AVIALL - BURBANK FACILITY	FUGITIVE AIR	29926
1987	1,1,1-TRICHLOROETHANE	3728	91505	AVIALL - BURBANK FACILITY	STACK AIR	0
1987	1,1,1-TRICHLOROETHANE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	101032
1987	1,1,1-TRICHLOROETHANE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	43299
1987	DICHLOROMETHANE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	9679
1987	DICHLOROMETHANE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	3226
1987	FREON 113	3728	91504	HYDRO-AIRE DIV.	FUGITIVE AIR	79900
1987	FREON 113	3728	91504	HYDRO-AIRE DIV.	STACK AIR	0
1987	METHYL ETHYL KETONE	3479	91504	SURFACE FINISHING INC.	FUGITIVE AIR	3957
1987	METHYL ETHYL KETONE	3479	91504	SURFACE FINISHING INC.	STACK AIR	15825
1987	METHYL ETHYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	11000
1987	METHYL ETHYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	37118
1987	TRICHLOROETHYLENE	3675	91504	NOVACAP	STACK AIR	26789
1987	METHYL ISOBUTYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	37632
1987	METHYL ISOBUTYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	25087
1987	TOLUENE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	4910
1987	TOLUENE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	26769
1987	TETRACHLOROETHYLENE	3479	91506	BURMAR FINISHING CORP.	FUGITIVE AIR	0
1987	TETRACHLOROETHYLENE	3479	91506	BURMAR FINISHING CORP.	STACK AIR	1103
1987	TETRACHLOROETHYLENE	3674	91502	INTERNATIONAL ELECTRONIC	FUGITIVE AIR	12078
1987	TETRACHLOROETHYLENE	3674	91502	INTERNATIONAL ELECTRONIC	STACK AIR	35
1987	TETRACHLOROETHYLENE	3728	91505	AVIALL - BURBANK FACILITY	FUGITIVE AIR	23821
1987	TETRACHLOROETHYLENE	3728	91505	AVIALL - BURBANK FACILITY	STACK AIR	0
1987	TETRACHLOROETHYLENE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	303000
1987	SODIUM HYDROXIDE (SOLUTION)		91502	ALUMINUM PROCESSING CO.	FUGITIVE AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)		91502	ALUMINUM PROCESSING CO.	STACK AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)	2844	91502	ANDREW JERGENS CO.	FUGITIVE AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)	2844	91502	ANDREW JERGENS CO.	STACK AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)	347	91502	K&L ANODIZING CORP.	FUGITIVE AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)	347	91502	K&L ANODIZING CORP.	STACK AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)	3471	91504	ALUMTREAT INC.	FUGITIVE AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)	3471	91504	ALUMTREAT INC.	STACK AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)	3471	91506	ALERT PLATING CO.	FUGITIVE AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)	3471	91506	ALERT PLATING CO.	STACK AIR	0

1987	SODIUM HYDROXIDE (SOLUTION)	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	250
1987	SODIUM HYDROXIDE (SOLUTION)	3479	91506	BURMAR FINISHING CORP.	FUGITIVE AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)	3479	91506	BURMAR FINISHING CORP.	STACK AIR	750
1987	SODIUM HYDROXIDE (SOLUTION)	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1987	SODIUM HYDROXIDE (SOLUTION)	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1987	LEAD	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	0
1987	LEAD	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	0
1987	MANGANESE	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	0
1987	MANGANESE	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	0
1987	NICKEL	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	0
1987	NICKEL	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	0
1987	NICKEL	3471	91504	ALUMTREAT INC.	FUGITIVE AIR	0
1987	NICKEL	3471	91504	ALUMTREAT INC.	STACK AIR	0
1987	CHROMIUM	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	0
1987	CHROMIUM	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	0
1987	COPPER	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	0
1987	COPPER	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	0
1987	HYDROCHLORIC ACID	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	250
1987	HYDROCHLORIC ACID	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	250
1987	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1987	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1987	PHOSPHORIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1987	PHOSPHORIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1987	SULFURIC ACID	347	91502	K&L ANODIZING CORP.	FUGITIVE AIR	0
1987	SULFURIC ACID	347	91502	K&L ANODIZING CORP.	STACK AIR	0
1987	SULFURIC ACID	3471	91502	ALUMINUM PROCESSING CO.	FUGITIVE AIR	0
1987	SULFURIC ACID	3471	91502	ALUMINUM PROCESSING CO.	STACK AIR	0
1987	SULFURIC ACID	3471	91504	ALUMTREAT INC.	FUGITIVE AIR	0
1987	SULFURIC ACID	3471	91504	ALUMTREAT INC.	STACK AIR	0
1987	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1987	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	250
1987	SULFURIC ACID	3479	91506	BURMAR FINISHING CORP.	FUGITIVE AIR	0
1987	SULFURIC ACID	3479	91506	BURMAR FINISHING CORP.	STACK AIR	250
1987	NITRIC ACID	3471	91504	ALUMTREAT INC.	FUGITIVE AIR	0
1987	NITRIC ACID	3471	91504	ALUMTREAT INC.	STACK AIR	0
1987	NITRIC ACID	3471	91506	ALERT PLATING CO.	FUGITIVE AIR	0
1987	NITRIC ACID	3471	91506	ALERT PLATING CO.	STACK AIR	0
1987	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1987	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	250
1987	SODIUM SULFATE (SOLUTION)	347	91502	K&L ANODIZING CORP.	FUGITIVE AIR	0
1987	SODIUM SULFATE (SOLUTION)	347	91502	K&L ANODIZING CORP.	STACK AIR	0
1987	SODIUM SULFATE (SOLUTION)	2791	91505	IMAGE TRANSFORM LABORATORY	FUGITIVE AIR	0
1987	SODIUM SULFATE (SOLUTION)	2791	91505	IMAGE TRANSFORM LABORATORY	STACK AIR	0
1988	METHANOL	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	100
1988	METHANOL	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	10000

1988	ISOPROPYL ALCOHOL (MANUFACTURI	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	17000
1988	ISOPROPYL ALCOHOL (MANUFACTURI	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	20000
1988	ACETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	7600
1988	ACETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1988	N-BUTYL ALCOHOL	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	27000
1988	N-BUTYL ALCOHOL	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	1200
1988	1,1,1-TRICHLOROETHANE	3443	91502	ZERO-WEST	FUGITIVE AIR	94077
1988	1,1,1-TRICHLOROETHANE	3443	91502	ZERO-WEST	STACK AIR	0
1988	1,1,1-TRICHLOROETHANE	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	2000
1988	1,1,1-TRICHLOROETHANE	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1988	1,1,1-TRICHLOROETHANE	3471	91504	MEL BERNIE & CO.	FUGITIVE AIR	9870
1988	1,1,1-TRICHLOROETHANE	3471	91504	MEL BERNIE & CO.	STACK AIR	0
1988	1,1,1-TRICHLOROETHANE	3479	91504	SURFACE FINISHING	FUGITIVE AIR	7496
1988	1,1,1-TRICHLOROETHANE	3479	91504	SURFACE FINISHING	STACK AIR	29986
1988	1,1,1-TRICHLOROETHANE	3675	91504	NOVACAP	FUGITIVE AIR	0
1988	1,1,1-TRICHLOROETHANE	3675	91504	NOVACAP	STACK AIR	13275
1988	1,1,1-TRICHLOROETHANE	3728	91504	HYDRO-AIRE DIV.	FUGITIVE AIR	41200
1988	1,1,1-TRICHLOROETHANE	3728	91504	HYDRO-AIRE DIV.	STACK AIR	0
1988	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	FUGITIVE AIR	0
1988	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	STACK AIR	37000
1988	1,1,1-TRICHLOROETHANE	3728	91505	AVIALL - BURBANK FACILITY	FUGITIVE AIR	18162
1988	1,1,1-TRICHLOROETHANE	3728	91505	AVIALL - BURBANK FACILITY	STACK AIR	0
1988	1,1,1-TRICHLOROETHANE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	67000
1988	1,1,1-TRICHLOROETHANE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	336000
1988	1,1,1-TRICHLOROETHANE	7812	91505	IMAGE TRANSFORM LABS.	FUGITIVE AIR	0
1988	1,1,1-TRICHLOROETHANE	7812	91505	IMAGE TRANSFORM LABS.	STACK AIR	34199
1988	DICHLOROMETHANE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	250
1988	DICHLOROMETHANE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	1600
1988	FREON 113	3471	91504	MEL BERNIE & CO.	FUGITIVE AIR	6560
1988	FREON 113	3471	91504	MEL BERNIE & CO.	STACK AIR	0
1988	METHYL ETHYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	75000
1988	METHYL ETHYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	12000
1988	TRICHLOROETHYLENE	3479	91506	BURMAR METAL FINISHING CORP.	FUGITIVE AIR	0
1988	TRICHLOROETHYLENE	3479	91506	BURMAR METAL FINISHING CORP.	STACK AIR	750
1988	TRICHLOROETHYLENE	3675	91504	NOVACAP	FUGITIVE AIR	0
1988	TRICHLOROETHYLENE	3675	91504	NOVACAP	STACK AIR	36482
1988	METHYLENEBIS(PHENYLISOCYANATE)	2891	91503	FIBER-RESIN CORP.	FUGITIVE AIR	750
1988	METHYLENEBIS(PHENYLISOCYANATE)	2891	91503	FIBER-RESIN CORP.	STACK AIR	0
1988	METHYL ISOBUTYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	15000
1988	METHYL ISOBUTYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	7400
1988	TOLUENE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	600
1988	TOLUENE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	5100
1988	TETRACHLOROETHYLENE	3479	91506	BURMAR METAL FINISHING CORP.	FUGITIVE AIR	0
1988	TETRACHLOROETHYLENE	3479	91506	BURMAR METAL FINISHING CORP.	STACK AIR	1362
1988	TETRACHLOROETHYLENE	3674	91502	INTERNATIONAL ELECTRONIC	FUGITIVE AIR	7100
1988	TETRACHLOROETHYLENE	3674	91502	INTERNATIONAL ELECTRONIC	STACK AIR	6100

1988	TETRACHLOROETHYLENE	3728	91504	STAINLESS STEEL PRODUCTS INC.	FUGITIVE AIR	0
1988	TETRACHLOROETHYLENE	3728	91504	STAINLESS STEEL PRODUCTS INC.	STACK AIR	75000
1988	TETRACHLOROETHYLENE	3728	91505	AVIALL - BURBANK FACILITY	FUGITIVE AIR	20007
1988	TETRACHLOROETHYLENE	3728	91505	AVIALL - BURBANK FACILITY	STACK AIR	0
1988	TETRACHLOROETHYLENE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	250
1988	TETRACHLOROETHYLENE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	450000
1988	SODIUM HYDROXIDE (SOLUTION)	2844	91502	ANDREW JERGENS CO.	FUGITIVE AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	2844	91502	ANDREW JERGENS CO.	STACK AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	2899	91502	BURMAH TECHNICAL SERVICES INC.	FUGITIVE AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	2899	91502	BURMAH TECHNICAL SERVICES INC.	STACK AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91502	ALUMINUM PROCESSING CO. INC.	FUGITIVE AIR	250
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91502	ALUMINUM PROCESSING CO. INC.	STACK AIR	250
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91504	ALUMTREAT INC.	FUGITIVE AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91504	ALUMTREAT INC.	STACK AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91504	MEL BERNIE & CO.	FUGITIVE AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91504	MEL BERNIE & CO.	STACK AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91506	ALERT PLATING CO. INC.	FUGITIVE AIR	35
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91506	ALERT PLATING CO. INC.	STACK AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3479	91506	BURMAR METAL FINISHING CORP.	FUGITIVE AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3479	91506	BURMAR METAL FINISHING CORP.	STACK AIR	1122
1988	SODIUM HYDROXIDE (SOLUTION)	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1988	SODIUM HYDROXIDE (SOLUTION)	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1988	ALUMINUM OXIDE	3728	91505	AVIALL - BURBANK FACILITY	FUGITIVE AIR	0
1988	ALUMINUM OXIDE	3728	91505	AVIALL - BURBANK FACILITY	STACK AIR	0
1988	LEAD	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	0
1988	LEAD	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	0
1988	MANGANESE	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	0
1988	MANGANESE	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	0
1988	NICKEL	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	0
1988	NICKEL	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	0
1988	CHROMIUM	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	0
1988	CHROMIUM	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	0
1988	CHROMIUM	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1988	CHROMIUM	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	1300
1988	COPPER	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	0
1988	COPPER	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	0
1988	HYDROCHLORIC ACID	2844	91502	ANDREW JERGENS CO.	FUGITIVE AIR	0
1988	HYDROCHLORIC ACID	2844	91502	ANDREW JERGENS CO.	STACK AIR	0
1988	HYDROCHLORIC ACID	3429	91503	ARIBANK MANUFACTURING INC.	FUGITIVE AIR	250
1988	HYDROCHLORIC ACID	3429	91503	ARIBANK MANUFACTURING INC.	STACK AIR	250
1988	HYDROCHLORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1988	HYDROCHLORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0

1988	HYDROCHLORIC ACID	3471	91502	ALUMINUM PROCESSING CO. INC.	FUGITIVE AIR	250
1988	HYDROCHLORIC ACID	3471	91502	ALUMINUM PROCESSING CO. INC.	STACK AIR	0
1988	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1988	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1988	PHOSPHORIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1988	PHOSPHORIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1988	SULFURIC ACID	3471	91502	ALUMINUM PROCESSING CO. INC.	FUGITIVE AIR	250
1988	SULFURIC ACID	3471	91502	ALUMINUM PROCESSING CO. INC.	STACK AIR	250
1988	SULFURIC ACID	3471	91502	K & L ANODIZING CORP.	FUGITIVE AIR	0
1988	SULFURIC ACID	3471	91502	K & L ANODIZING CORP.	STACK AIR	0
1988	SULFURIC ACID	3471	91504	ALUMTREAT INC.	FUGITIVE AIR	0
1988	SULFURIC ACID	3471	91504	ALUMTREAT INC.	STACK AIR	0
1988	SULFURIC ACID	3471	91504	MEL BERNIE & CO.	FUGITIVE AIR	0
1988	SULFURIC ACID	3471	91504	MEL BERNIE & CO.	STACK AIR	0
1988	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1988	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1988	SULFURIC ACID	3479	91506	BURMAR METAL FINISHING CORP.	FUGITIVE AIR	0
1988	SULFURIC ACID	3479	91506	BURMAR METAL FINISHING CORP.	STACK AIR	250
1988	SULFURIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1988	SULFURIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1988	NITRIC ACID	3471	91504	ALUMTREAT INC.	FUGITIVE AIR	0
1988	NITRIC ACID	3471	91504	ALUMTREAT INC.	STACK AIR	0
1988	NITRIC ACID	3471	91506	ALERT PLATING CO. INC.	FUGITIVE AIR	24
1988	NITRIC ACID	3471	91506	ALERT PLATING CO. INC.	STACK AIR	0
1988	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1988	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1988	NITRIC ACID	3728	91504	STAINLESS STEEL PRODUCTS INC.	FUGITIVE AIR	750
1988	NITRIC ACID	3728	91504	STAINLESS STEEL PRODUCTS INC.	STACK AIR	0
1988	NITRIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1988	NITRIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1989	CADMIUM COMPOUNDS	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1989	CADMIUM COMPOUNDS	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1989	LEAD COMPOUNDS	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	250
1989	LEAD COMPOUNDS	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1989	ZINC COMPOUNDS	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	250
1989	ZINC COMPOUNDS	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1989	1,1,1-TRICHLOROETHANE	2752	91506	WESTLAND GRAPHICS	FUGITIVE AIR	32512
1989	1,1,1-TRICHLOROETHANE	2752	91506	WESTLAND GRAPHICS	STACK AIR	0
1989	1,1,1-TRICHLOROETHANE	3443	91502	ZERO CORP.	FUGITIVE AIR	3204
1989	1,1,1-TRICHLOROETHANE	3443	91502	ZERO CORP.	STACK AIR	18154
1989	1,1,1-TRICHLOROETHANE	3479	91506	BURMAR METAL FINISHING	FUGITIVE AIR	0
1989	1,1,1-TRICHLOROETHANE	3479	91506	BURMAR METAL FINISHING	STACK AIR	1089
1989	1,1,1-TRICHLOROETHANE	3728	91504	CRANE CO.	FUGITIVE AIR	27200
1989	1,1,1-TRICHLOROETHANE	3728	91504	CRANE CO.	STACK AIR	0
1989	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	FUGITIVE AIR	0
1989	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	STACK AIR	38264

1989	DICHLOROMETHANE	3471	91504	MEL BERNIE & CO.	FUGITIVE AIR	10147
1989	DICHLOROMETHANE	3471	91504	MEL BERNIE & CO.	STACK AIR	0
1989	FREON 113	3728	91504	CRANE CO.	FUGITIVE AIR	53200
1989	FREON 113	3728	91504	CRANE CO.	STACK AIR	0
1989	METHYL ETHYL KETONE	3479	91504	SURFACE FINISHING	FUGITIVE AIR	1388
1989	METHYL ETHYL KETONE	3479	91504	SURFACE FINISHING	STACK AIR	5550
1989	METHYL ETHYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	17085
1989	METHYL ETHYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	3015
1989	CHLOROACETIC ACID	2844	91502	ANDREW JERGENS CO.	FUGITIVE AIR	0
1989	CHLOROACETIC ACID	2844	91502	ANDREW JERGENS CO.	STACK AIR	0
1989	METHYLENEBIS(PHENYLISOCYANATE)	2891	91503	FIBER-RESIN CORP.	FUGITIVE AIR	750
1989	METHYLENEBIS(PHENYLISOCYANATE)	2891	91503	FIBER-RESIN CORP.	STACK AIR	0
1989	METHYL ISOBUTYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	12325
1989	METHYL ISOBUTYL KETONE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	21175
1989	TOLUENE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	750
1989	TOLUENE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	8200
1989	TETRACHLOROETHYLENE	3674	91502	INTERNATIONAL ELECTRONIC	FUGITIVE AIR	7100
1989	TETRACHLOROETHYLENE	3674	91502	INTERNATIONAL ELECTRONIC	STACK AIR	6100
1989	TETRACHLOROETHYLENE	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	16200
1989	TETRACHLOROETHYLENE	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1989	TETRACHLOROETHYLENE	3728	91505	RYDER AVIALL INC.	FUGITIVE AIR	36710
1989	TETRACHLOROETHYLENE	3728	91505	RYDER AVIALL INC.	STACK AIR	0
1989	TETRACHLOROETHYLENE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	5720
1989	TETRACHLOROETHYLENE	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	108670
1989	NICKEL	3471	91504	MEL BERNIE & CO.	FUGITIVE AIR	750
1989	NICKEL	3471	91504	MEL BERNIE & CO.	STACK AIR	0
1989	NICKEL	3471	91506	ALERT PLATING CO. INC.	FUGITIVE AIR	250
1989	NICKEL	3471	91506	ALERT PLATING CO. INC.	STACK AIR	0
1989	HYDROCHLORIC ACID	2844	91502	ANDREW JERGENS CO.	FUGITIVE AIR	0
1989	HYDROCHLORIC ACID	2844	91502	ANDREW JERGENS CO.	STACK AIR	0
1989	HYDROCHLORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	32000
1989	HYDROCHLORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1989	HYDROCHLORIC ACID	3471	91502	ALUMINUM PROCESSING CO.	FUGITIVE AIR	250
1989	HYDROCHLORIC ACID	3471	91502	ALUMINUM PROCESSING CO.	STACK AIR	0
1989	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1989	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1989	PHOSPHORIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1989	PHOSPHORIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1989	SULFURIC ACID	3471	91502	ALUMINUM PROCESSING CO.	FUGITIVE AIR	250
1989	SULFURIC ACID	3471	91502	ALUMINUM PROCESSING CO.	STACK AIR	250
1989	SULFURIC ACID	3471	91502	K & L ANODIZING CORP.	FUGITIVE AIR	0
1989	SULFURIC ACID	3471	91502	K & L ANODIZING CORP.	STACK AIR	0
1989	SULFURIC ACID	3471	91504	ALUMTREAT SOUTH INC.	FUGITIVE AIR	0
1989	SULFURIC ACID	3471	91504	ALUMTREAT SOUTH INC.	STACK AIR	0
1989	SULFURIC ACID	3471	91504	MEL BERNIE & CO.	FUGITIVE AIR	0
1989	SULFURIC ACID	3471	91504	MEL BERNIE & CO.	STACK AIR	0

1989	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1989	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1989	SULFURIC ACID	3479	91506	BURMAR METAL FINISHING	FUGITIVE AIR	0
1989	SULFURIC ACID	3479	91506	BURMAR METAL FINISHING	STACK AIR	250
1989	SULFURIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1989	SULFURIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1989	NITRIC ACID	3471	91502	ALUMINUM PROCESSING CO.	FUGITIVE AIR	0
1989	NITRIC ACID	3471	91502	ALUMINUM PROCESSING CO.	STACK AIR	0
1989	NITRIC ACID	3471	91504	ALUMTREAT SOUTH INC.	FUGITIVE AIR	0
1989	NITRIC ACID	3471	91504	ALUMTREAT SOUTH INC.	STACK AIR	0
1989	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1989	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1989	NITRIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1989	NITRIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1990	1,1,1-TRICHLOROETHANE	2752	91506	WESTLAND GRAPHICS	FUGITIVE AIR	20180
1990	1,1,1-TRICHLOROETHANE	2752	91506	WESTLAND GRAPHICS	STACK AIR	0
1990	1,1,1-TRICHLOROETHANE	3398	91502	BURBANK STEEL TREATING INC.	FUGITIVE AIR	37000
1990	1,1,1-TRICHLOROETHANE	3398	91502	BURBANK STEEL TREATING INC.	STACK AIR	0
1990	1,1,1-TRICHLOROETHANE	3443	91502	ZERO CORP.	FUGITIVE AIR	2307
1990	1,1,1-TRICHLOROETHANE	3443	91502	ZERO CORP.	STACK AIR	13073
1990	1,1,1-TRICHLOROETHANE	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	10000
1990	1,1,1-TRICHLOROETHANE	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1990	1,1,1-TRICHLOROETHANE	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	6000
1990	1,1,1-TRICHLOROETHANE	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	5
1990	1,1,1-TRICHLOROETHANE	3479	91506	BURMAR METAL FINISHING	FUGITIVE AIR	12993
1990	1,1,1-TRICHLOROETHANE	3479	91506	BURMAR METAL FINISHING	STACK AIR	0
1990	1,1,1-TRICHLOROETHANE	3728	91504	CRANE CO.	FUGITIVE AIR	36800
1990	1,1,1-TRICHLOROETHANE	3728	91504	CRANE CO.	STACK AIR	0
1990	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	FUGITIVE AIR	25297
1990	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	STACK AIR	0
1990	DICHLOROMETHANE	3471	91504	MEL BERNIE & CO.	FUGITIVE AIR	11861
1990	DICHLOROMETHANE	3471	91504	MEL BERNIE & CO.	STACK AIR	0
1990	DICHLOROMETHANE	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1990	DICHLOROMETHANE	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1990	DICHLOROMETHANE	3491	91502	ITT AEROSPACE CONTROLS	FUGITIVE AIR	7036
1990	DICHLOROMETHANE	3491	91502	ITT AEROSPACE CONTROLS	STACK AIR	0
1990	FREON 113	3491	91502	ITT AEROSPACE CONTROLS	FUGITIVE AIR	7036
1990	FREON 113	3491	91502	ITT AEROSPACE CONTROLS	STACK AIR	0
1990	FREON 113	3728	91504	CRANE CO.	FUGITIVE AIR	40700
1990	FREON 113	3728	91504	CRANE CO.	STACK AIR	0
1990	CHLOROACETIC ACID	2844	91502	ANDREW JERGENS CO.	FUGITIVE AIR	0
1990	CHLOROACETIC ACID	2844	91502	ANDREW JERGENS CO.	STACK AIR	0
1990	METHYLENEBIS(PHENYLISOCYANATE)	2891	91503	FIBER-RESIN CORP.	FUGITIVE AIR	0
1990	METHYLENEBIS(PHENYLISOCYANATE)	2891	91503	FIBER-RESIN CORP.	STACK AIR	0
1990	TETRACHLOROETHYLENE	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	250
1990	TETRACHLOROETHYLENE	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0

1990	TETRACHLOROETHYLENE	3728	91505	RYDER AVIALL INC.	FUGITIVE AIR	0
1990	TETRACHLOROETHYLENE	3728	91505	RYDER AVIALL INC.	STACK AIR	39840
1990	AMMONIUM NITRATE (SOLUTION)	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	5
1990	AMMONIUM NITRATE (SOLUTION)	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	5
1990	LEAD	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	0
1990	LEAD	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1990	MANGANESE	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	5
1990	MANGANESE	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	5
1990	NICKEL	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	5
1990	NICKEL	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	5
1990	NICKEL	3471	91506	ALERT PLATING CO. INC.	FUGITIVE AIR	0
1990	NICKEL	3471	91506	ALERT PLATING CO. INC.	STACK AIR	5
1990	NICKEL	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1990	NICKEL	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1990	NICKEL	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	250
1990	NICKEL	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1990	CADMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	5
1990	CADMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	5
1990	CHROMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	5
1990	CHROMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	5
1990	CHROMIUM	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	5
1990	CHROMIUM	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1990	COPPER	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	5
1990	COPPER	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	5
1990	ZINC (FUME OR DUST)	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	250
1990	ZINC (FUME OR DUST)	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	250
1990	HYDROCHLORIC ACID	2844	91502	ANDREW JERGENS CO.	FUGITIVE AIR	0
1990	HYDROCHLORIC ACID	2844	91502	ANDREW JERGENS CO.	STACK AIR	0
1990	HYDROCHLORIC ACID	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	250
1990	HYDROCHLORIC ACID	3452	91503	AVIBANK MFG. INC.	STACK AIR	250
1990	HYDROCHLORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	5
1990	HYDROCHLORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	5
1990	HYDROCHLORIC ACID	3471	91502	ALUMINUM PROCESSING CO.	FUGITIVE AIR	250
1990	HYDROCHLORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1990	HYDROCHLORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1990	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1990	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1990	AMMONIA	3398	91502	BURBANK STEEL TREATING INC.	FUGITIVE AIR	25000
1990	AMMONIA	3398	91502	BURBANK STEEL TREATING INC.	STACK AIR	0
1990	SULFURIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	250
1990	SULFURIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	5
1990	SULFURIC ACID	3471	91504	ALUMTREAT SOUTH INC.	FUGITIVE AIR	0
1990	SULFURIC ACID	3471	91504	ALUMTREAT SOUTH INC.	STACK AIR	0
1990	SULFURIC ACID	3471	91504	MEL BERNIE & CO.	FUGITIVE AIR	0
1990	SULFURIC ACID	3471	91504	MEL BERNIE & CO.	STACK AIR	0
1990	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0

1990	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1990	SULFURIC ACID	3479	91506	BURMAR METAL FINISHING	FUGITIVE AIR	0
1990	SULFURIC ACID	3479	91506	BURMAR METAL FINISHING	STACK AIR	0
1990	SULFURIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	FUGITIVE AIR	0
1990	SULFURIC ACID	3830	91504	LOCKHEED AERONAUTICAL SYSTEMS	STACK AIR	0
1990	NITRIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	5
1990	NITRIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	5
1990	NITRIC ACID	3471	91504	ALUMTREAT SOUTH INC.	FUGITIVE AIR	0
1990	NITRIC ACID	3471	91504	ALUMTREAT SOUTH INC.	STACK AIR	0
1990	NITRIC ACID	3471	91506	ALERT PLATING CO. INC.	FUGITIVE AIR	5
1990	NITRIC ACID	3471	91506	ALERT PLATING CO. INC.	STACK AIR	5
1990	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1990	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1990	NITRIC ACID	3479	91506	BURMAR METAL FINISHING	FUGITIVE AIR	0
1990	NITRIC ACID	3479	91506	BURMAR METAL FINISHING	STACK AIR	0
1990	NITRIC ACID	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	0
1990	NITRIC ACID	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1990	CHLORINE	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	250
1990	CHLORINE	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	5
1991	ACETONE	3471	91502	K & L ANODIZING CORP.	FUGITIVE AIR	8000
1991	ACETONE	3471	91502	K & L ANODIZING CORP.	STACK AIR	0
1991	ACETONE	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	10000
1991	ACETONE	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1991	1,1,1-TRICHLOROETHANE	2752	91506	WESTLAND GRAPHICS	FUGITIVE AIR	15629
1991	1,1,1-TRICHLOROETHANE	2752	91506	WESTLAND GRAPHICS	STACK AIR	0
1991	1,1,1-TRICHLOROETHANE	3399	91502	BURBANK STEEL TREATING INC.	FUGITIVE AIR	31000
1991	1,1,1-TRICHLOROETHANE	3399	91502	BURBANK STEEL TREATING INC.	STACK AIR	0
1991	1,1,1-TRICHLOROETHANE	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	1,1,1-TRICHLOROETHANE	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	1,1,1-TRICHLOROETHANE	3471	91502	K & L ANODIZING CORP.	FUGITIVE AIR	14000
1991	1,1,1-TRICHLOROETHANE	3471	91502	K & L ANODIZING CORP.	STACK AIR	0
1991	1,1,1-TRICHLOROETHANE	3728	91504	CRANE CO.	FUGITIVE AIR	28517
1991	1,1,1-TRICHLOROETHANE	3728	91504	CRANE CO.	STACK AIR	0
1991	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	FUGITIVE AIR	20924
1991	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	STACK AIR	0
1991	1,1,1-TRICHLOROETHANE	3728	91505	RYDER AVIALL INC.	FUGITIVE AIR	16700
1991	1,1,1-TRICHLOROETHANE	3728	91505	RYDER AVIALL INC.	STACK AIR	0
1991	DICHLOROMETHANE	3728	91505	RYDER AVIALL INC.	FUGITIVE AIR	9300
1991	DICHLOROMETHANE	3728	91505	RYDER AVIALL INC.	STACK AIR	0
1991	FREON 113	3728	91504	CRANE CO.	FUGITIVE AIR	40885
1991	FREON 113	3728	91504	CRANE CO.	STACK AIR	0
1991	TETRACHLOROETHYLENE	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	8503
1991	TETRACHLOROETHYLENE	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1991	TETRACHLOROETHYLENE	3728	91505	RYDER AVIALL INC.	FUGITIVE AIR	12700
1991	TETRACHLOROETHYLENE	3728	91505	RYDER AVIALL INC.	STACK AIR	0
1991	ALUMINUM OXIDE (FIBROUS FORM)	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0

1991	ALUMINUM OXIDE (FIBROUS FORM)	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	AMMONIUM NITRATE (SOLUTION)	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	AMMONIUM NITRATE (SOLUTION)	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	LEAD	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	0
1991	LEAD	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	5
1991	MANGANESE	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	0
1991	MANGANESE	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1991	MANGANESE	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	MANGANESE	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	NICKEL	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	0
1991	NICKEL	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1991	NICKEL	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	NICKEL	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	NICKEL	3471	91506	ALERT PLATING CO.	FUGITIVE AIR	0
1991	NICKEL	3471	91506	ALERT PLATING CO.	STACK AIR	5
1991	CADMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	CADMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	CHROMIUM	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	0
1991	CHROMIUM	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1991	CHROMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	CHROMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	COBALT	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	0
1991	COBALT	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1991	COPPER	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	0
1991	COPPER	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1991	COPPER	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	COPPER	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	HYDROCHLORIC ACID	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	250
1991	HYDROCHLORIC ACID	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1991	HYDROCHLORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	HYDROCHLORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	PHOSPHORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	PHOSPHORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1991	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1991	AMMONIA	3399	91502	BURBANK STEEL TREATING INC.	FUGITIVE AIR	14000
1991	AMMONIA	3399	91502	BURBANK STEEL TREATING INC.	STACK AIR	0
1991	SULFURIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	SULFURIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	SULFURIC ACID	3471	91502	K & L ANODIZING CORP.	FUGITIVE AIR	50
1991	SULFURIC ACID	3471	91502	K & L ANODIZING CORP.	STACK AIR	950
1991	SULFURIC ACID	3471	91504	MEL BERNIE & CO.	FUGITIVE AIR	0
1991	SULFURIC ACID	3471	91504	MEL BERNIE & CO.	STACK AIR	0
1991	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1991	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1991	SULFURIC ACID	3479	91506	BURMAR METAL FINISHING	FUGITIVE AIR	0

1991	SULFURIC ACID	3479	91506	BURMAR METAL FINISHING	STACK AIR	0
1991	SULFURIC ACID	3728	91505	RYDER AVIALL INC.	FUGITIVE AIR	0
1991	SULFURIC ACID	3728	91505	RYDER AVIALL INC.	STACK AIR	0
1991	NITRIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	NITRIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1991	NITRIC ACID	3471	91506	ALERT PLATING CO.	FUGITIVE AIR	0
1991	NITRIC ACID	3471	91506	ALERT PLATING CO.	STACK AIR	5
1991	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1991	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1991	NITRIC ACID	3479	91506	BURMAR METAL FINISHING	FUGITIVE AIR	0
1991	NITRIC ACID	3479	91506	BURMAR METAL FINISHING	STACK AIR	0
1991	NITRIC ACID	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	5
1991	NITRIC ACID	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1991	CHLORINE	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1991	CHLORINE	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	BARIUM COMPOUNDS	2891	91503	FIBER-RESIN CORP.	FUGITIVE AIR	150
1992	BARIUM COMPOUNDS	2891	91503	FIBER-RESIN CORP.	STACK AIR	0
1992	ACETONE	3471	91502	K & L ANODIZING CORP.	FUGITIVE AIR	8000
1992	ACETONE	3471	91502	K & L ANODIZING CORP.	STACK AIR	0
1992	1,1,1-TRICHLOROETHANE	2752	91506	WESTLAND GRAPHICS	FUGITIVE AIR	25953
1992	1,1,1-TRICHLOROETHANE	2752	91506	WESTLAND GRAPHICS	STACK AIR	0
1992	1,1,1-TRICHLOROETHANE	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	7848
1992	1,1,1-TRICHLOROETHANE	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1992	1,1,1-TRICHLOROETHANE	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	1,1,1-TRICHLOROETHANE	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	1,1,1-TRICHLOROETHANE	3471	91502	K & L ANODIZING CORP.	FUGITIVE AIR	8800
1992	1,1,1-TRICHLOROETHANE	3471	91502	K & L ANODIZING CORP.	STACK AIR	0
1992	1,1,1-TRICHLOROETHANE	3728	91504	CRANE CO.	FUGITIVE AIR	23100
1992	1,1,1-TRICHLOROETHANE	3728	91504	CRANE CO.	STACK AIR	0
1992	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	FUGITIVE AIR	17774
1992	1,1,1-TRICHLOROETHANE	3728	91505	BARRY CONTROLS	STACK AIR	0
1992	1,1,1-TRICHLOROETHANE	3728	91505	RYDER AVIALL INC.	FUGITIVE AIR	1485
1992	1,1,1-TRICHLOROETHANE	3728	91505	RYDER AVIALL INC.	STACK AIR	0
1992	FREON 113	3728	91504	CRANE CO.	FUGITIVE AIR	19100
1992	FREON 113	3728	91504	CRANE CO.	STACK AIR	0
1992	METHYLENEBIS(PHENYLISOCYANATE)	2891	91503	FIBER-RESIN CORP.	FUGITIVE AIR	0
1992	METHYLENEBIS(PHENYLISOCYANATE)	2891	91503	FIBER-RESIN CORP.	STACK AIR	0
1992	TETRACHLOROETHYLENE	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	18228
1992	TETRACHLOROETHYLENE	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1992	TETRACHLOROETHYLENE	3728	91505	RYDER AVIALL INC.	FUGITIVE AIR	0
1992	TETRACHLOROETHYLENE	3728	91505	RYDER AVIALL INC.	STACK AIR	9289
1992	ALUMINUM OXIDE (FIBROUS FORM)	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	ALUMINUM OXIDE (FIBROUS FORM)	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	AMMONIUM NITRATE (SOLUTION)	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	AMMONIUM NITRATE (SOLUTION)	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	MANGANESE	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	0

1992	MANGANESE	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1992	MANGANESE	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	MANGANESE	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	NICKEL	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	0
1992	NICKEL	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1992	NICKEL	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	NICKEL	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	NICKEL	3471	91506	ALERT PLATING CO.	FUGITIVE AIR	0
1992	NICKEL	3471	91506	ALERT PLATING CO.	STACK AIR	5
1992	CADMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	CADMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	CHROMIUM	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	0
1992	CHROMIUM	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1992	CHROMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	CHROMIUM	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	COPPER	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	COPPER	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	HYDROCHLORIC ACID	3452	91503	AVIBANK MFG. INC.	FUGITIVE AIR	250
1992	HYDROCHLORIC ACID	3452	91503	AVIBANK MFG. INC.	STACK AIR	0
1992	HYDROCHLORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	HYDROCHLORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	PHOSPHORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	PHOSPHORIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1992	PHOSPHORIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1992	AMMONIA	3398	91502	BURBANK STEEL TREATING INC.	FUGITIVE AIR	16000
1992	AMMONIA	3398	91502	BURBANK STEEL TREATING INC.	STACK AIR	0
1992	SULFURIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	SULFURIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	SULFURIC ACID	3471	91502	K & L ANODIZING CORP.	FUGITIVE AIR	50
1992	SULFURIC ACID	3471	91502	K & L ANODIZING CORP.	STACK AIR	950
1992	SULFURIC ACID	3471	91504	MEL BERNIE & CO.	FUGITIVE AIR	0
1992	SULFURIC ACID	3471	91504	MEL BERNIE & CO.	STACK AIR	0
1992	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1992	SULFURIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1992	NITRIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	NITRIC ACID	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0
1992	NITRIC ACID	3471	91506	ALERT PLATING CO.	FUGITIVE AIR	0
1992	NITRIC ACID	3471	91506	ALERT PLATING CO.	STACK AIR	5
1992	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	FUGITIVE AIR	0
1992	NITRIC ACID	3471	91506	SPENCE ELECTRO PLATING CO.	STACK AIR	0
1992	NITRIC ACID	3728	91504	STAINLESS STEEL PRODS. INC.	FUGITIVE AIR	5
1992	NITRIC ACID	3728	91504	STAINLESS STEEL PRODS. INC.	STACK AIR	0
1992	CHLORINE	3471	91502	ALL METALS PROCESSING CO. INC.	FUGITIVE AIR	0
1992	CHLORINE	3471	91502	ALL METALS PROCESSING CO. INC.	STACK AIR	0

ANALYSIS OF AMBIENT DATA FROM POTENTIAL TOXICS "HOT SPOTS" IN THE SOUTH COAST AIR BASIN



SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Appendix 7

Selected pages from:

The Magnitude of Ambient Air Toxics Impacts
From Existing Sources In The
South Coast Air Basin

1987 - SQAMD

Analysis of Ambient Data
From Potential Toxics
"Hot Spots" In The
South Coast Air Basin

SQAMD

TABLE 4-1

AVERAGE AMBIENT CONCENTRATIONS OF ORGANIC GASES DURING THE MATES PERIOD
(Concentrations in ppb)

	SCAQMD - NETWORK				ARB					SCAQMD - MATES									
	ANA-HEIM	AZUSA	BUR-BANK	HAW-THORNE	EL MONTE	LONG BEACH	L.A.	RUBI-DOUX	UPLAND	L.A. SCHOOL DIST.	MAYWOOD	BELL GARDENS	AT&T HAW-THORNE	GARDENA	RANCHO DOMIN-GUEZ	YORBA LINDA	IRVINE PARK	L.A. FIRE DEPT.	BURBANK POLICE
BENZENE																			
Ave. Conc.[a]	2-3	1-3	4-5	2-4	3.8	4.1	3.9	2.6	2.9	3-4	3-4	3-4	6	1-3	5-6	1-3	0-3	5-6	7
Std. Dev.	2	1	4	3	2.2	2.5	2.0	1.1	1.2	2	2	2	4	1	3	2	0	2	3
Detection Limit[b]	2-4	2-4	2-4	1-4	.5	.5	.5	.5	.5	1-4	2-4	2-4	2	2-4	2	4	2-4	2	2
Sample Size/#<DL[c]	32/19	32/25	26/8	31/19	10/1	29/0	31/0	29/0	32/0	30/14	31/11	29/13	31/5	30/22	31/4	31/15	29/25	32/3	31/2
Data Category[d]	B	B	B	B	B	A	A	A	A	B	B	B	B	B	B	B	B	A	A
CARBON TETRACHLORIDE																			
Ave. Conc.	.16	.15	.14	.20	.10	.13	.12	.12	.13	.14	.15	.14	.16	.14	.17	.13	.14	.15	.14
Std. Dev.	.10	.04	.03	.18	.04	.05	.03	.02	.02	.02	.03	.02	.03	.02	.04	.02	.05	.03	.02
Detection Limit	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
Sample Size/#<DL	31/0	31/0	31/0	31/0	10/1	28/0	31/0	27/0	31/0	30/0	31/0	29/0	30/0	30/0	31/0	31/0	29/0	32/0	30/1
Data Category	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A
CHLOROFORM																			
Ave. Conc.	.04-.4	.02-.4	.0-.5	.02-.4	.286	.226	.212	.193	.217	.0-.4	.0-.4	.0-.4	.0-.4	.0-.4	.0-.4	.0-.4	.0-.4	.0-.4	.0-.4
Std. Dev.	*[e]	*	*	*	.273	.191	.232	.167	.171	*	*	*	*	*	*	*	*	*	
Detection Limit	.4	.4	.4	.4	.004	.004	.004	.004	.004	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
Sample Size/#<DL	31/28	31/30	24/22	27/26	10/0	28/0	31/0	27/0	31/0	30/30	31/31	29/28	30/30	31/31	30/30	29/29	29/28	31/31	30/30
Data Category	C	C	C	C	A	A	A	A	A	C	C	C	C	C	C	C	C	C	C
ETHYLENE DIBROMIDE																			
Ave. Conc.	.00	.00	.00	.00	.0-.01	.01-.02	.0-.01	0-.01	.0-.01										
Std. Dev.	*	*	*	*	.01	.02	*	*	.01										
Detection Limit	.10	.10	.10	.10	.01	.02	*	*	.01										
Sample Size/#<DL	31/30	32/31	26/26	29/28	10/7	28/20	31/29	27/25	31/26										
Data Category	C	C	C	C	B	B	C	C	B										
METHYLENE CHLORIDE																			
Ave. Conc.					2	2	2-3	1-2	2	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14
Std. Dev.					1	2	2	2	2	*	*	*	*	*	*	*	*	*	*
Detection Limit					1	1	1	1	1	14	14	14	14	14	14	14	14	14	14
Sample Size/#<DL					10/2	28/6	31/4	27/9	31/5	30/30	31/31	29/29	30/30	30/30	31/31	31/31	29/29	32/32	31/31
Data Category					B	B	B	B	B	C	C	C	C	C	C	C	C	C	C
PERCHLOROETHYLENE																			
Ave. Conc.	4.6	5.2	7.1	4.2	.89	.80	1.08	.55	.83	2.4	2.1	2.1	3.9	2.3	2.8	1.8	1.4	3.4	4.2
Std. Dev.	6.7	6.2	7.6	9.2	.56	.51	.55	.44	.45	1.6	1.5	1.5	2.9	2.3	1.2	1.5	1.4	1.6	2.5
Detection Limit	.2	.2	.2	.2	.004	.004	.004	.004	.004	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Sample Size/#<DL[c]	31/0	32/0	26/0	29/0	10/0	27/0	31/0	27/0	31/0	30/0	31/0	29/0	30/0	30/0	31/0	31/0	29/0	32/0	31/0
Data Category	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

TABLE 4-1 (Continued)

	SCAQMD - NETWORK				ARB					SCAQMD - MATES									
	ANA-HEIM	AZUSA	BUR-BANK	HAW-THORNE	EL MONTE	LONG BEACH	L.A.	RUBI-DOUX	UPLAND	L.A. SCHOOL DIST.	MAYWOOD	BELL GARDENS	AT&T HAW-THORNE	GARDENA	RANCHO DOMIN-GUEZ	YORBA LINDA	IRVINE PARK	L.A. FIRE DEPT.	BURBANK POLICE
TOLUENE																			
Ave. Conc.[a]	6-8	7-8	13-14	8-9						10-11	12	10-11	16	8-10	15	6-7	2-5	13	17
Std. Dev.	5	5	9	8						6	7	6	11	12	7	6	2	6	7
Detection Limit[b]	5	5	5	5						5	5	5	5	5	5	5	5	5	5
Sample Size/#<DL[c]	32/9	32/6	26/3	31/9						30/7	31/3	29/8	31/4	31/13	31/1	31/6	29/16	32/3	31/0
Data Category[d]	B	B	B	B						B	A	B	B	B	A	B	B	A	A
1,1,1-TRICHLOROETHANE																			
Ave. Conc.	4.3	4.5	6.7	4.4	5.06	3.58	4.87	2.21	3.75	6.1	6.8	6.5	8.7	4.6	10.4	3.3	2.6	8.7	9.0
Std. Dev.	2.9	3.1	2.9	2.8	3.70	2.79	3.16	1.54	2.75	4.2	4.2	3.2	5.1	2.8	4.0	2.5	1.7	4.8	3.1
Detection Limit	.2	.2	.2	.2	.004	.004	.004	.004	.004	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Sample Size/#<DL	31/0	32/0	26/0	29/0	10/0	28/0	31/0	27/0	31/0	30/0	31/0	29/0	30/0	30/0	31/0	31/0	29/0	32/32	31/31
Data Category	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
TRICHLOROETHYLENE																			
Ave. Conc.	.3-.5	.6-.7	.7-.8	.2-.4	.173	.210	.250	.124	.496	.4-.5	.3-.4	.1-.3	.1-.3	.1-.3	.1-.3	.0-.3	.1-.3	.1-.3	.3-.5
Std. Dev.	.5	.7	.6	.5	.082	.092	.083	.070	.572	.4	.9	.4	.5	.2	.2	*	.3	*	.4
Detection Limit	.2	.2	.2	.2	.005	.005	.005	.005	.005	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Sample Size/#<DL	31/17	32/10	26/4	29/22	10/0	28/0	31/0	27/0	31/0	30/11	31/21	29/21	30/26	30/27	31/23	31/30	29/24	32/29	31/16
Data Category	B	B	B	B	A	A	A	A	A	B	B	B	B	B	B	C	B	C	B
VINYL CHLORIDE																			
Ave. Conc.	0-2	0-2	0-2	0-2						0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2
Std. Dev.	*	*	*	*						*	*	*	*	*	*	*	*	*	*
Detection Limit	2	2	2	2						2	2	2	2	2	2	2	2	2	2
Sample Size/#<DL	33/33	32/32	28/27	31/29						30/30	31/31	29/29	31/31	31/31	31/31	31/31	29/29	32/32	31/31
Data Category	C	C	C	C						C	C	C	C	C	C	C	C	C	C

[a] Blanks indicate no data available. Ranges of arithmetic annual averages defined as follows: first estimate is the average assuming all sub-detection limit observations equal zero; second estimate is the average assuming all sub-detection limit observations are equal to the detection limit concentration.
Standard deviations were calculated using only the observations above detection limits; if more than 90 percent of the observations were below detection limits, standard deviations were not calculated.

[b] Detection limits for some SCAQMD-measured pollutants reported as range because limits changed from sample to sample depending on analytical conditions. See text for further explanation.

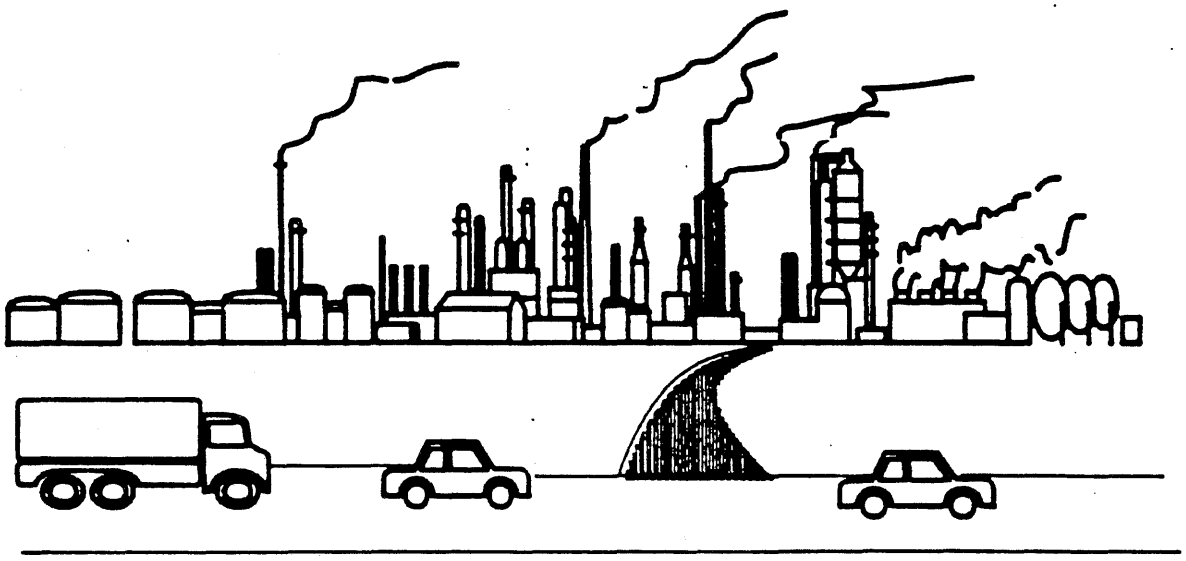
[c] "Sample Size/# < DL" = (the total number of samples taken over the year) / (total number of these samples with concentrations below minimum detectable limits).

[d] Data Category codes: A - Most of the data above detection limits (>90%), C - Very few of the data points are above detection limits (<10%), and B - Several data points fall above and below detection limits.

* standard deviation not calculated for Data Category C.

JUNE 1987

THE MAGNITUDE OF AMBIENT AIR TOXICS IMPACTS FROM EXISTING SOURCES IN THE SOUTH COAST AIR BASIN



1987 AIR QUALITY
MANAGEMENT PLAN REVISION
WORKING PAPER NO. 3

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

TABLE 5-1

UNIT RISK FACTORS FOR CARCINOGENS

AIR TOXIC	UNIT RISK FACTOR $(ug/m^3)^{-1}$	EVIDENCE[1]
Above Detection Limits		
Arsenic	$4.3x10^{-3}$	A
Benzene[2]	$5.3x10^{-5}$	A
Beryllium	$2.4x10^{-3}$	B2
Cadmium[2]	$1.2x10^{-2}$	B1
Carbon tetrachloride[2]	$4.2x10^{-5}$	B2
Chromium VI [2]	$1.5x10^{-1}$	A
Nickel (refinery dust)	$2.4x10^{-4}$	A
Perchloroethylene	$5.8x10^{-7}$	C
Trichloroethylene	$1.3x10^{-6}$	B2
Predominantly Below Detection Limits		
Chloroform	$2.3x10^{-5}$	B2
Ethylene dibromide[2]	$7.2x10^{-5}$	B2
Methylene chloride	$4.1x10^{-6}$	B2
Vinyl chloride	$2.7x10^{-6}$	A

[1]EPA weight of evidence classification per EPA Cancer Guidelines (A-Human carcinogen, B1-Probable human carcinogen with limited human evidence, B2-Probable human carcinogen with sufficient animal evidence, C-Possible human carcinogen with limited animal evidence)

[2]Developed by California DHS under Title 17, CAC.

TABLE 5-2

MAXIMUM RISKS ASSOCIATED WITH INHALATION OF TOXIC POLLUTANTS MATES SAMPLING SITES

SPECIES	LA SCHOOL DISTRICT	MAYWOOD	BELL GARDENS	AT&T HAWTHORNE	GARDENA	RANCHO DOMINGUEZ	YORBA LINDA	IRVINE PARK	L.A. FIRE DEPARTMENT	BURBANK POLICE
ORGANIC GASES:					RISK x ONE MILLION					
BENZENE	675	675	675	1012	506	1012	506	506	1012	1181
CARBON TETRACHLORIDE	80	85	80	91	80	97	74	80	85	80
PERCHLOROETHYLENE	9	8	8	15	9	11	7	5	13	16
TRICHLOROETHYLENE	3	3	2	2	2	2	2	2	2	3
RISK GAS	767	771	765	1121	597	1122	589	593	1113	1281
METALS:					RISK x ONE MILLION					
ARSENIC	8	15	13	10	5	19	6	3	8	6
BERYLLIUM	0.13	0.21	0.21	0.08	0.11	0.74	0.12	0.16	0.09	0.23
CADMIUM	98	42	24	30	24	146	18	7	63	36
CHROMIUM (AS 100% Cr VI)	1020	1020	2595	795	615	3600	465	390	1155	1410
CHROMIUM+6 (AS MEASURED)	-	-	-	-	-	-	-	-	-	-
NICKEL	4	5	4	4	5	9	2	2	4	4
RISK METAL (100% Cr VI)	1130	1082	2636	838	650	3774	492	402	1230	1458
RISK METAL W/O Cr	110	62	41	43	35	174	27	12	75	48
TOTAL RISK (100% Cr VI)	1898	1853	3401	1959	1246	4896	1081	996	2343	2738
TOTAL RISK W/O Cr	878	833	806	1164	631	1296	616	606	1188	1328
					RISK					
TOTAL RISK (100% Cr VI)	1.90E-03	1.85E-03	3.40E-03	1.96E-03	1.25E-03	4.90E-03	1.08E-03	9.96E-04	2.34E-03	2.74E-03
TOTAL RISK W/O Cr	8.78E-04	8.33E-04	8.06E-04	1.16E-03	6.31E-04	1.30E-03	6.16E-04	6.06E-04	1.19E-03	1.33E-03

TABLE 5-2 (Continued)

NETWORK STATIONS

SPECIES	ANAHEIM	AZUSA	BURBANK	HAWTHORNE	EL MONTE	LONG BEACH	LOS ANGELES	RUBIDOUX	UPLAND
ORGANIC GASES:					RISK x ONE MILLION				
BENZENE	506	506	844	675	641	692	658	439	489
CARBON TETRACHLORIDE	91	85	80	114	57	74	68	68	74
PERCHLOROETHYLENE	18	20	28	16	3	3	4	2	3
TRICHLOROETHYLENE	3	5	6	3	1	1	2	1	3
RISK GAS	619	617	957	808	703	770	732	510	570
METALS:					RISK x ONE MILLION				
ARSENIC					-	18	9	5	7
BERYLLIUM					-	0.07	0.05	0.07	0.07
CADMIUM					-	24	19	6	11
CHROMIUM (AS 100% Cr VI)					1650	1200	1350	1200	900
CHROMIUM+6 (AS MEASURED)					-	60	45	45	30
NICKEL					2	2	2	1	1
RISK METAL (100% Cr VI)					1652	1305	1425	1258	949
RISK METAL W/O Cr					2	105	75	58	49
TOTAL RISK (100% Cr VI)	619	617	957	808	2355	2075	2157	1768	1519
TOTAL RISK W/O Cr	619	617	957	808	705	875	807	568	619
					RISK				
TOTAL RISK (100% Cr VI)	6.19E-04	6.17E-04	9.57E-04	8.08E-04	2.35E-03	2.07E-03	2.16E-03	1.77E-03	1.52E-03
TOTAL RISK W/O Cr	6.19E-04	6.17E-04	9.57E-04	8.08E-04	7.05E-04	8.75E-04	8.07E-04	5.68E-04	6.19E-04

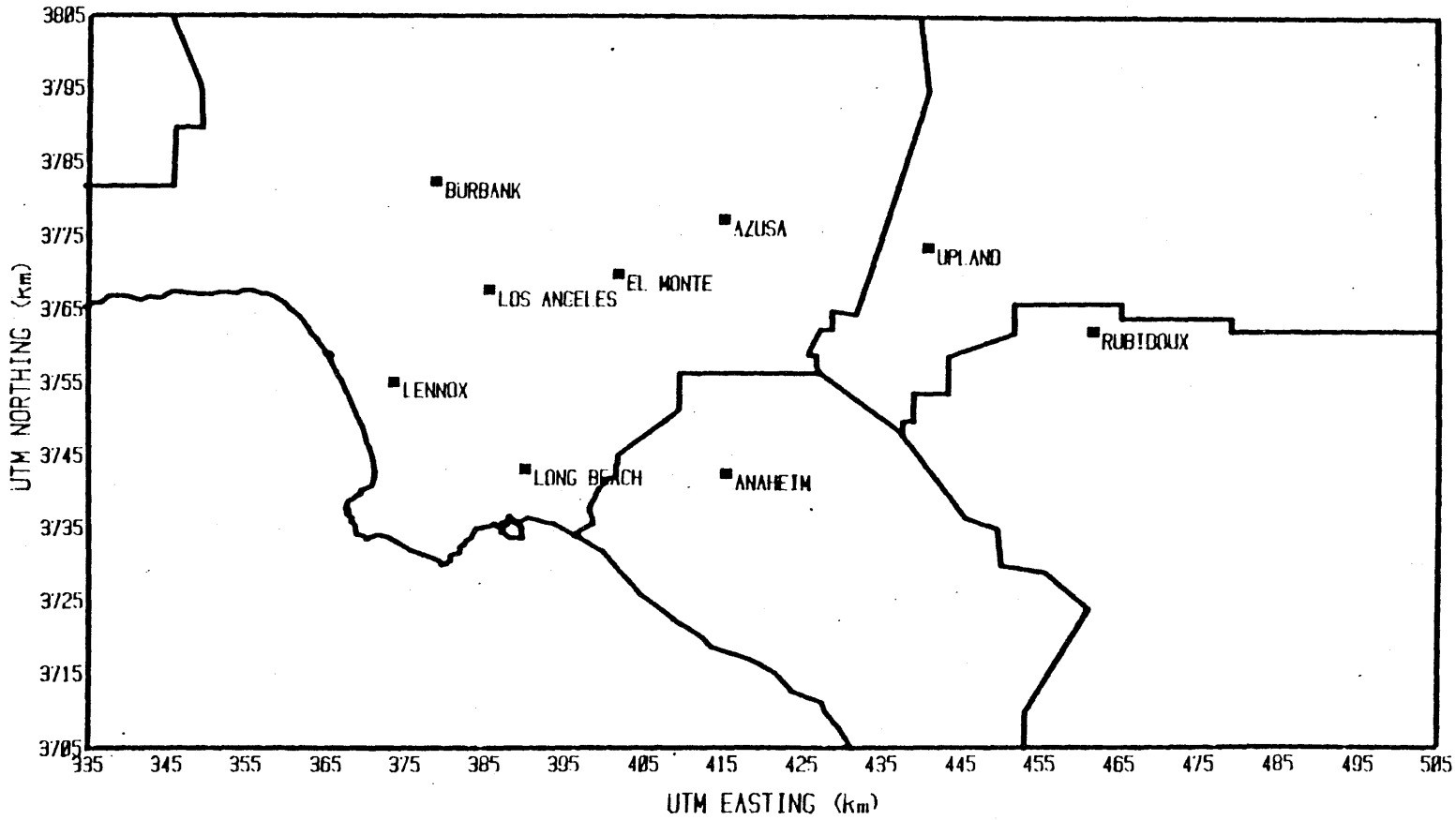


FIGURE V-1

AMBIENT AIR TOXIC MONITORING SITES IN THE SOUTH COAST AIR BASIN

TABLE IV-4

TOXICS EMISSIONS OF TWENTY SPECIES
IN THE SOUTH COAST AIR BASIN
IN 1984

Species	Emissions (tons/year)			
	Point	Area	Mobile	Total
Arsenic	0.047	-	-	0.047
Benzene	118.	7870.	6910.	14,898.
Beryllium	0.037	-	-	0.037
Cadmium	1.12	-	6.91	8.03
Carbon Tetrachloride	3.20	-	-	3.20
Chloroform	0	-	0.0006	0.0006
Chromium	16.0	-	13.2	29.2
Ethylene Dibromide	1.09	-	12.0	13.1
Ethylene Dichloride	3.53	-	42.7	46.2
Lead	14.5	-	2030.	2045.
Mercury	0.13	-	-	0.13
Methyl Bromide	24.4	-	-	24.4
Methylene Chloride	4780.	10,200.	-	14,980.
Nickel	5.40	-	2.44	7.84
Perchloroethylene	3970.	8850.	-	12,820.
Toluene	714.	276.	14,200.	15,190.
1,1,1-Trichloroethane	8590.	6150.	-	14,740.
Trichloroethylene	9.52	546.	-	556.
Vinyl Chloride	1.37	-	-	1.37
Xylenes	230.	185.	8950.	9365.

- = no data available

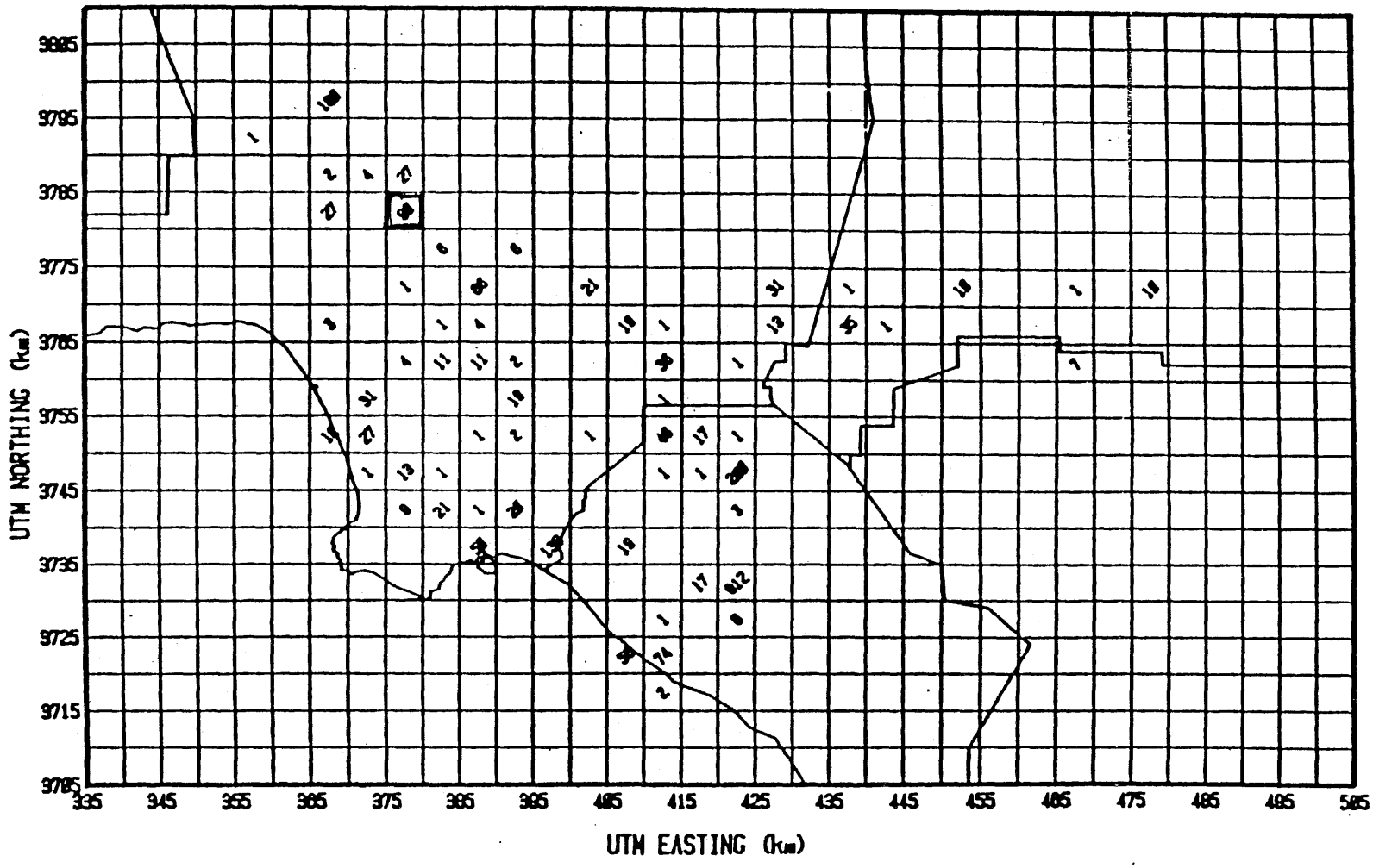


FIGURE A-4

SPATIAL DISTRIBUTION OF POINT SOURCE EMISSIONS OF CADMIUM (lbs/yr)

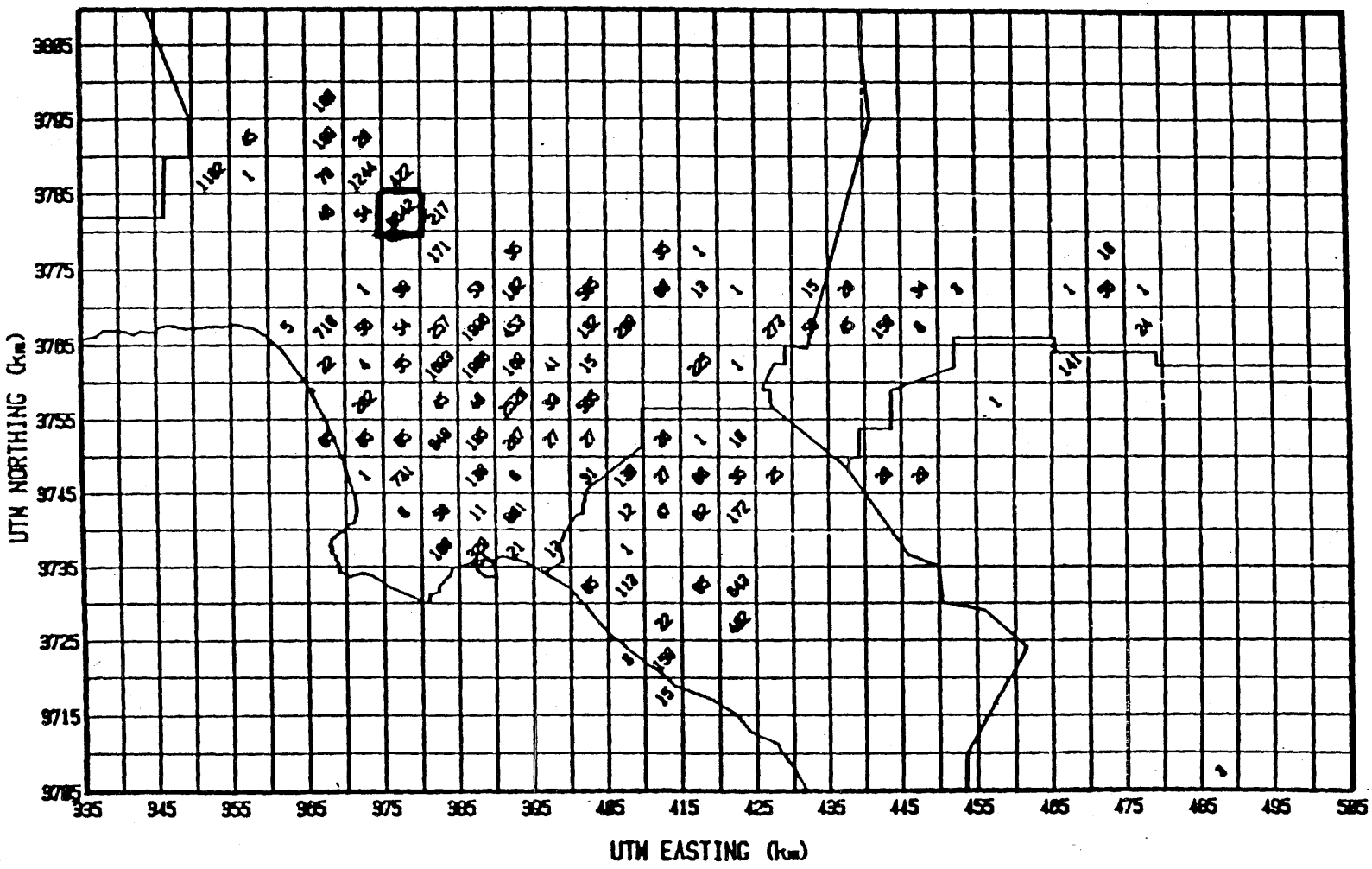


FIGURE A-6

SPATIAL DISTRIBUTION OF POINT SOURCE EMISSIONS OF CHROMIUM (lbs/yr)

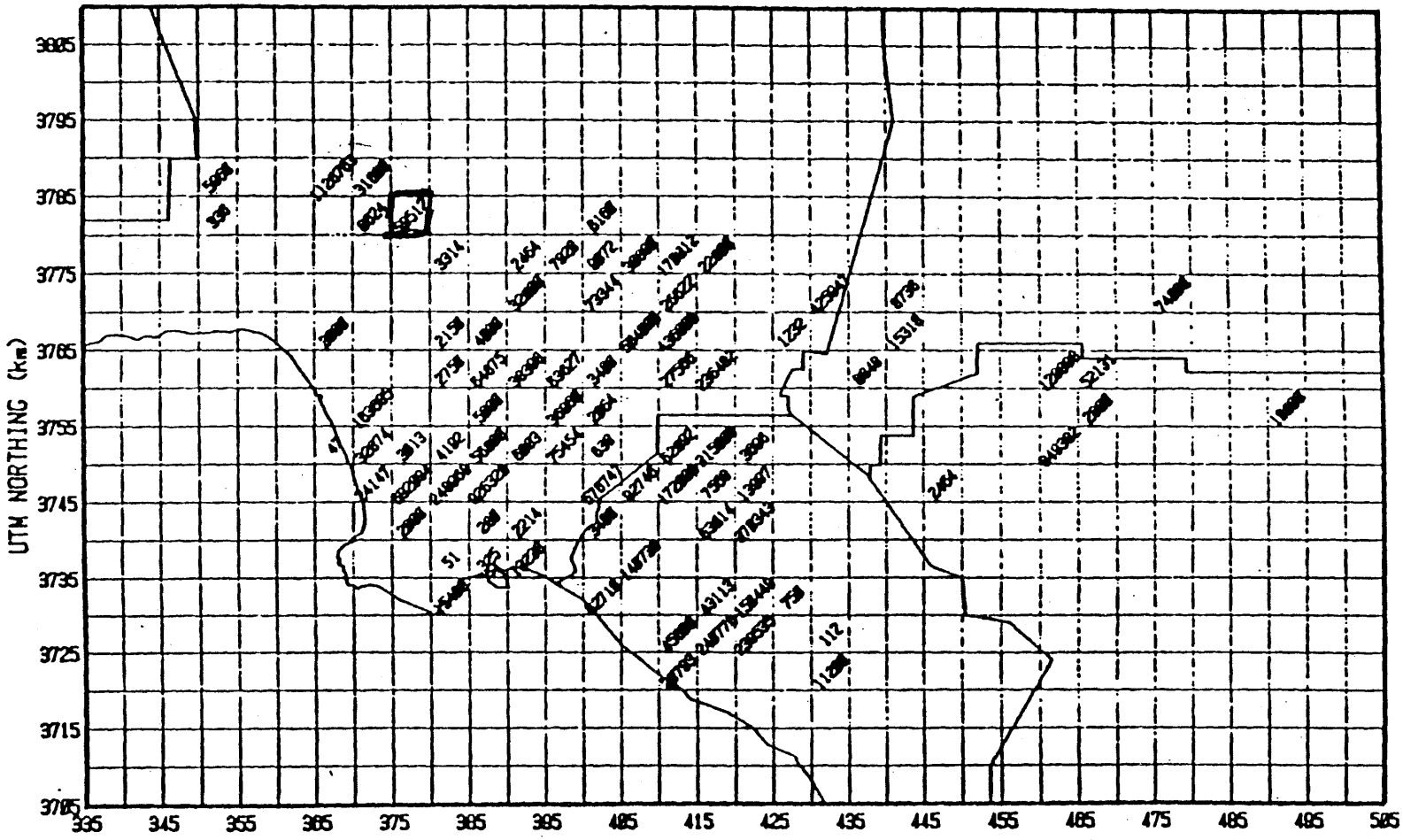


FIGURE A-12

DISTRIBUTION OF POINT SOURCE EMISSIONS OF METHYLENE CHLORIDE (lbs/yr)

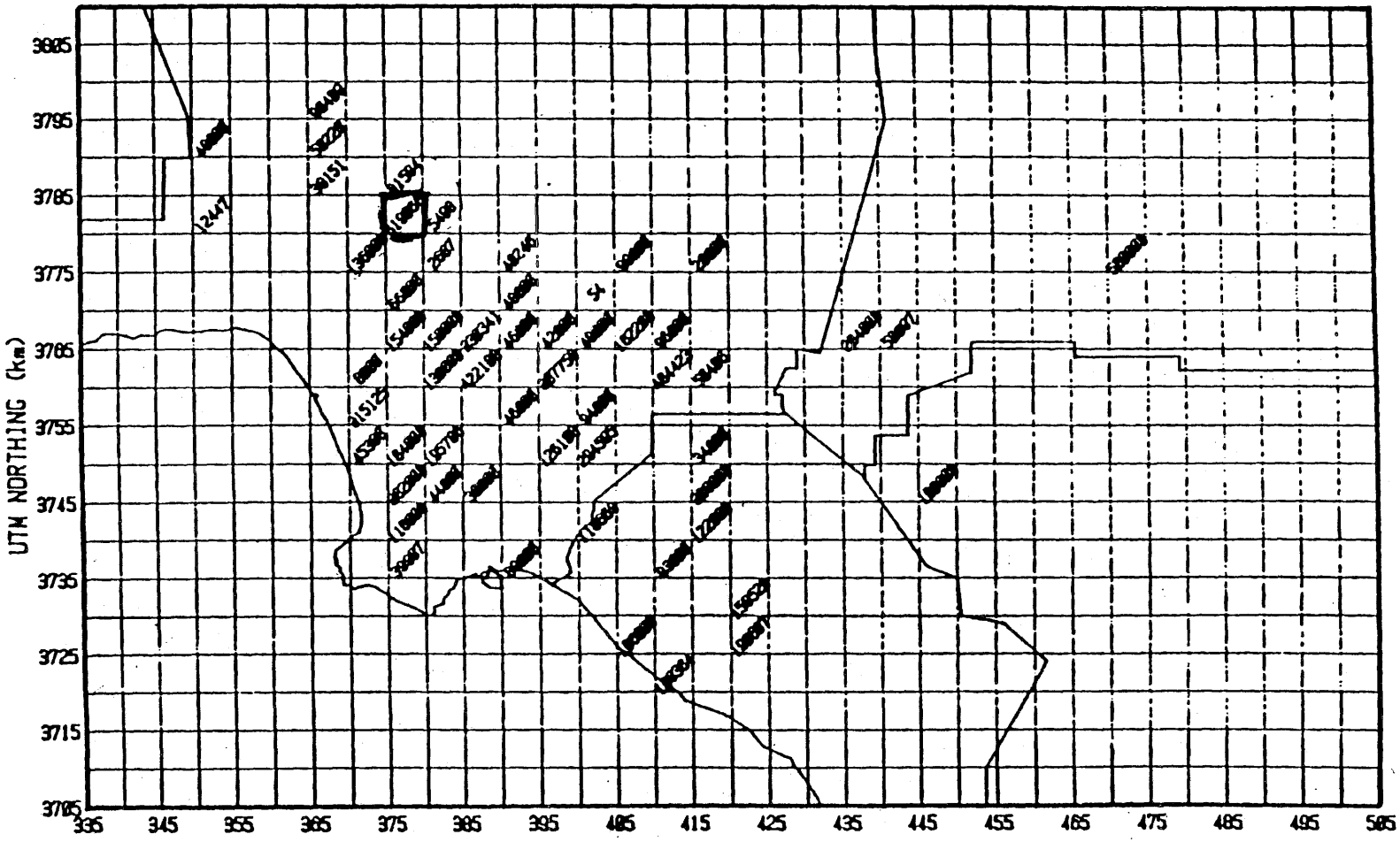


FIGURE A-14

DISTRIBUTION OF POINT SOURCE EMISSIONS OF PERCHLOROETHYLENE (lbs/yr)

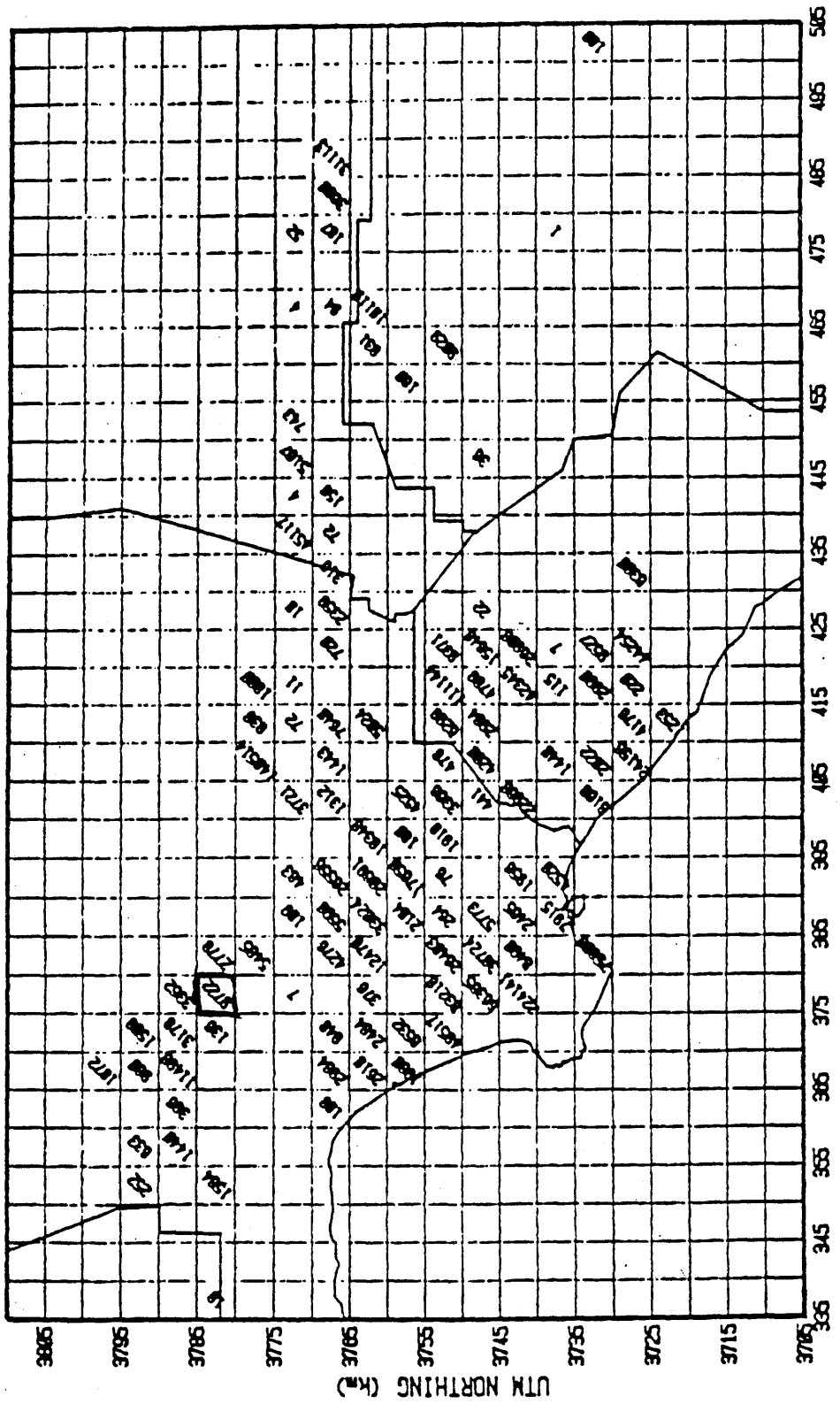


FIGURE A-15

SPATIAL DISTRIBUTION OF POINT SOURCE EMISSIONS OF TOLUENE (lbs/yr)

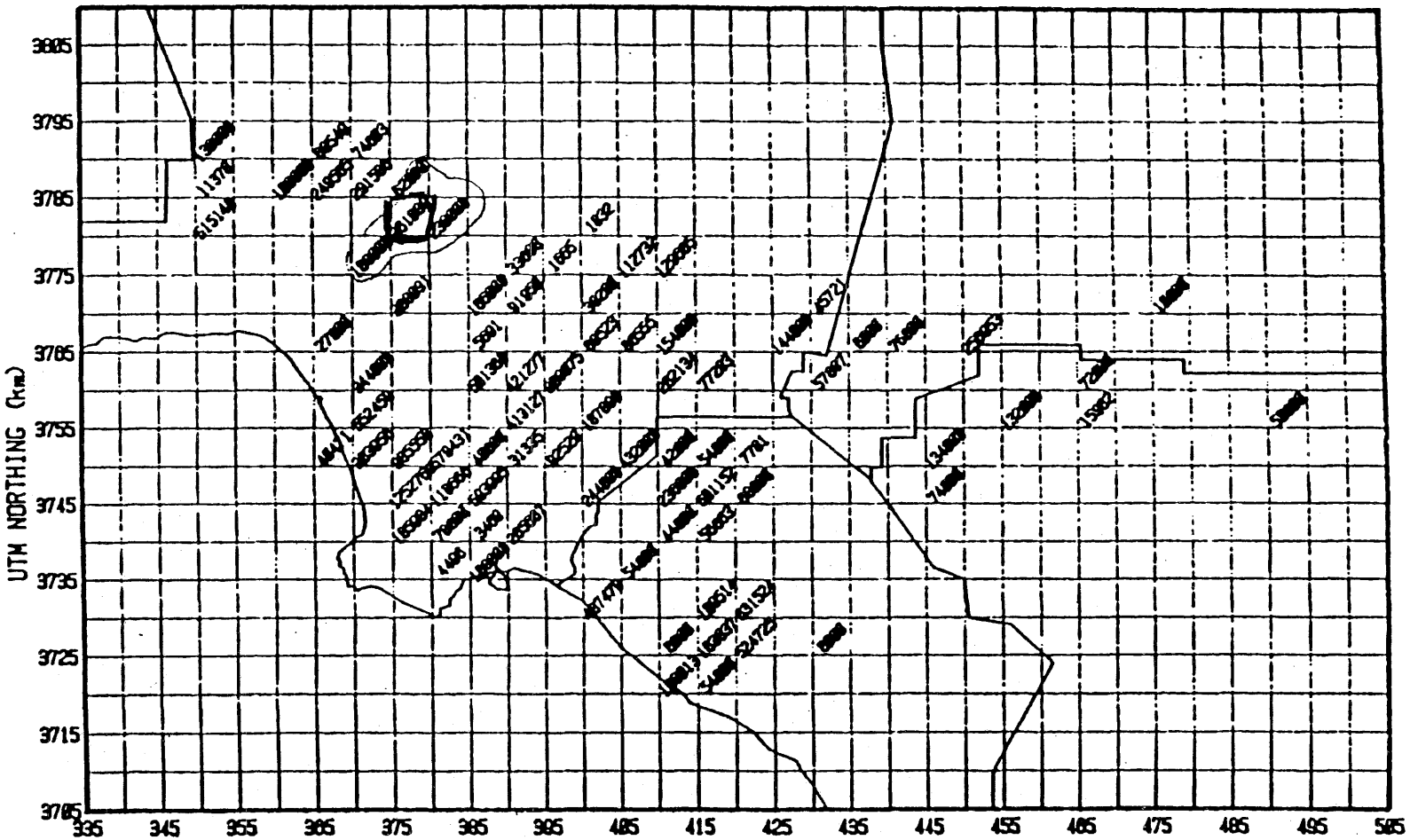


FIGURE A-16

DISTRIBUTION OF POINT SOURCE EMISSIONS OF 1,1,1-TRICHLOROETHANE (lbs/yr)

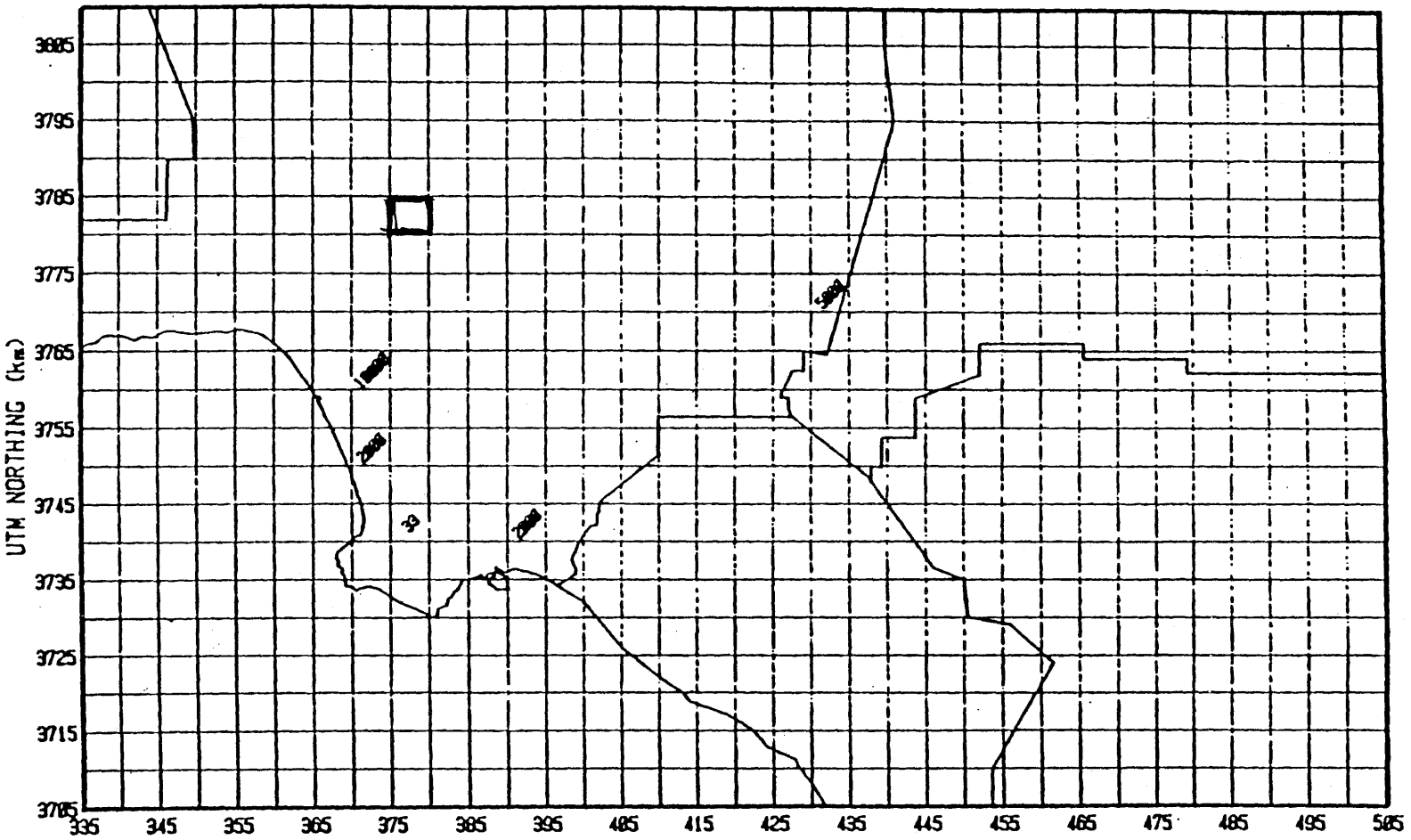


FIGURE A-17

DISTRIBUTION OF POINT SOURCE EMISSIONS OF TRICHLOROETHYLENE (lbs/yr)

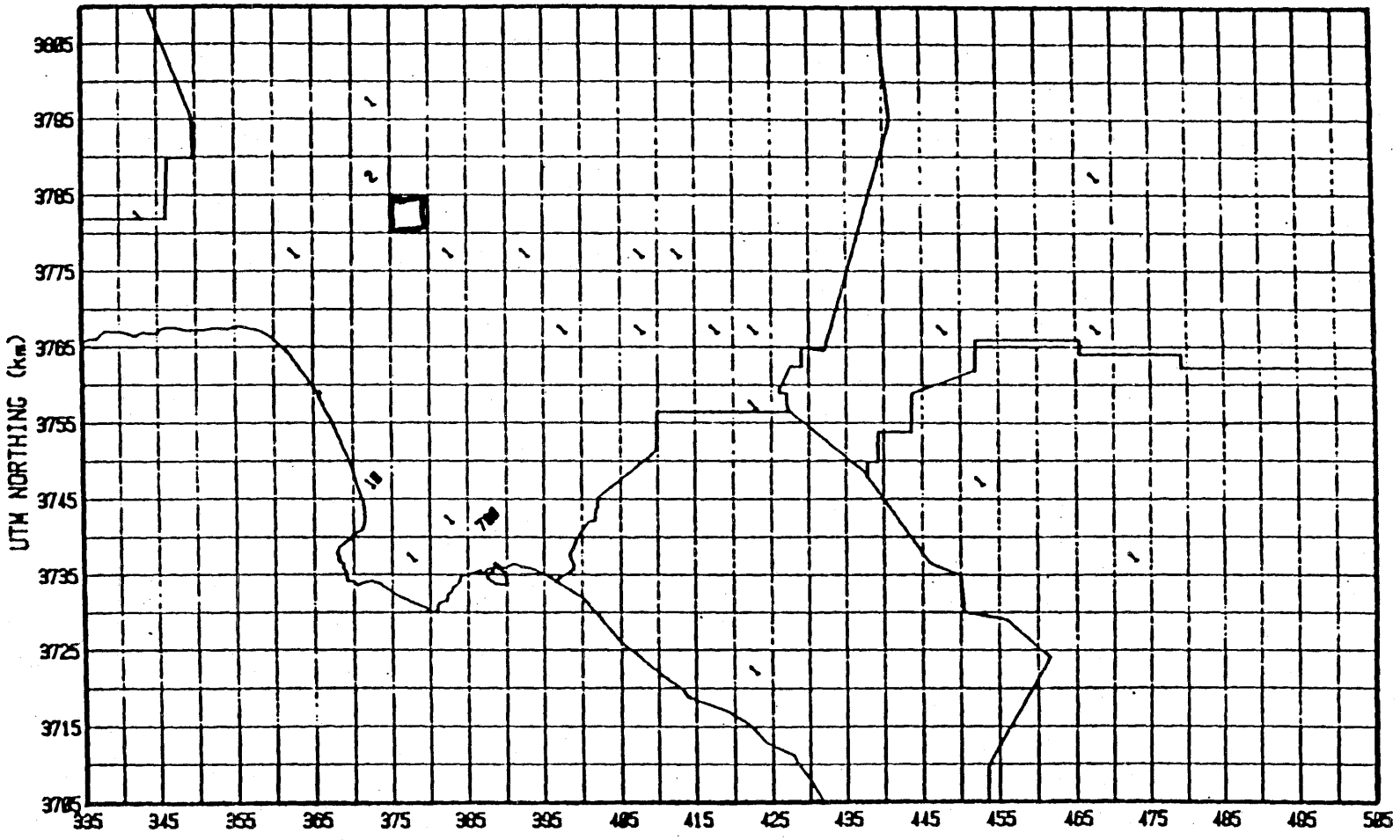


FIGURE A-18

DISTRIBUTION OF POINT SOURCE EMISSIONS OF VINYL CHLORIDE (lbs/yr)

Note: 1 lb/yr default assigned to landfills

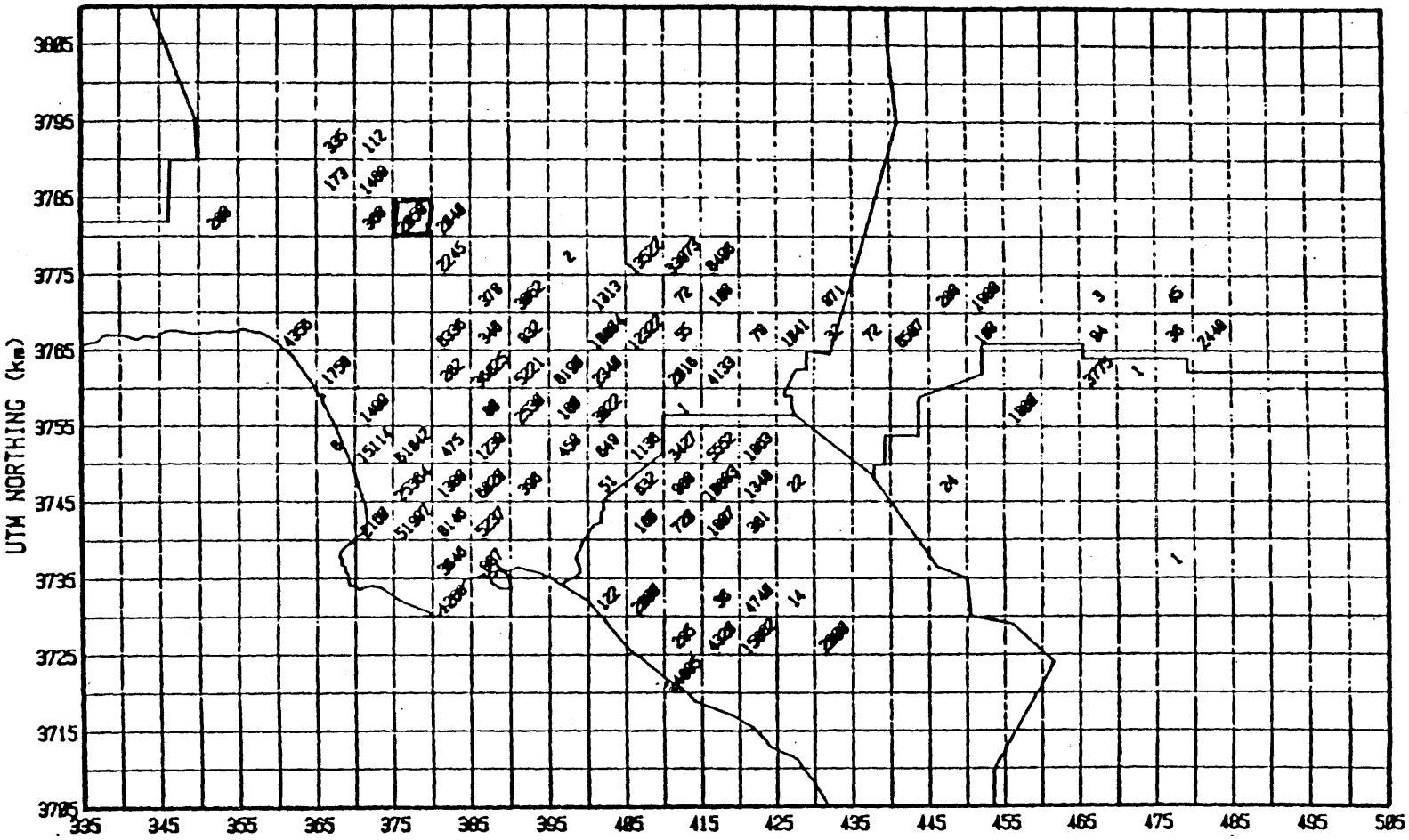


FIGURE A-19

SPATIAL DISTRIBUTION OF POINT SOURCE EMISSIONS OF XYLENES (lbs/yr)

Appendix 8

Record of telephone conversation with Ben Kaufman, Attorney to City of Burbank Redevelopment Corporation. *Mr. Kaufman was responding to Peartree's question regarding the potential for exposure to residential receptors near the B-1 plant from consuming municipal water derived from contaminated groundwater.*

After losing rights to all surface waters in about 1943, the City of Burbank has obtained its potable water supply from two sources, (1) groundwater in the San Fernando Basin and (2) water imported from the Metropolitan Water District which gets its raw water from the Colorado River. The San Fernando Basin runs north, south and east of the city. The percentage of water taken from the MWD increased gradually, reaching about 30% by the 1970's.

Lockheed used its own wells sunk in the North Hollywood Well Field operable unit beneath their facilities for the purpose of supplying their industrial needs. Because of the cone of influence of Lockheed's wells, the City had located its wells some distance away. The nearest city wells were 3500-5000 feet down gradient of Lockheed facilities. Because the City of Glendale had a history of high nitrate concentrations in their wells, City of Burbank wells were screened to receive water only in the deeper zones, 250 to 400 feet, mostly 400 feet. The worst contamination in the N. Hollywood well field is at the shallow level, which starts at 140-150 feet below grade. From 200 to 400 feet down, the level of contamination ranged (in 1992) from ND-5 ppb to 100-500ppb PCE.

In 1975 the City lost another lawsuit wherein it lost rights to the groundwater in the area except for a fraction, about 20% of the total demand, that was recaptured return flow (from surface uses).
They subsequently increased the amount imported from MWD to 50-60%
At all times the city has blended and disinfected water from the various (upgradient and down gradient) wells and from the MWD at its central facility and then distributed the water to customers.

In 1982 city wells showed measurable levels of VOC's for the first time and they were shut down. It is unclear whether this finding resulted from improved analytical techniques. Some water department personnel say they had been using improved techniques two years before. Lockheed had also lost rights to use groundwater in the 1975 court case and ceased pumping in 1979. Some believe that, up to that time, Lockheed's pumping had substantially prevented off migration of groundwater contamination, and that's why the city discovered contamination in down-gradient wells for the first time in 1982. Since 1982 less than 10% of city water has come from wells. These were upgradient wells that can be used only during drought conditions.

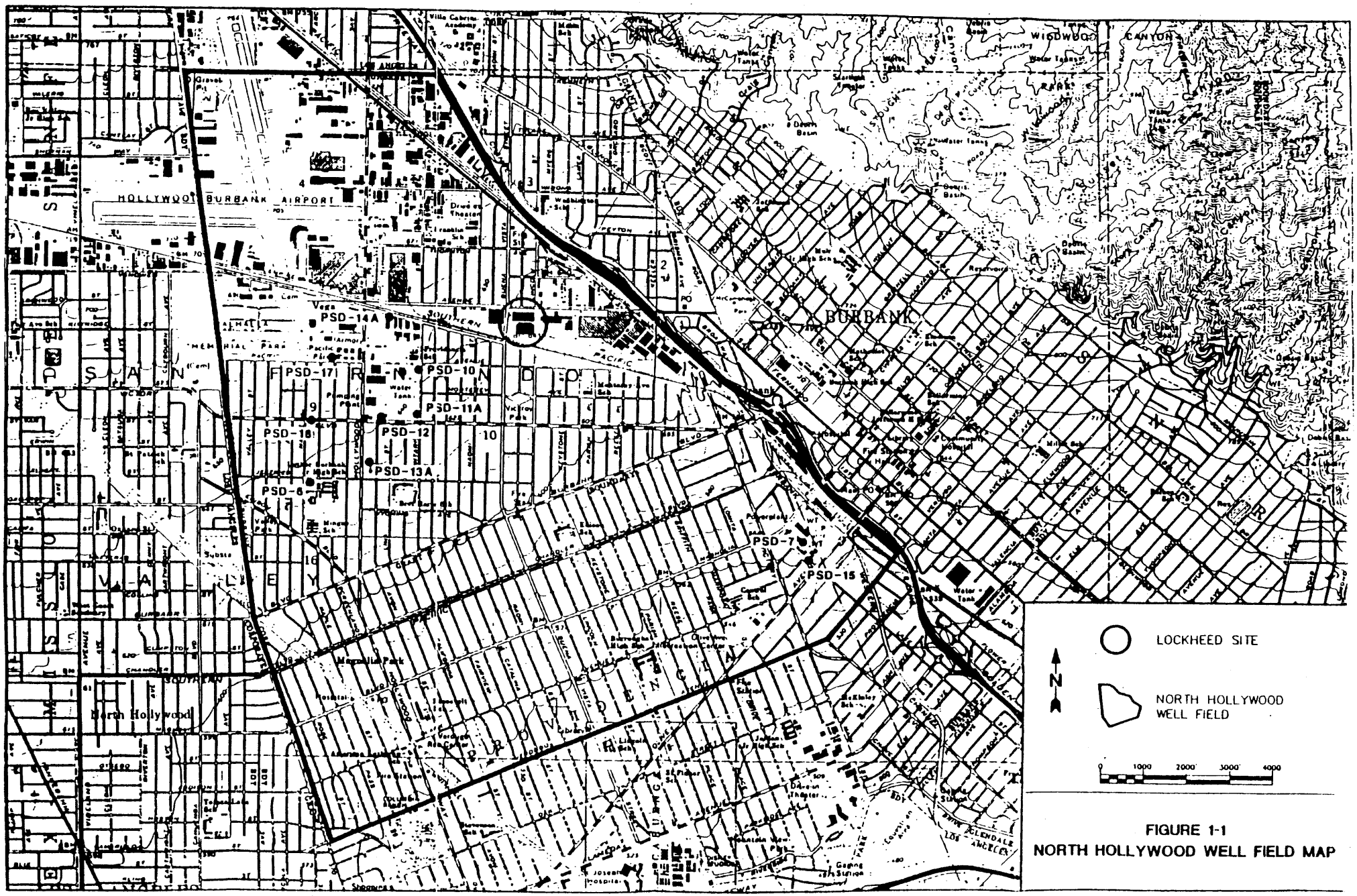


FIGURE 1-1
NORTH HOLLYWOOD WELL FIELD MAP

RECEIVED 1995
orig BJ
cc RT, JF, B
RH

THE PEARTREE GROUP, INC.

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C. Volland (913) 334-0556

March 24, 1995

Mr. Rick Pruetz
Chief Assistant, Community Development Director
City of Burbank
P. O. Box 6459
Burbank, Ca. 91510-6459

Subj: Addendum to our report dated March 8, 1995
Concerning the Lockheed B-1 Plant Site Remediation

Dear Mr. Pruetz,

In our report dated March 8, 1995 we concluded that T-BACT was primary treatment with activated carbon followed by 70% reinjection of treated air. The 70% figure was derived from two pieces of information provided in ICF Kaiser's letter dated February 14, 1995. First, ICF Kaiser presented a model scenario which indicated that almost 100% of extraction air could be reinjected to the four deeper zones without creating significant fugitive emissions at the surface. However only about 35% could be injected in the shallowest zone (due to it's high permeability and it's proximity to the surface). The combination of the two in that scenario worked out to 84% reinjection. Secondly, ICF Kaiser noted that they had already designed the injection system to handle a volume of air equal to 70% of extraction volume. We observed that all of this could be treated air and still provide some margin for error.

Lockheed disagreed with our recommendation and asked to discuss this issue with the Peartree Group. To this end, George Baggett and I participated in a conference call on March 20 with Mr. Ralph Peck of Lockheed and Mr. John McMillan of ICF-Kaiser. Mr. McMillan stated that the scenario depicted in their letter of February 14 covered only one of several operating modes that will be employed during the life of the project. In particular, during the early months of operation, the operators will be extracting proportionally more air from the shallow zone. In one such case, they expect to be able to reinject only about 50%. They also noted that vents not employed for extraction are the ones used for injection. Certain combinations of these vents would, at times, limit the capacity for reinjection. Finally, when bringing on line a new cluster of vents, it may be necessary to have reinjection lag extraction for a short period to ensure that subsurface strata are not overpressurized. In short, they have a need for a certain degree of operational flexibility to properly operate the system.

During our conference call, Mr. Peck stated that Lockheed has already given instructions to increase the size of the treated air recycle piping so as to increase its capacity from 50% to 70% of extraction volume. Thus the system will have the capability to reinject up to 70% of the treated air when feasible and prudent to do so. We share Lockheed's overriding concern to avoid fugitive emissions. Mr. Baggett noted that excessive reinjection might cause migration and diffusion of contaminants to the surface and into buildings which might be part of future redevelopment of the site. We also agreed that some operational flexibilty is necessary and reasonable to ensure that this doesn't happen.

Both Mr. Peck and Mr. McMillan noted that it was in their best interest to reinject as much as feasible, but felt that the proposed 9.8 lb/day permit limit, which is based on 50% reinjection of treated air, would suffice in lieu of a T-BACT designation more specific than activated carbon adsorption. He noted they would usually be emitting a lessor amount (3-4 lb/day), anyway.

We prefer a T-BACT designation that recognizes the role of reinjection of treated air to further reduce emissions. Accordingly we are comfortable with revising our report as follows:

T-BACT should be primary treatment by activated carbon adsorption with structural provisions for reinjection of up to 70% of the treated air.

By primary treatment we also mean to incorporate the AC polisher unit to handle spikes as planned. Since Lockheed has already instructed their engineers to increase the size of the treated air recycle piping and valves to accommodate a volume equal to 70% of extraction, when prudent and feasible, they already meet this designation.

This designation must be incorporated into the permit in conjunction with our report recommendation no. 3 in order to provide enforcable limits on emissions of each chemical. The 9.8 lb/day (30 day average) permit limit for total reactive organic gases should ensure that reinjection does not fall below 50% for a significant length of time.

We would also recommend that the City conclude an operating understanding with Lockheed that includes a statement of their commitment to operate the system to maximize the percentage of reinjection that is feasible and prudent, and to report on a regular basis the degree of reinjection of treated air that they do achieve.

We would also recommend that if and when redevelopment activities result in new buildings on the site, that are in use during the life of the remediation project, that the indoor air be regularly monitored at a level of detection consistent with the Reference Exposure Levels for PCE and TCE. Lockheed disagreed with this recommendation on the basis that they will not have control of the airspace within these buildings. For example emissions could emanate from construction materials and building appurtenances or from activities of tenants such as film development and use of cleaning fluid. They have a very good point. Nonetheless it's hard to get around the fact that these buildings will be situated above a significant source of these chemicals and the best place to measure exposure would be inside occuppied

buildings. Detection of these chemicals would merely warrant further investigation and Lockheed would not necessarily be to blame. We also think the city should pursue with Lockheed alternate ways to ensure demonstrable control of any fugitive emissions from the remediation project.

Sincerely,

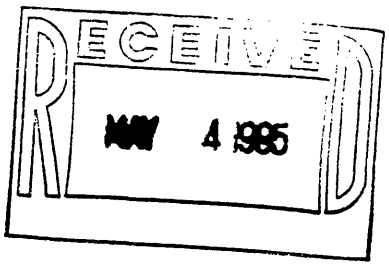
Craig S. Volland
Project Coordinator

cc. John McMillan
ICF-Kaiser Engineers, Inc.

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May 2, 1995

Mr. Rick Pruetz
Chief Assistant, Community Development Director
City of Burbank
P. O. Box 6459
Burbank, Ca. 91510-6459

Subject: Second Addendum to our report dated March 8, 1995 Concerning the Lockheed B-1 Plant Site Remediation

Dear Mr. Pruetz,

This second addendum to our report addresses the Lockheed responses dated April 12 and April 24, 1995. Our report as amended by our first addendum dated March 24, 1995, and the conclusions and recommendations therein remain unchanged except for the following:

Five Years of Meteorological Data

We agree that rerunning the dispersion model with 5 years of meteorological data would be unlikely to materially change the conclusions regarding cancer and non cancer health risks associated with the Vapor Extraction Project. The one year of data from the Burbank Airport, which is only two miles from the site, could be interpreted as meeting the EPA minimum guideline for one year of "on site" data.

We still feel the use of additional data would be desirable to further reassure the public, but not strongly enough to press the point further. The cost of obtaining five years of formatted data for LAX from the National Climatic Data Center is $1200. However, we do feel strongly that the special case of acute impacts during periods of stagnation, as discussed on pages 11 and 12 of our report and encompassed in recommendation number 6, has not been adequately addressed. This issue will be discussed in more detail later in this text.

Permit limits

Our Recommendation No. 3 is revised as follows: *Permit limits, based on a monthly average concentration for each contaminant, should be set equal to the highest number listed in Table 4 of the Rule 1401 Health Risk Assessment (Dec. '94), ie. higher of emissions listed for either the low efficiency or high efficiency condition.* We have eliminated that part of the recommendation referring to hourly average concentrations since it is inconsistent with our monitoring recommendation.

Cumulative Impact Analysis

The authors appears to have incorporated, by reference, our analysis of past point source toxic air emissions in the Burbank area. We criticized the draft because, even though the

authors briefly mentioned the MATES study, they did not proceed to the appropriate analysis and interpretation of the data contained therein which is very useful to the public's understanding of the project. We concluded that because of these past exposures Lockheed should make every reasonable effort to minimize future emissions. In our opinion, Lockheed has met this recommendation with their most recent design provided that the facility is operated within the permit limits and the monitoring protocol we have suggested.

We are pleased that Lockheed has listed future projects in the area, and agree that these are unlikely to significantly increase the risk to the same receptors affected by the subject project.

Regarding Lockheed's concerns about the accuracy of the Toxic Release Inventory data, we would note that Lockheed, themselves, have reported their past emissions under this federal program, and we would be happy to evaluate any additional data they would like to provide in this regard. However, it should be noted that EPA analysts have estimated that, if anything, the TRI data significantly underestimates the actual level of emissions. This is due to under reporting, a failure to report by some parties who are subject to the law, and a list of certain types of facilities which have not been required to report. Further, many manufacturers fall under the reporting threshold, and the inventory only requires reporting on a small number of chemicals widely used in industry. It is important to note that we chose to use the TRI data in this case because it covers many of the specific chemicals pertinant to this site.

Other Issues

The above constitutes the entirety of changes to our report. However, Lockheed has identified other issues on which they have requested closure.

T-BACT and Reinjection of Vapor

Please note that the designation of T-BACT as activated carbon adsorption plus provisions for reinjection of up to 70% of the treated air must be coupled with enforceable permit limits on emissions. Otherwise there's nothing to prevent the plant operator from discontinuing the reinjection of treated air, if they so desired. According to our report, (recommendation number 3), we believe that, for the reasons stated below, these limits should be written in terms of the individual chemical species in addition to the 9.8 lb./day reactive organic gases (ROG) limit as proposed by the applicant.

Monitoring of Individual Chemical Species

The impacts estimated in the Health Risk Assessment were not calculated using the 9.8 lb/day ROG figure, rather they are based on an estimated mix of emissions of individual chemicals. This mix could quite possibly be different than expected, and materially affect the actual risk to nearby receptors. The public needs to be assured that if the actual emissions of certain individual species, particularly vinyl chloride, turn out to be higher than expected, that permit limits would ensure that corrective action will be taken. Our monitoring recommendation number 4 is designed to ensure that operators will know if this happens. We would note that the decline in vinyl chloride emissions, expected by the applicant, cannot be verified without monitoring such as we have recommended.

The reason we have recommended monitoring monthly for the duration of the project, even after the initial period of more intensive monitoring, is because the operator will be making major changes in the pattern of extraction from time to time. We are concerned that unexpected pockets of vinyl chloride, created in years past, might be evacuated before aerobic bacteria can be mobilized to degrade it. After the actual concentrations of minor species are verified during the initial 6 month intensive monitoring period, the number of species monitored can be reduced to just those significant to the health risk assessment, which are PCE, TCE, and vinyl chloride.

Additional Analysis Under Stagnant Conditions

Without providing any supporting data or references, other than a conversation with the head of the modeling group at SCAQMD, Montgomery Watson claims that extended stagnant conditions do not occur in the South Coast Air Basin. They point out that the 1981 Burbank data modeling, which includes one meter/second wind data, showed that the hazard index is very low (0.0029). They further stated that concentration is inversely proportional to wind speed, and that the hazard index would still be quite low if the wind speed diminished to 1/2 meter/second. In their earlier comments dated Feb. 10, 1995, they had cited SCAQMD that 1981 was a "bad year in terms of air quality."

In an attempt to verify this information we consulted the EPA's database on tropospheric ozone values in the Los Angeles area[1]. Ozone smog is primarily a function of VOC and NOx precursors, sunlight, temperature and air stagnation. Within any given year the precursor chemicals available for photocatalytic reaction would be about the same. Thus, ozone exceedances are a reasonable surrogate for the warm, stagnant conditions we are concerned about. The data available for Burbank from 1978 through 1992 is shown on chart No. 1.

First, we note that 1981 was one of the *better* years within the 1978-1985 period in terms of both total number of ozone exceedances and the number of consecutive days of exceedance, the latter being an indicator of extended periods of air stagnation. The incremental improvement in ozone performance since 1985 does not mean that Burbank has less air stagnation, rather it reflects the success of regulatory efforts to reduce the emission of precursor contaminants.

We question Montgomery-Watson's assertion that the acute hazard during periods of stagnation can be described or inferred by the ISCST2 model, particularly that the inverse proportionality between concentration and wind speeds would hold for a receptor near the base of the stack. Such a receptor would not be impacted at all (the plume is overhead) until the wind speed approaches zero, so we are talking about a non-continuous function in this case.

We can construct a worst case scenario that suggests the need for further study of this issue. In Table 4 of the HRA, the applicant assumes an influent concentration of about 4000 µg/l of PCE which, at 97% removal, means that 120 µg/l would exit the stack (regardless of the % reinjected). This corresponds to PCE emissions of 5.359 lb/day. The soil vapor data revealed numerous instances when PCE comprised virtually all of the VOC's present. Thus it is quite possible at times that all of the 9.8 lb/day permitted effluent will be PCE. Multiplying the 120 µg/l by 9.8 divided by 5.359 in Table 4 we get a new stack concentration of 219.5 µg/l.

In Table 3 the applicant shows that between year 1.5 and 2, the extraction rate will be reduced from 6000 to 2770 scfm, but the allowable emissions of VOC's remains the same, ie. 9.8 lb/day. With dilution air thus reduced, the potential concentration of PCE that could be legally emitted now rises to 475 µg/l (219 µg/l x 6000/2770). This figure compares to the OSHA limit for workers of 170 µg/l and the reference dose for the public of 6.8 µg/l (from Table 2, non-cancer HRA). When the wind is not moving, the question is ... how much dilution will occur as the PCE diffuses 44 feet down to a six foot tall receptor working near the base of the stack?

We are not so much concerned about the treatment plant workers who can take protective measures. Recommendation No. 6 in our report referred to *future redevelopment scenarios* where shop owners, for example, might be present near the stack for 12 hours a day, 6 days per week. The 6.8 µg/l reference dose is approximately the same as the ATSDR's Minimum Risk Level of 4 µg/l for acute exposure[2]. The ATSDR number corresponds to 24 hour exposures and incorporates a safety factor of ten to account for variations in human susceptibility.

This problem can be analyzed, on a preliminary basis, with Burbank station wind data regardless of whether it is properly formated for use with a dispersion model. We are merely interested in the percentage of the time winds were less than 1 M/S during a stagnation episode and in evidence of dead calm. Based on the aforementioned ozone exceedance data, we suggest that the following periods be analyzed in this regard:

October 1 - 7, 1978
September 5 - 12, 1979
September 28 - Oct. 4, 1980
August 1 - 8, 1983
September 13 - 18, 1983

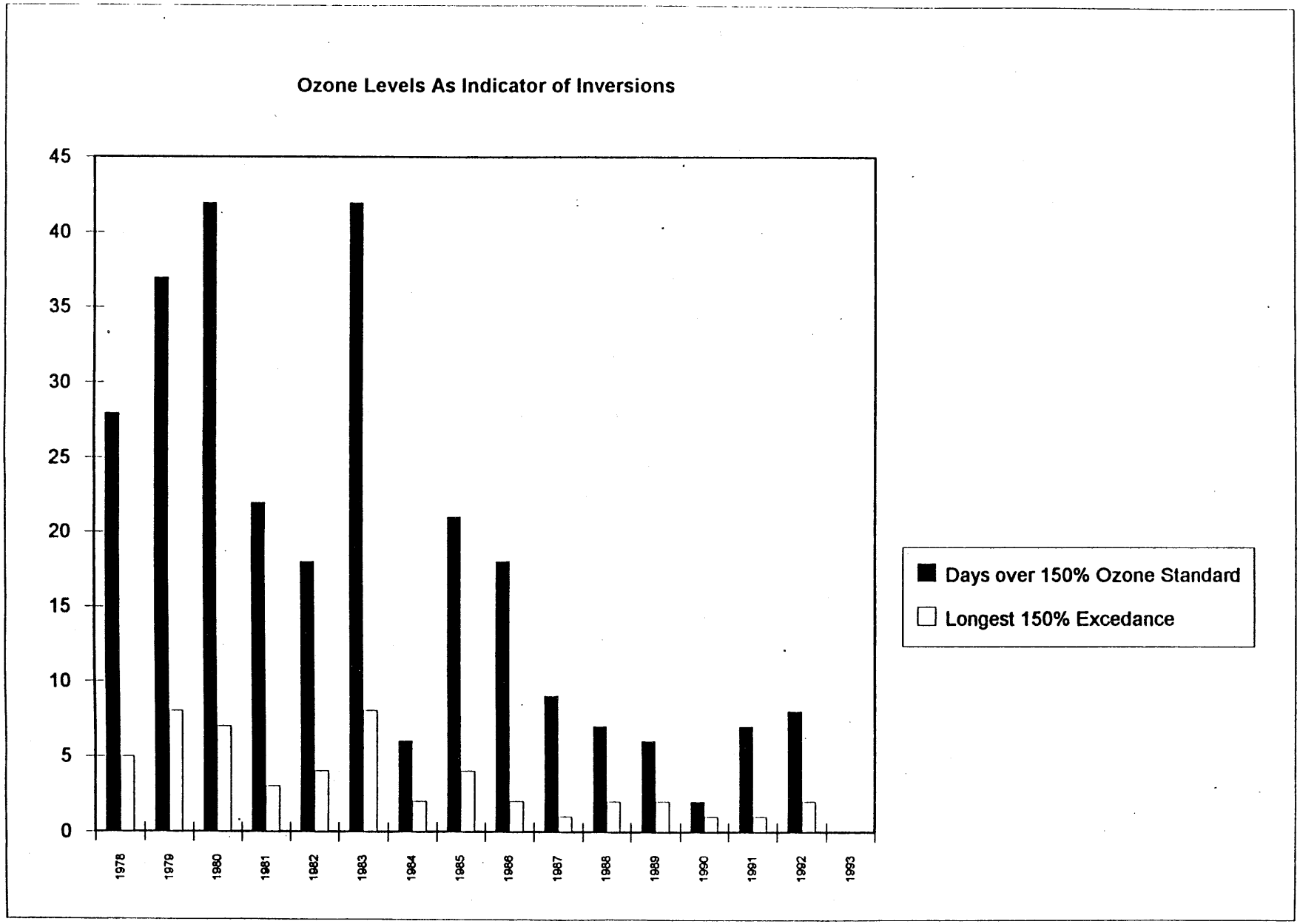
This issue need not delay the project. We are merely saying that the City should study this issue further in connection with specific redevelopment plans and avoid configurations that might unduly retard movement of air at ground level. One can react to serious episodes of stagnation by simply shutting off the system for a few days, and the city should prepare contingency plans as to when such action should be taken.

Sincerely,

Craig S. Volland
Project Coordinator

References

1. USEPA Aerometric Information Retrieval System.
2. ATSDR, Toxicological Profile for Tetrachloroethylene, April, 1993.



Source: USEPA Aerometric Infomation Retrieval System

APPENDIX G

COMPARISON OF VOC/ROG EMISSIONS FOR CITY OF BURBANK AND LOCKHEED

DAMES & MOORE
8801 FOLSOM BOULEVARD, SUITE 200, SACRAMENTO, CALIFORNIA 95826
(916) 387-8800 FAX: (916) 387-0802

March 28, 1995

Mr. William D. Jacobs, AICP
Assistant Planner, Planning Division
Community Development Department
City of Burbank
P.O. Box 6459
275 East Olive Avenue
Burbank, California 91510-6459

SUBJECT: **Comparison of VOC/ROG Emissions for City of Burbank and Lockheed**

Dear Mr. Jacobs:

The revised memorandum provides a comparison of air emissions from Lockheed's Vapor Extraction System (VES) to air emissions for the City of Burbank as presented in your attached fax dated February 23, 1995 (Attachment A). Some key points to consider when using this data are:

1. ROGs are a large subset of VOCs and considered to be ozone precursors. The subset of chemicals considered to be VOCs but not ROGs are classified as "Exempt Compounds" by the SCAQMD. The SCAQMD further separates the Exempt Compounds into two groups – Group 1 and Group 2. Group 2 compounds are considered to be potential ozone depleters and are in the process of being regulated.

2. The TRI data may not provide a comprehensive list of all VOC emissions for the City of Burbank. As such, the percent contribution by Lockheed's VES is probably overestimated using the TRI data.

Basis for Comparison

1. City of Burbank Emissions (1992)

VOCs	139,828 lb/yr
ROGs	35,517 lb/yr

2. SCAQMD Exempt Compounds and Amounts

Group 1	HCL @ 255 lb/yr
Group 2	1,1,1-trichloroethane @ 84,960 lb/yr
	Freon 113 @ 19,100 lb/yr

3. Emission amounts in the TRI table are for lb/yr.

4. Revised ROG emissions are 3,577 lb/year (or 9.8 lb/day) as presented in Attachment A.

5. The Lockheed VES VOC emissions as presented for Year 0 to 0.5 in Table 3 of the Non-Cancer Health Risk Assessment (Montgomery-Watson, February 1995) were adjusted proportionally such that the emissions of the ROG component were 9.8 lb/day (*i.e.*, 3,577 lb/year). In Table 3, ROG emissions constitute 98.5 percent of total VOC emissions. Therefore, ROG emissions of 3,577 lb/day similarly constitute 98.5 percent of VOC emissions of 3,633 lb/day.

6. The original VOC emission rates assume the same speciation of compounds as the revised emission estimates.

Lockheed Proposal	VOC (lb/yr)	ROG (lb/yr)	Percent of Total as	
			VOCs	ROGs
Original	14,822	14,600	10.4%	41.1%
Revised	3,633	3,577	2.6%	10.1%

Please give us a call if you have any questions or comments.

Sincerely,

DAMES & MOORE

Ijaz S. Jamall, Ph.D., DABT
Principal and Manager
Toxicology, Risk Assessment and
Environmental Statistics Group
Telephone (916) 387-7559

Gary W. Gruwell, P.E.
Senior Engineer
Telephone (916) 387-7565

ISJ:fal
Attachment

B:\BURBANK.CTY\JACOBS3.LTR
March 28, 1995

Significant VOC Emissions 1987-92
(stated in pounds/year)
Pounds Reported by Industry
in Zip Codes
9102, 91503, 91504, 91506

Chemical Name	1987	1988	1989	1990	1991	1992*
1,1,1, -Trichloroethane	412,761	690,265	120,423	163,655	126,770	84,960
Dichloromethane	12,905	1,850	10,147	18,897	9,300	0
Freon 113	79,900	6,560	53,200	47,736	40,885	19,100
Methyl Ethyl Ketone	67,900	87,000	27,038	0	0	0
Methyl Isobutyl Ketone	62,719	22,400	33,500	0	0	0
Tetrachloroethylene (PCE)	340,037	559,819	180,500	40,090	21,203	27,517
Toluene	31,679	5,700	8,950	0	0	0
Trichloroethylene (TCE)	26,789	37,232	0	0	0	0
Hydrochloric Acid	500	750	32,250	760	250	250
Acetone	0	7,600	0	0	18,000	8,000
Methanol	0	10,100	0	0	0	0
Total Significant VOC Emissions	1,035,190	1,429,276	466,008	271,138	216,408	139,827

Source: The Right to Know (RTK)net -EPA
* Most recent numbers available from EPA

bodfemissions\kt

PROVIDED LOCKHEED 8 VES Data:
Original Report: 40 lbs/Day = 14,600 lbs/yr.
Revised Report*: 9.8 lbs/Day = 3,577 lbs/yr

* 12/94 Enhanced VES submittal

To: Dr. Ijaz Jamal, Dames and Moore

Fax #: (916) 387-0802

From: William D. Jacobs, AICP, Burbank Planning Div - Community Development Dept.

Date: February 23, 1995

Pages: 2, including this cover sheet

fax

Ijaz-

The Peartree Group provided the attached list of TRI data for VOC emissions in Burbank. However, it is our understanding that Lockheed's HRA focuses on ROG's. To clarify the difference between VOC and ROG's, would it be possible for you to do a table comparing the output of each in both the original (5/94) and revised proposals (12/94), i.e.:

	VOC (lbs/day)	ROG (lbs/day)	Percentage
Original proposal	?	40	
Revised proposal	?	9.8	

Thank you for your assistance.

From the desk of...

William D. Jacobs, AICP
Assistant Planner
Burbank Planning Div - Community Development Dept.
P.O. Box 6459; 275 East Olive Ave.
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tel: 818-953-8609
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APPENDIX I

1993 EMISSIONS PERMITTED BY SCAQMD FOR BURBANK FACILITIES

APPENDIX H

OCTOBER 13, 1995 LETTER FROM SCAQMD

South Coast
AIR QUALITY MANAGEMENT DISTRICT
21865 E. Copley Drive, Diamond Bar, CA 91765-4182 (909) 396-2000

October 13, 1995

Rick Pruetz
City of Burbank Planning Division
275 East Olive Avenue
Burbank, CA 91510-6549

Re: Lockheed VES Project

Dear Rick,

In response to the October 11, 1995 letter from Sharon Rubalcava. During the original proposal for the vapor extraction system, the risk factor was over one in a million. At the time, the proposed control device was considered best available control technology for toxics (T-BACT).

Since the project was revised and the risk factor is less than one in a million, T-BACT is no longer required for allowing the project to continue.

I hope this answers your question. If you have any other questions or comments, please feel free to give me a call at (909) 396-2094.

Sincerely,

Steve Jones
AQ Analysis and Compliance Supervisor

APPENDIX I

1993 EMISSIONS PERMITTED BY SCAQMD FOR BURBANK FACILITIES

1993 Emissions Permitted by SCAQMD for Burbank Facilities

	CH4	CO	NOX	ROG	SOX	SPOG	TSP
K&L	0	0.1	0.4	0	0	0	0
Polycraft	0	0	0	0	0	0	0
Caroca				4.3			
Hoppenfeld				0.03			
Disney	0	0.2	0.7	15.6	0		0
Barry	0	0	0.1	2.6	0	0	0
Foto Kem	0	0	0	0	0	0	0
Lockheed	0	0.3	8.3	1.1	0	0	0
Phillips	0	0	0	10.5	0	0	0
Ball		0.1	0.2	1	0.1		0.1
Photo Sonics	0	0	0	0	0	0	0
Tech Graphic	0	0	0	1.8	0	0	0
St. Joseph		1.7	2	0.34	0.06		0.32
Quality Heat				2.9			
McMurray	0	0	0.1	0	0	1	0
Surface Finshing	0	0	0.2	5	0	0	0
Rene	0	0	0	0	0	0	0
AH Plating		0.1	0.1	1	0.1		0.1
Aviall	0	0	0.2	1	0	0	0
Hydra Electric							0.3
Stainless Steel		10.2	0.6	4.5	0		0
Avibank		0.14	0.52	0.54	0.003		0.03
Spence		0.2	0.7	0.2	0.1		0.1
Valley Engravers	0	0	0	1.2	0	0	0
Martinos			0.1				
Pacific Airmotive		1.2	5.3	15.4	2.4		29
Crane	0	0	0	2	0	0	0
Image Transform	0	0	0.2	0	0	0	0
Warners				6.3			
Screen Graphics	0	0	0	1	0	0	0
Mel Bernie		0.2	0.6	0.1	0		0
Johanson	0	0	1.6	18.5	0	0	0
Allen's	0	0	0	0	0	0	0
Wanamaker		0.1	0.5	0	0		0
ITT	0	0	0	0.1	0	0.1	0
Aircraft Service				0.9			
GL Crawford	0	0		3.6	0	0	
Swiss Dane	0					0	
Westland				3.7			
In & Out Paint/Body						2.1	
Pointille	0	0	0	9.3	0	0	
Shadkor		0	0.3	0	0		0
American Mobile	0	0.9	0.1	0.1	0.1	0	0.1
AC Equipment		0.1	0.2	0	0		0
Technical Metal Finishing				0			
Airport Authority	0	0.3	1.2	0.1	0.1	0	0.1
Q-West	19	9	5	0.5		0.5	0.1
Commercial Lamp	0	0	0.2	0.4	0	0	0
Regal				0.3			
Color West				6			
TOTAL Tons/Year	19	24.84	29.42	121.91	2.963	3.7	30.25
TOTAL Pounds/Day	104.1096	136.1096	161.2055	668	16.23562	20.27397	165.7534