GEO-PHASE
ENVIRONMENTAL

REPORT

PRELIMINARY ENDANGERMENT ASSESSMENT
Former Haley Flying Service
21,000 Paradise Road, Tracy, CA
(Cal-Site # 39070037)

January 18, 2006

GPE Project No. 474.2

Submitted to:

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Mr. Eric Wallberg
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RE: REPORT – PRELIMINARY ENDANGERMENT ASSESSMENT
Former Haley Flying Service, 21,000 Paradise Road, Tracy
(Cal-Site # 39070037)

Mr. Wallberg:

The attached report is submitted on behalf of Mrs. Dorothy Haley, the owner of the subject site, formerly operated as a crop-dusting service. The site is listed on the DTSC "Cal-Site" database. The purpose of this PEA is to assess the risk to human health and ecological receptors, and the potential threat to groundwater from a release of pesticides.

Sincerely,

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Stephen M. Lankford, PG, REA
President

cc: Dorothy Haley
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GEO-PHASE ENVIRONMENTAL

PRELIMINARY ENDANGERMENT ASSESSMENT

Former Haley Flying Service
21,000 Paradise Road, Tracy
Cal-Site # 39070037

January 18, 2006
GPE Project No. 474.2

EXECUTIVE SUMMARY

Purpose

The subject site was formerly used as a crop dusting airstrip from the 1950s to the late 1980's. The operations included storage and handling of agricultural pesticides and herbicides. The primary chemical handling facilities included an aircraft loading dock and pad, as well as a "wash-out pit" where the tanks of returning aircraft were rinsed out and the rinseate was treated by aeration. (See Figures 2 and 3 for a graphical representation of the site.) The facility was placed on the DTSC "Cal-Site" list in 1981, and the listing included a requirement that a Preliminary Endangerment Assessment (PEA) of the site be completed. For 25 years, however, no PEA was completed nor was any or other attempt made to assess the possible impact to the site from agricultural chemicals. This current report is in fulfillment of the DTSC requirement for a PEA.

A secondary objective of this PEA was to assess the possible impact to the soil from a reported spill of an oil / diesel / water mixture as well as an area of oil stained soil near the permanent buildings on the site. The spill was investigated by the San Joaquin County Environmental Health Department in 2001, and the agency required additional investigation to assess the extent of possible soil impact.

Site Use and Setting

The subject site is a 10-acre parcel just inside the Tracy city limit that was formerly used as a crop dusting airstrip. The hangars and immediately adjacent area are currently in use by a small trucking company, and the remainder of the site remains undeveloped. Except for a Yellow Freight truck terminal adjacent to the west, the adjacent parcels are in agricultural use, primarily to raise corn and alfalfa. The Haley site and parcels adjacent to the north, south, and west are zoned industrial, and the area is planed for development as an industrial park. The parcel is bounded on the east by Paradise Road, and the land on the opposite side

continues to be zoned for agricultural use. Paradise Road also marks the Tracy city limit. The nearest residents are farm houses approximately ½ mile away.

Scope of Work

The tasks accomplished during completion of this PEA included collecting a suite of shallow soil samples and two groundwater grab samples. These samples were subjected to laboratory analysis to test for the possible presence of a variety of pesticides and herbicides. Several soil samples were also tested for the presence of extractable petroleum hydrocarbons and one was tested for volatile organic compounds to assess the reported waste oil and diesel spill.

Sample Analytical Results

The analytical testing indicates the soil in the vicinity of the aircraft loading dock, surrounding loading pad, and the washout pit, is severely contaminated by a variety of pesticides, mostly of the organo-chlorine group. The bulk of the contaminant mass consists of the DDT sub-group (DDT, DDD, DDE) and Toxaphene. Dieldrin was detected in much lower concentrations, but this chemical is hazardous at much lower concentrations. Other contaminants include Chlordane, Aldrin, Methoxychlor, and Endosulfans. The sample with the greatest total contaminant mass was collected from a point adjacent to the loading dock. It contained a total pesticide mass load of approximately 50,000 parts per million (ppm).

Groundwater at the site lies about 11 feet below the surface and the two groundwater samples were collected from points near either end of the washout pit. Laboratory analysis detected the presence of pesticides in the groundwater samples. These results are questionable however, because the sample collection required installing the borings through the highly contaminated shallow soil. This means the drilling and sampling tools had to pass through the contaminated soil in order to reach the groundwater. It is considered very possible or likely that cross-contamination from the shallow soil may have affected the groundwater samples and thus resulted in false detections or exaggeration of pesticide concentrations.

No material presence of extractable petroleum hydrocarbons or VOCs was detected in the soil samples that were tested for these substances.

Human Health Hazard Assessment

Upon completion of the field and laboratory work, government-approved software, known as CalTOX, was employed to help evaluate the risk posed to human health by the agricultural chemicals detected. A U.S. EPA computer program known as ProUCL was used to statistically analyze the distribution of laboratory data and derive a mean concentration for each detected chemical to a 95 percent upper confidence limit (UCL). Analytical tests for herbicides and pesticides outside the organo-chlorine group were completed on too few samples to represent a statistically significant population. Mean contaminant concentrations for these chemicals were assumed to be the maximum concentration actually detected. Based, in part, on the ProUCL statistical analysis, the following organo-chlorine pesticides were identified as organo-chlorine pesticide Chemicals of Potential Concern (COPCs) in the soil:

a-Chlordane	Endosulfan I
g-Chlordane	Endosulfan II
DDD	Endosulfan Sulfate
DDE	Endrin
DDT	Toxaphene
Dieldrin	

The organo-phosphorous chemicals, Ethion and Ethyl parathion, were also detected and deemed to represent COPCs, as were the N-methyl Carbamate pesticides, Carbaryl and Methiocarb.

Although the groundwater samples are considered suspect, the following organo-chlorine pesticides were detected and are identified as COPCs in the groundwater:

DDD	Endosulfan I
DDE	Endosulfan II
DDT	Endosulfan Sulfate
Toxaphene	

The organo-phosphorous chemical, Ethyl parathion, was also detected and deemed to represent a groundwater COPCs as was the N-methyl Carbamate pesticide Carbaryl and the chlorinated herbicide DCPA.

The computerized health risk model known as CalTOX was used to assess the human health risk of these COPCs. In the CalTOX model, it was assumed that a hypothetical future resident would live on the site for 70 years and be available for exposure to the COPCs. The CalTOX software contains a library of characteristics and toxicity information on various chemicals, but not all the COPCs were included in the CalTOX library of chemicals. Those chemicals not included, however, represent only about 1.6 percent of the calculated total contaminant mass present at the site, and the assumption was made that excluding these chemicals from the risk assessment would not materially affect the results of the risk assessment. This assumption is based on the fact that even excluding these minor COPCs, the estimated human health risk is much greater than the accepted EPA and Cal-EPA criteria of 1 in one million. The risk management decision, is therefore, not affected by excluding these minor COPCs from the total risk calculation. The following table represents the increased cancer risk and the non-cancer chemical risk estimated by the CalTOX program:

Chemical	**Increased Cancer Risk**	**Hazard Ratio (non-Cancer)**
Chlordane	2.2E-3	3.8E+2
DDD	4.9E-5	0.0
DDE	5.9E-4	0.0
DDT	6.8E-5	4E+0
Dieldrin	1.3E-2	3.3E+2
Endosulfan	0.0	4.6E-1
Endrin	0.0	1.8E+1
Toxaphene	1.3E-2	1.9E+2
TOTALS	**2.9E-2 (=0.029)**	**9.2E+2 (=922)**

It should be noted that the estimated risk associated with Dieldrin exposure is almost certainly unreasonably high due to the calculated 41-mg/Kg contaminant point concentration for this chemical compared with the highest actual measured concentration of 3.8-mg/Kg (see Section 7.2).

In general, the exposure pathways most likely to affect humans are through ingestion of shallow (root zone) soil or inhalation of chemically impacted dust. Ingestion and dermal contact are also possible exposure pathways, but are less likely to have an adverse human health impact. Given that the shallow groundwater is not used as a source of municipal drinking water, it is unlikely that ingestion of groundwater would pose a health risk. As a part of this assessment, the CalTOX model took into consideration the plant uptake of the various chemicals.

General Observations

1. The hazard ratio is a measure of the non-carcinogenic health hazard associated with COPCs at the site. Any value over 1 indicates an elevated risk to human health. The potential non-cancer hazard quotient associated with exposure to the COPCs in the shallow soil by a hypothetical future on-site resident is 922. The increased cancer risk factor is 0.028 (i.e. 1 in 35). This compares with the risk factor of 1 in one million, which is generally considered acceptable. Both the increased cancer risk factor and the health hazard factor are very high and clearly indicate that an unacceptable health risk is associated with the Haley site. The figures also suggest that Dieldrin and Toxaphene are the chemicals that pose most of the risk. Although the Dieldrin risk is almost certainly grossly exaggerated for reasons discussed in Section 7.2, even the risk associated with this chemical is discounted; it would not change the risk management decision.

2. The distribution of chemicals in the various soil samples indicates that nearly all the contaminant mass as well as the health risk lies in the shallow soil of a relatively small area very roughly estimated at around 10,000 square feet in the immediate vicinity of where chemicals were stored and handled.

3. Samples collected from areas outside this highly contaminated zone generally appeared to contain trace or non-detectable concentrations of these chemicals. One deviation form this observation was in a sample from near the mid-point of the east-west trending airstrip. This sample point (S-5) had somewhat elevated concentrations of DDT and Endosulfan. Additional work is needed to characterize the risk in the vicinity of sample point S-5.

4. The actual presence of COPCs in the groundwater remains as an open question. Additional work is needed to make this determination.

Recommended Actions

1. Additional groundwater samples should be collected in the assumed down-gradient direction (north) to obtain information on the possible presence of pesticides in the groundwater. The best location would be along the south line of the agricultural parcel that lies on the north side of the irrigation ditch that marks the boundary between these parcels.

2. The concrete loading dock, washout pit, and aircraft loading pad should be removed and the concrete properly disposed of. This would allow access to the underlying soil so that additional samples can be collected to better define the lateral and vertical extent of the intensely contaminated soil.

3. Once this additional soil characterization is complete, the highly contaminated soil should be excavated and either treated on-site, or hauled to a Class I hazardous waste landfill as an interim remedial measure. This work would be expected to remove nearly all of the contaminant mass, thereby removing the source of potential groundwater contamination. New soil samples would then be collected from the freshly exposed surface and new groundwater samples could be collected to determine if additional remedial action is needed.

4. Additional sampling is needed in the vicinity of sample point S-5 to characterize the extent of low levels of organo-chlorine pesticides found there.

5. No evidence was found to suggest the spill of 2 drums of oil, water, and diesel in the area in front of the west hangar has materially impacted the soil. Further characterization and/or remediation does not appear to be warranted.

1.0 INTRODUCTION

As defined by California Health and Safety Code, Division 20, Section 25319.5, a Preliminary Endangerment Assessment (PEA) is "*an activity which is performed to determine whether current or past waste management practices have resulted in the release of hazardous substances which pose a threat to public health or the environment*".

1.1 Purpose and Scope of Work

The Purpose of this PEA was to assess whether the former use of the subject site as a crop dusting airstrip may have resulted in a release of pesticides and/or herbicides that impacted the soil and thereby pose a human health hazard and an ecological hazard. To accomplish this goal, the following tasks were completed:

1. Identified potential exposure pathways,
2. Collected a series of shallow soil samples and tested them for the presence of a variety of herbicides and pesticides,
3. Collected and tested several soil samples for the possible presence of extractable hydrocarbons and volatile organic compounds,
4. Collected two groundwater samples and tested them for the presence of pesticides and herbicides,
5. Conducted a screening-level assessment of soil toxicity and resultant human health risk,
6. Evaluated possible ecological impacts to the flora and fauna, and
7. Provided a series of recommendations based on the findings of this PEA.

1.2 Report Organization

Sections 2 and 3 summarize what is known of the history and past use of the site, as well as the present site status. A general description of the site location and setting is also provided. Section 4 provides general information regarding the geological and hydrologic setting, and the possible pathways in which receptors (people) could be exposed to the contaminants. The actual sampling and laboratory analytical results are documented in Section 5, and Section 6 evaluates the quality of the information so obtained. Section 7 describes the methods used to evaluate the laboratory results and estimate the potential risk to human health resulting from the soil contamination. Section 8 supplements the preceding section with a description of the possible impact to sensitive biota (plants and animals). Section 9 provides information on the nearby community and lists nearby residents and businesses and identifies pertinent elected officials and regulatory agencies. The conclusions and recommendations are detailed in Section 10. Eleven figures with graphical information are also provided, and six appendices containing laboratory data sheets and other basic information support the text.

2.0 SITE DESCRIPTION

The following sub-sections provide a detailed description of the location, setting, and current and past uses of the site and adjacent parcels.

2.1 Site Identification

Physical Address	21,000 Paradise Road, Tracy, California 95376
Assessor Parcel Number	213-060-13
Land Survey Grid Location	37° 45' 48" N; 121° 23' 29" W. NW ¼ S.14, T2S,R5E
On-site Business	Continental Express 2395 E Pescadero Ave Tracy, CA 95376 (209) 836-8888
Current Zoning	Industrial
Cal-Site I.D.	39070037
USEPA I.D.	None Assigned

2.2 Site Location & Setting

San Joaquin County has a Mediterranean climate with arid summers and mild winters. It has average annual rainfall of about 12 to 14 inches, most of which falls between November and March.

The area historically has been in agricultural use, but is in the process of being developed to industrial use. With the exception of a Yellow Freight truck terminal, the adjacent and nearby parcels remain in agricultural use but are zoned for industrial use.

The site is a 10-acre industrial parcel at the intersection of Paradise Road and Pescadero Avenue just inside the northeastern limits of the city of Tracy in San Joaquin County. It consists of a very long, narrow strip of land that is currently mostly unused except for a small complex of buildings near the extreme east end of the parcel. Continental Express, a small trucking firm occupies the buildings. (See Figures 1, 2, and 3 for the site location and graphical details.) The company uses the facility to park heavy trucks and trailers and to perform light servicing of the vehicles.

Hydrogeology

As shown on the USGS topographic map (Figure 1), the area is nearly flat lying, with little topographic variation, and a very gentle northerly slope. The north lot line is bounded by an unlined irrigation ditch, which lies inside a raised levee or berm. The ditch appears to be used only occasionally, and much of the year it is dry. According to a the San Joaquin County Groundwater Report (Hirata, 1999), it appears that first groundwater lies approximately 6 to 10 feet below ground surface and flows in a north to northeasterly direction. Based on soil borings completed for this PEA, the groundwater surface lies about 11 feet below grade.

Soils & Geology
Based on Page (1986), the geologic features of this portion of San Joaquin County are typical of California's Central Valley, a large northwest/southeast trending asymmetric trough bounded by mostly pre-Tertiary metamorphic, sedimentary and granitic rocks. Depth to basement rock in the Valley ranges up to at least 6 vertical miles in the southern portions of the Central Valley (the "San Joaquin" Valley), and to up to 10 miles in sediment thickness in the northern expanse of the valley (the "Sacramento" Valley). In most of San Joaquin County, with the exception of its eastern and western margins which are dominated by the foothills of the Sierra Nevada and Coast Ranges, respectively, recently (Cenozoic) deposited terrestrial, lacustrine, and marine sediments overlie older (pre-Tertiary in age) consolidated marine sediments. These older sedimentary units in turn overlie Mesozoic crystalline basement rocks.

The formation of soils in San Joaquin County is dependent on the sedimentary transport path from the primary sediment sources. These sediment sources are the Coastal Range to the west and the Sierra Nevada to the east of the County. Generally, the longer the transport path the greater the working of the sediments prior to deposition as soils. Along the San Joaquin River and in the delta regions west of Stockton, the low energy river and flood plain environments deposit layers of silt and clays during seasonal floods. These fine-grained sediments flocculate out of slack water as floodwaters recede. The erosion of the Coast Range forms portions of far western San Joaquin County soils and transport of these sediments is facilitated through seasonal run-off of the minor streams of the Coast Range. These soils are formed in environments similar to those of eastern San Joaquin county, i.e., alluvial fans, but tend to be less well worked in comparison to their Sierran derived counterparts due to the shorter transport path.

The USDA Soils Conservation Service *Soil Survey of San Joaquin County, California*, (McElhiney, 1992) classifies soil in San Joaquin County. The *Survey* generally classifies the soils in this area of Tracy as part of the Capay association; moderately well drained, fine-textured soils, very deep and subject to artificial wetness. The on-site soil is specifically classified as Capay clay, 0-2 percent slopes; a very deep, moderately well drained soil on alluvial fans. Based on soil sampling and two soil borings, most of the shallow soil consists of silt and clay.

According to Munger (2002), and Cal-DOGR (1982), the Haley site lies within a natural gas producing field called the Tracy Gas Field. The field is productive from sands of the Tracy Formation at a depth of about 4,000 feet. Based on the available information, it does not appear that any gas wells were ever drilled on, or near, the subject property.

2.3 Site Background

The property was the subject of a Phase I Environmental Site Assessment (ESA) completed in October of 2004 (Geo-Phase Environmental, 2004). The following paragraphs summarize the findings of the ESA.

According to the owner, Mrs. Haley, beginning in 1951 her late husband and a partner operated the site as Haley's Flying Service, a crop dusting operation. The specific agricultural chemicals that were stored and used on the site were not well known, but were assumed to include various pesticides.

Mr. Haley died in 1975, but the partner continued to operate the business until about 1989. Since then, the facility has been leased to several non-aviation related persons or companies. Since the mid- to late-1990's the principal tenant has been Continental Express, a small trucking company. Prior tenants have included a tomato packing company, and a truck repair business as well as an individual who served as an informal caretaker of the property.

The existing buildings on the site date from the time the property was used for crop dusting. According to information in the county Assessor's records, in 1955, an aircraft hangar was constructed and a second hangar was constructed in 1968. An office that connects the two hangars was constructed in 1976. According to Mrs. Haley, the paved area east of the hangars and adjacent to the loading dock was where aircraft were loaded with agricultural chemicals for spraying. The pavement in the area of the loading dock is locally cracked, and it is clear that any spilled liquids could have penetrated to the underlying soil. The loading dock was where bulk chemicals were stored, mixed and then pumped into waiting aircraft.

Upon returning from a flight, the crop dusting aircraft would have their tanks rinsed and the rinse water was pumped into a nearby concrete-lined washout pit. The rinse water in the pit would be aerated in an attempt to breakdown any residual chemicals by oxidation. The pit has 4-inch thick walls and is about 40 feet long, 8 feet wide and four feet deep. Visual inspection of the concrete lining reveals that the concrete was poured in at least two separate events. The seams where the several parts of the concrete meet are zones of weakness where liquid could possibly penetrate. The area immediately adjacent to the washout pit is unpaved and consists of bare ground.

The property was formerly the site of a 1,000-gallon regular unleaded gasoline tank and a 5,000-gallon aviation fuel tank. These tanks were removed in 1990 under County supervision. As a part of the tank closure, one confirmation soil sample was collected from beneath the 1,000-gallon tank and two soil samples were collected from under the 5,000-gallon tank. The sample from beneath the 1,000-gallon tank and one of two samples from beneath the 5,000-gallon did not contain detectable gasoline hydrocarbons or BTEX compounds. The other soil sample from beneath the 5,000-gallon tank contained 610 parts per million (ppm) of total gasoline hydrocarbons. It also included 6.5-ppm of benzene, 62-ppm of toluene, 41-ppm of ethylbenzene and 169-ppm of xylene. Due to the very shallow groundwater, the tank pit contained native groundwater, which was also sampled. The groundwater did not contain detectable gasoline hydrocarbons (<10-ppm), but 3.9 parts per billion (ppb) of benzene were detected, as were 18.4-ppb of toluene, 7.5-ppb of ethylbenzene and 32-ppb of xylene. Based on these sample results, the San Joaquin County Environmental Health Department issued a "notice of unauthorized release" in 1994. Information pertaining to mitigation of the release has been misplaced from the County files, but based on the LUST list maintained by the RWQCB, the site was adequately mitigated and officially closed.

The ESA (Geo-Phase Environmental, 2004) identified several environmental issues that were deemed to represent ongoing "recognized environmental conditions" as follows:

- The soil in the vicinity of a former mobile building is stained with oil in some areas. If the oil has penetrated more than a short distance into the soil, it could represent an adverse environmental condition.

- A surface release in front of the westerly hangar of two drums of water, oil and diesel fuel in 2001 was the subject of an emergency response call by County agencies. The spill was cleaned up, but the San Joaquin County Environmental Health Department indicated that additional work would be needed to investigate the extent of impact to the soil in the area of the spill.

- A surface release of what probably was pesticide impacted the soil in the vicinity of the washout area in 1982. The incident was the subject of a report by the California DTSC. The agency indicated that additional work is needed to investigate the impact to the soil, but at the time of the ESA no such work has been completed.

- The operation of the concrete-lined washout-pit was not in compliance with applicable regulations and there is a possibility that the use of the pit could have impacted the soil in the area around the pit and adjacent concrete pad.

The area believed to be most at risk of having been impacted by a release(s) of agricultural chemicals was the soil around, and under, the washout pit and the area adjacent to, and under, the aircraft-loading pad. The ESA recommended that soil sampling be conducted to assess the distribution of various contaminants and that DTSC and the San Joaquin County Environmental Health Department be contacted to determine what steps would be required to investigate the known and suspected releases.

2.4 Site Status

As a part of the Phase I ESA (Geo-Phase Environmental, 2004), a search of State and Federal environmental databases was completed by EDR. The document identified Haley's Flying Service in several databases. In addition to the Cal-Site listing, the California Regional Water Quality Control Board (RWQCB) determined that the operation of the concrete washout pit was not in compliance with regulations regarding toxic waste pits and as a result, the site is listed in the WMUDS database. The site was also the subject of an investigation of a leaking underground fuel tank, but the release was deemed adequately mitigated and subsequently was officially "closed". Haley's Flying Service is further identified in the AST list as the site of a permitted 10,000-gallon aboveground tank. The address associated with this listing is on Tracy Boulevard suggesting that the tank was actually located at another facility operated by the partner of Mr. Haley. The current owner of the property reports that no such tank was ever present and no evidence was found to indicate that a 10,000-gallon aboveground fuel tank was ever used on the site. Given the large indicated size compared to the relatively small scale of the operation, and the relative costs involved, it would seem

unlikely that such a large tank would have ever been used at the site. Moreover, given that until 1990 (after crop dusting operations ended) underground tanks were present, it would seem to make little sense to operate a large aboveground tank.

Records on file with the San Joaquin County Environmental Health Department (SJC-EHD) include a report of a 2001 site inspection that revealed the presence of drums of hazardous waste, apparently consisting of an oil/diesel/water mixture. A "notice to abate" was issued. In addition to these conditions, records on file with the San Joaquin County Office of Emergency Services and the Environmental Health Department indicate that an emergency response team mobilized to the site on August 8, 2001. A surface release of at least 110 gallons of oil, water, and diesel fuel occurred on the premises occupied by Continental Express. The impacted soil was removed and placed in 55-gallon drums for off-site disposal. The point of release was in front of the westerly hangar. A notation on the incident report indicates additional investigation of the soil will be needed but there is no evidence to suggest this work was ever undertaken.

The site was originally placed on DTSC's Cal-Site list because of a 1981 fire that caused a pesticide spill from ruptured containers stored in a hanger. A recent review of DTSC records indicates, however, that such a fire never occurred on this property. The fire in question was at another airstrip about 5 miles away. Based on this information, the DTSC was asked to reconsider the Cal-Site listing, but agency personnel indicated that the past use of the site for crop dusting operations was sufficient justification to maintain the listing, even though the fire that triggered the listing was acknowledged to have been at another location.

3.0 APPARENT PROBLEM

Prior to this PEA, it does not appear that any soil or groundwater samples have ever been collected to determine whether past operations on the property might have impacted the soil or groundwater with organo-chlorine pesticides or other agricultural chemical contaminants. The only samples ever collected were confirmation soil samples taken in connection with the 1990 removal of a 1,000-gallon regular unleaded gasoline tank and a 5,000-gallon aviation fuel tank (see Section 1.2 for details).

Based on the results of this PEA, a limited area near the east end of the parcel has been severely impacted with several chemicals. The primary contaminants are the DDT group, Dieldrin, and Toxaphene, although other chemicals are present as well. The shallow soil, (above 2 feet) is the site of almost all of the contaminant mass. The deeper soil and groundwater may also have been impacted, but additional work is needed to make this determination. The area of most concern is the exposed soil surrounding and beneath the pesticide loading dock, and pad and the washout pit. The dates of the releases are unknown, but it is likely there were a series of small spills or leaks extending for many years from the 1950's and ending when flight operations ended in the late 1980's.

The Site Conceptual Model Diagram (Figure 5) provides a summary of the potential contaminant pathways and receptors.

A secondary issue was the possibility that the reported spill of two drums of waste water/oil/diesel in the area in front of the westerly hangar may have impacted the soil. Laboratory analytical data obtained for this PEA suggest, however, that the spill did not result in any material degradation to the soil.

4.0 ENVIRONMENTAL SETTING

4.1 Factors Related to Soil Pathways

The site is in a generally undeveloped area. The nearest developed industrial site is a Yellow Freight truck terminal adjacent to the west end of the Haley site. Other adjacent lands are either in agricultural use or are in use as public roadways. The nearest residences are farm houses about ½ mile to the north. Several other residences are about ½ mile to the south. The nearest residential tract is about 0.9 miles to the southeast in the small town of Banta. The only known highly sensitive receptor (such as schools, hospitals, nursing homes) within a mile of the site is Banta Elementary School at 22345 El Rancho Road, about 0.9 miles from the site.

The site is easily accessible to vehicles from either Pescadero Avenue or Paradise Road. There is no fencing or other impediment restricting access to the site. At this time, no steps have been taken to fence the pesticide-impacted area.

The site and surrounding areas are generally flat lying, with little vertical relief. The land surface slopes very gently toward the north. The only remarkable topographic feature is an earthen berm, which runs parallel to the north lot line of the site. The berm is one of the retaining walls of an unlined irrigation ditch immediately adjacent the site. It rises to a maximum of about 6 feet above grade.

The only readily observable evidence of a hazardous release is the general absence of vegetation in the immediate vicinity of the loading dock and washout pit. On occasion, an unusual, septic odor may also be detected in this area. During the course of collecting soil samples, stained soil was also found at several points beneath and near the concrete apron and the graveled area just south of the loading dock.

During the course of the fieldwork, two soil borings were installed to a maximum depth of 17 feet below grade. The vadose zone extends to a depth of about 11 feet where the surface of groundwater was encountered. Boring logs (see Appendix B) indicate the soil consists primarily of silt with varying percentages of clay and sand. This material is representative of recently deposited alluvium in the area. The alluvium extends to a depth of more than 100 feet and it directly overlies sediments of the Plio-Pleistocene age Tulare Formation (Hotchkiss and Balding, 1971).

4.2 Factors Related to Surface Water Pathways

As described above, the only body of surface water on or adjacent to the Property is the irrigation canal adjacent to the north. Water is apparently present in the ditch when crops are being irrigated. During periods of heavy rain, storm water may not immediately percolate into the soil. The natural, gentle north slope of the land would tend to direct storm water runoff toward the base of the south berm of the irrigation ditch, and it therefore appears unlikely that there is any material storm water runoff that can migrate off of the site.

4.3 Factors Related to Groundwater Pathways

As described above, the groundwater surface lies about 11 feet below grade and is believed to flow in a northerly direction.

The two shallow groundwater samples collected as a part of this PEA contained low concentration of pesticides, primarily Toxaphene, but this may be a result of cross-contamination that is suspected to have occurred during drilling. The shallow aquifer is, nevertheless considered as threatened by pesticides and herbicides.

The shallow groundwater contains marginally potable water, and generally the only water production wells completed opposite this zone are domestic wells. The shallow aquifer is composed of shallow sand, and silt alluvium deposited on the valley floor. Hotchkiss & Balding, (1971) described the aquifers and their characteristics for the Tracy-Dos Palos area. In the Tracy area, the recent alluvium is generally less than 100 feet thick and directly overlies the Tulare Formation, a Plio-Pleistocene age, mixed clastic sequence of clay, silt, sand and gravel. There is little to distinguish the contact between the base of the alluvium from the top of the Tulare Formation

A widespread clay deposit, the Corcoran Clay (or E-clay), divides the upper and lower members of the Tulare Formation. The Tulare sediments lying above the Corcoran Clay are entirely Pleistocene in age. The Corcoran Clay is about 100 feet thick in the Tracy area and it serves as an effective aquitard. It lies about 200 feet below the ground surface in the Tracy area.

The principal groundwater aquifer in the Tracy area is the lower Tulare Formation below the Corcoran Clay. According to a Public Health Assessment of the Tracy Defense Depot (ATSDR, 1998), all of the municipal wells in Tracy are completed opposite this zone with well depths generally from 400 to 700 feet. This aquifer is hydraulically isolated from the shallow zone and is not believed to be at risk from the release herein documented.

The only water production wells producing from the aquifer potentially impacted by the Haley site appear to be shallow domestic wells. These wells (including the on-site well) are generally between about 80 and 140 feet deep (Hotchkiss & Balding, 1971). According to the EDR database report contained in the Phase I ESA (Geo-Phase Environmental, 2004), the nearest offsite domestic well is located near the intersection of Grant Line Road and Paradise Road about ½ mile south of the site. This well is reported to be 100 feet deep. In the northerly (down-gradient direction), the nearest wells are also almost ½ mile from the site.

4.4 Factors Related to Air Pathways

The chemicals of potential concern are pesticides, which are primarily soil- and water-borne. Pesticides are not volatile and therefore not subject to direct vapor inhalation. Air exposure is not generally considered to be an issue except in the form of inhalation of pesticide-impacted dust. Except for a very small area of a few hundred square feet, the impacted soil lies under pavement or a graveled surface.

5.0 SAMPLING ACTIVITIES AND RESULTS

The sampling strategy and protocols are described in the Work Plan for this PEA, entitled. *Work Plan – Preliminary Endangerment Assessment, Former Haley's Flying Service, 21,000 Paradise Road, Tracy, CA* (Geo-Phase Environmental, 2005). There were few deviations from the Work Plan (see Section 5.8).

5.1 Shallow Soil Sampling and Analysis

Excluding the hangar area, most of the site is undeveloped except for the runway. This undeveloped area encompasses about 8 of the 10 acres that comprise the site. A suite of 8 sample points (1 per acre) were authoritatively selected at grid points in this area to provide a representative cross-section of the site as shown on the overall site sketch map (Figure 2). The shallow soil sample designations were assigned the prefix "S" followed by a sequence number beginning with 1 and increasing from west to east. In most cases, two soil samples were collected from each sample point, and these were represented by letter suffixes increasing with depth. Thus, the designation "S-3B" indicates the second shallowest sample collected from shallow sample point 3. The maps (Figures 2 and 3) show the sample points and their designations.

A suite of targeted shallow samples was collected at specific points around the former flight facilities at the east end of the site to determine if hazardous substances are present. As shown on the detailed site map (Figure 3), a total of 14 authoritatively targeted shallow soil sample points were selected. One of the samples (S-10B) was also tested for the possible presence of VOC's and extractable petroleum hydrocarbons that may have been released from a surface spill from two drums of waste liquid documented by the San Joaquin County Environmental Health Department

The sample points (S-23 & S-24) were located in the vicinity of the west side of the west hanger to test for the possible presence of total extractable petroleum hydrocarbons. These were collected from areas of visible oil staining or where waste oil drums had been observed. Only a single sample was collected from each of these points.

The shallow soil samples were collected from August 24 through August 26, 2005 using hand auger soil boring tools. The first 6-inches of soil were collected as a discreet sample, and a second discreet sample was collected from 6 to 12 inches. These two, stacked samples were collected for the purpose of obtaining information regarding the vertical distribution of any contaminants that may be detected. In general, two samples were collected from each sample point except as otherwise noted.

After labeling, the samples were placed in a cooler chilled with water ice pending transport to the analytical laboratory under chain-of-custody protocol. Chain of custody (CofC) forms are documents used to track the handling of samples. All dates, times, persons and companies handling the samples were listed from the time the sample is collected to its ultimate disposal.

Sampling equipment was double washed using a non-phosphate detergent after every use and rinsed with de-ionized water.

Upon completion of each day's fieldwork, the accumulated samples, accompanied by the Chain-of-Custody were transported to Argon Laboratories of Ceres, CA, a California Environmental Protection Agency (Cal-EPA) certified laboratory (certification # 2359). Argon, in-turn shipped most of the samples to McCampbell Labs for pesticide testing.

All samples except those from sample points S-23 and S-24 were tested for organo-chlorine pesticides by EPA method 8081A. The specific chemicals and their reporting limits are listed in Summary Table 1.

In addition, two shallow soil samples from the vicinity of the washout pit (S-14 A&B) and one from the area of the cracked aircraft-loading pad (S19A) were also tested as follows:

- Organo-phosphorous herbicides and pesticides by EPA method 8141A,
- Chlorinated Herbicides by EPA method 8151A and,
- N-methyl Carbamate pesticides by EPA method 8318.

The specific chemicals and their reporting limits are summarized in Summary Table 1 and the laboratory data sheets are in Appendix A.

As mentioned above, one sample was tested for volatile organic compounds (VOC's) by EPA method 8260B and for Total Extractable Petroleum Hydrocarbons by EPA method 8015m. Samples S-23 and S-24 were also tested for total extractable petroleum hydrocarbons. The laboratory data are summarized in Summary Table 3 and the list of VOC's and their reporting limits are included in Appendix A.

Figures 6 through 11 provide graphical representations of the distribution of the principal contaminants, the DDT sub-group, Endosulfan sub-group, and Toxaphene.

5.2 Groundwater Sampling and Analysis

The single installation originally believed most likely to have impacted the soil was the washout pit. A groundwater sample was collected from points near each end of the washout pit. Geo-Probe soil borings (designated B-1 and B-2) were advanced to a depth sufficient to penetrate the groundwater surface, and a sample of the shallow groundwater was collected from each of the two borings.

On October 6, 2005, two Geo-Probe soil borings were installed using 1.5-inch outside diameter, Geo-Probe drilling equipment owned and operated by V&W Drilling (C-57 License #720904). The borings, (B-1 & B-2) were advanced to a depth sufficient to penetrate the groundwater surface, which was found at approximately 11 feet below grade.

In an attempt to reduce the obvious risk of cross-contamination from the shallow soil, each boring was started by using hand auger soil boring tools to drill the first two feet of each boring. A length of 3-inch diameter PVC pipe was then inserted into the hole, and the Geo-Probe borings were advanced through this pipe. In effect, the PVC pipe served as a form of conductor.

During drilling, a log was made of each boring. Information noted includes such data as sample depths, horizons of detectable contamination (detected by field methods), soil classification utilizing the Unified Soil Classification System and sediment description (color, texture, composition, hardness, moisture content, and post-depositional changes that have occurred in the sediments). The boring logs are attached as Appendix B.

Upon reaching total depth of the first boring (B-2), a groundwater sample was collected using the Hydro-Punch sampling tool. A 3-foot section of stainless steel was lowered down the hollow drill stem and then driven into the undisturbed soil. The drill stem was then retracted, thus exposing the screen and allowing water to enter. In the second boring (B-1), upon reaching total depth, the hollow drill rods were removed from the boring, and replaced with a length of ¾ inch PCV tubing with the lead 4-foot section being screened, thus creating a temporary well. In both cases, a length of new, dedicated Teflon tubing fitted with a check valve was inserted inside of the sample screen and then rapidly oscillated to produce a stream of groundwater at the surface. The water was transferred directly to laboratory-supplied sample containers. Each sample was stored in 1-liter amber glass bottles provided by the laboratory. Each sample container was then labeled and immediately transferred to a cooler chilled with water ice for transport to the laboratory under chain-of-custody.

After collecting the final sample, each boring was filled to grade with Class G neat cement under the supervision of a San Joaquin County Department of Environmental Health inspector, Mr. Harlin Knoll.

Upon retrieval, each groundwater sample was transported to Argon Laboratories of Ceres, CA for analytical testing. Argon forwarded the samples to McCampbell Labs, and this laboratory performed the following analyses:

- Organo-phosphorous herbicides and pesticides by EPA method 8141A,
- Chlorinated Herbicides by EPA method 8151A and,
- N-methyl Carbamate pesticides by EPA method 8318.
- Organo-chlorine pesticides by EPA method 8081A

The specific chemicals and their reporting limits are listed in the Summary Table 2 and in the laboratory data sheets in Appendix A.

5.3 Waste Disposal

Decon water from washing sample equipment was containerized in an appropriate DOT container for later recycling by a licensed hazardous waste hauler. Unfortunately, the drum

was later stolen, and the contained water was presumably dumped on the ground. No waste soil cuttings were generated during the Geo-Probe drilling process or shallow soil sampling.

5.4 Documentation

A general field log was maintained during the fieldwork. Notes were made of the date and time of the work, the personnel on site, the general weather, and the sequence and time of significant field events. Careful notes were taken of each shallow sample collected for laboratory analysis. A log form describing the sample as well as sample location and time accompanied the shallow soil samples. Photographs supplemented the log information, and general site photos were made to show the overall site and the sampling area. Photocopies of the field notes are attached as Appendix F. Photos are attached as Appendix C, and boring logs are attached as Appendix B.

5.5 Summary of Soil Analytical Results – Pesticides and Herbicides

As shown in Summary Table 1 and Figures 6 to 11, organo-chlorine pesticides were detected in a number of samples. The principal area of contamination is in the vicinity of the loading dock and the washout pit. The sample with the highest contaminant concentration was S-17A, which contained 19,000 ppm of DDT, and 24,000 ppm of Toxaphene. The principal contaminants are DDT and its daughter products (DDD, DDE) as well as Toxaphene. Other contaminants are present as well, especially the Endosulfan sub-group, Endrin, and Dieldrin. In addition to the organo-chlorine pesticides, trace concentrations of Ethion and Ethyl parathion from the organo-phosphorous group were detected at one sample point (S-14) as were traces of the chlorinated herbicide, Dinoseb. Carabyl and Methiocarb, (N-methyl carbamates) were also detected in samples from S-14.

Comparison of contaminant concentrations in the A and B samples from each sample point suggest that for the most part, there is a rather high vertical attenuation rate. This means that the pesticide concentrations fall off rapidly with increasing depth. The vertical attenuation is such that almost all of the contaminant mass is likely to be restricted to the upper 2 feet of the soil.

Outside the area of the washout pit, loading dock, and aircraft loading pad, one sample point (S-5) from about the mid-point of the runway produced greater than trace concentrations of the DDT and the Endosulfan groups of organo-chlorine pesticides.

5.6 Summary of Soil Analytical Results – Petroleum Hydrocarbons and VOC's

As a part of this investigation, six soil samples were collected and tested for the presence of Total Extractable Petroleum Hydrocarbons and one was tested for Volatile Organic Compounds (VOCs) (Summary Table 3). This was to investigate a reported release of two drums of oily waste water from the area in front of the west hangar, and areas of suspected storage of waste oil drums, or visible oil staining. None of the samples contained detectable levels of the contaminants tested for.

5.7 Summary of Groundwater Analytical Results

As shown in Summary Table 2, organo-chlorine pesticides were detected in both groundwater samples, which were collected from points near either end of the washout pit. The principal contaminants are DDT and its daughter products (DDD, DDE) as well as Toxaphene. Other contaminants are present as well, especially the Endosulfan sub-group. In addition to the organo-chlorine pesticides, trace concentrations of Ethyl parathion from the organo-phosphorous group were detected, as were traces of the chlorinated herbicide, DCPA. Carabyl, a N-methyl carbamate was also detected.

Given the very high concentrations of several pesticides in the shallow soil at the point borings B-1 and B-2 were drilled, it is quite possible or likely that the groundwater contaminants are an artifact of cross-contamination, and do no reflect actual groundwater conditions.

5.8 Deviations From the Work Plan

The following points summarize material deviations from the Work Plan.

- Sample S-11 was collected from the area of a small sump in front of the eastern hangar. The sump was filled with course gravel to a depth of at least two feet. The gravel made the use of the hand auger tools impossible. Rather than a set of two stacked samples, a single sample was collected from a depth of about 18 inches.

- Samples S-10A and S-10B were to be collected from the vicinity of a sump in front of the western hangar. The sump was filled with course gravel similar to that described above. The sample point was moved several feet to the south east of the intended sample point in order to avoid the course gravel.

- Samples S-20A and S-20B were collected from a point near the southwest corner of the aircraft-loading pad. The sample was originally collected on September 25. Later that day, after samples collected during the day were delivered to the laboratory, the discovery was made that these two samples were missing. It not known how or where the samples were misplaced. Replacement samples S-20A and S-20B were collected the following day from a point less than one foot from the original sample point.

- Two shallow sample points from near the west side of the west hangar (S-23 & S-24) were added to test for the possible presence of extractable petroleum hydrocarbons. Only a single sample was collected from each of these sample points.

6.0 DATA QUALITY EVALUATION

Data evaluation is the process of analyzing site characteristics and data to identify Chemicals of Potential Concern (COPCs) to be evaluated in the human health risk assessment. This section identifies data of sufficient quality for use in the risk assessment, summarizes the chemical characterizations of soil and groundwater, and provides a summary of COPCs.

6.1 Data Quality

The following criteria were considered to evaluate the quality of the laboratory data points:

- Laboratory QC data sheets are reviewed to verify that the analytical laboratory analytical procedures were within acceptable limits as regards repeatability and contaminant recoverability.

- Blank contamination is evaluated based on the results of field and laboratory blank data. Common laboratory contaminants are eliminated if detected concentrations are within 10 times the associated blank concentrations (Cal-EPA, 1994). All other chemicals are eliminated if detected concentrations are within 5 times blank concentrations.

- Sample Quantitation Limits (SQLs) must be sufficiently low such that chemicals can be selected at levels of potential concern. Data are reviewed to determine if SQLs are sufficiently low.

6.1.1 Soil Samples

The temperature blanks from the ice chests in which the samples were transported to the laboratory were measured upon reaching the lab with an infrared digital thermometer. (See CofC forms for details). All temperature blanks indicated the samples were adequately chilled to less than 4 degree C. Analysis of a duplicate of the extract from sample S-14A (see Summary Table 1) indicates a reasonable degree of repeatability in the laboratory analytical procedures. During soil sampling, an equipment blank (S-14C) was created to verify the reusable sample equipment was being cleaned adequately between uses. Analysis of the resultant sample reported detectable concentrations of several pesticides as follows.

Text Table 1 - Soil Equipment Blank Contaminants

8081 Analytes	Result
p,p-DDD	0.018
p,p-DDE	0.011
p,p-DDT	0.18
Endosulfan I	0.1
Endosulfan II	0.058
Units	**µg/L**

Chemicals not listed were not detected. While detectable in the water sample equipment blank, these analytical results are far below the corresponding detection limits of soil samples, and indicate the soil analytical data is not materially degraded by inadequate

equipment decontamination. The presence of these contaminants in the field equipment blank is probably a result of the extremely high levels of contaminants in the soil that precluded the complete decontamination of the reusable equipment.

Laboratory data sheets describing QC analytical tests indicate that laboratory procedures were of an acceptable quality (see Appendix A). All matrix spike and matrix spike duplicate analytical results were within the acceptable range of recovery for the analytical methods and all laboratory blanks were non-detect for the chemicals of concern.

A number of the laboratory sample extracts were diluted lest the MS-GC equipment be damaged during the analytical process. There were two principal reasons for the dilution. First, some of the samples had quite high contaminant concentrations that required dilution to prevent possible damage to the laboratory equipment. Secondly, many samples contained oils, possibly natural oils from peats or other organic sources, which can interfere with the laboratory equipment (verbal communication, McCampbell Analytical). The degree of dilution ranged from none to as high as 250,000 to 1. An unavoidable result of this dilution is the minimum reporting limit (SQL) for chemicals is increased by an equal factor (see Appendix A). This may have resulted in some chemicals going un-reported, that otherwise would be detectable.

6.1.2 Groundwater Samples

The temperature blanks from the ice chest in which the samples were transported to the laboratory were measured upon reaching the lab with an infrared digital thermometer. (See CofC forms for details). The temperature blanks indicated the temperature in the ice chest was less than 4 degrees C. The travel blank provided by the laboratory did not contain detectable concentrations of any chemical that was tested for. Laboratory data sheets describing QC analytical tests indicate that laboratory procedures were of an acceptable quality (see Appendix A). All matrix spike and matrix spike duplicate analytical results were within the acceptable range of recovery for the analytical methods, and all laboratory banks were non-detect for the chemicals of potential concern.

During soil boring installation, an equipment blank was created to verify the reusable sample equipment was being cleaned adequately between uses. Analysis of the resultant sample reported detectable concentrations of several pesticides as follows:

Text Table 2 - Groundwater Equipment Blank Contaminants

8081 Analytes	**Result**
p,p-DDD	0.51
p,p-DDT	0.19
Endosulfan I	0.12
Endosulfan II	0.052
Units	**µg/L**

The QC results notwithstanding, it is believed that there is a high probability that some or all of the contamination is an artifact of cross contamination of drilling through highly contaminated shallow soil.

6.2 Chemical Characterization

This sub-section briefly summarizes the nature and extent of chemicals detected in the soil and groundwater for purposes of providing context to the risk assessment. Based on the information from the laboratory analytical results (Summary Table 1), the following table was prepared to summarize the identity of detected chemicals, total number of samples analyzed, total number of detections, range of detection limits, and range of concentrations detected

Text Table 3 - Soil Sample Characterization Table

Chemical	No. of Spls	No. of Detects	Range of SQL (mg/Kg)	Range of Reported Concentrations (mg/Kg)
Method 8081B				
a-Chlordane	43	1	0.001 - 250	<0.001 - 0.069
g-Chlordane	43	5	0.001 - 250	<0.001 - 17
DDD	43	16	0.001 - 250	<0.001 - 3,000
DDE	43	22	0.001 – 250	<0.001 - 530
DDT	43	22	0.001 – 250	<0.001 - 19,000
Dieldrin	43	2	0.001 – 250	<0.001 - 3.8
Endosulfan I	43	19	0.001 – 250	<0.001 - 1,100
Endosulfan II	43	21	0.001 – 250	<0.001 - 750
Endosulfan suphate	43	6	0.001 – 250	<0.001 - 33
Endrin	43	3	0.001 – 250	<0.001 - 40
Methoxychlor	43	4	0.001 – 250	<0.001 - 260
Toxaphene	43	16	0.05 - 12,500	<0.05 - 24,000
Method 8141				
Ethion	3	2	0.1	<0.1 - 7.7
Ethyl parathion	3	2	0.1	<0.1 - 1.8
Method 8151				
Dinoseb (DNBP)	3	2	0.5 - 2.5	<0.5 - 21
Method 8318				
Carbaryl	3	2	0.04	<0.04 - 190
Methiocarb	3	2	0.04	<0.04 - 220

Note: No. of Samples does not include duplicate extract of S-14A or QC Samples

Not all chemicals detected at a site warrant a quantitative evaluation. In many cases, chemicals are detected at so low a concentration as to pose a negligible risk and may be eliminated from further consideration. On the other hand, it can not be assumed that chemicals that were tested for, but not detected, are altogether absent. In this investigation, several soil samples were so severely impacted that the extract dilution factors resulted in very high reporting limits or SQLs. Due to the high reporting limits, low concentrations of several chemicals may, in effect, be masked by high concentrations of others, such as Toxaphene. For the purposes of this PEA, it is assumed that a chemical detected in any

sample is present in all samples at a concentration of ½ the SQL. This is considered an acceptable approach to evaluating chemicals that may be present at less than detectable concentrations (U.S. EPA, 1989).

The list of COPCs was derived by comparing the laboratory analytical data with Health Screening Levels (Cal-EPA, 2005). This document offers two sets of screening levels (CHHSLs) for a list of specific contaminants. One set of values is for residential sites, and the other is for commercial and industrial sites. Chemicals that are present above the residential screening level are considered to be COPCs. The following table lists the pertinent CHHSLs for chemicals identified in the laboratory analyses:

Text Table 4 – Health Screening Levels of Soil Contaminants

Chemical	Screening Level
Chlordane	0.43 mg/Kg
DDD	2.3 mg/Kg
DDE	1.6 mg/Kg
DDT	1.6 mg/Kg
Dieldrin	0.035 mg/Kg
Endrin	21 mg/Kg
Methoxychlor	340 mg/Kg
Toxaphene	0.46 mg/Kg

Except for Methoxychlor, all of these chemicals have been detected in concentrations in excess of the designated screening level or, due to sample extract dilution, have at least one SQL that exceeds the screening level. No screening levels have been identified for other chemicals that were detected in the soil samples but not listed in the above table. These unlisted chemicals must also be considered as COPCs. All pesticides detected in the soil, are therefore considered as COPCs, except for Methoxychlor, which occurs at a mean concentration considerably less than the 340-ppm CHHSL threshold established for this chemical.

Text Table 5 - Groundwater Sample Characterization Table

Chemical	No. of Spls	No. of Detects	Range of SQL (μg/L)	Range of Reported Concentrations (μg/L)
Method 8081B				
a-Chlordane	2	0	2.5 - 5	<2.5 - <5
g-Chlordane	2	0	2.5 - 5	<2.5 - <5
DDD	2	1	0.5 - 1.0	<0.5 – 27
DDE	2	1	0.5 - 1.0	<0.5 - 5.9
DDT	2	2	2.5 - 5	14 – 350
Dieldrin	2	0	0.5 - 1.0	<0.5 - <1.0
Endosulfan I	2	2	1.0 - 2.0	18 – 23
Endosulfan II	2	2	0.5 - 1.0	7.9 - 33
Endosulfan suphate	2	0	2.5 - 5	<2.5 - <5
Endrin	2	0	0.5 - 1.0	<0.5 - <1.0
Methoxychlor	2	0	5 - 10	<5 - <10
Toxaphene	2	2	25 - 50	170 – 560

Method 8141				
Ethion	2	0	10	<10
Ethyl parathion	2	2	10	13 – 40
Method 8151				
Dinoseb (DNBP)	2	0	4 - 20	<4 - <20
DCPA	2	1	0.20 - 1.0	<0.20 - 2.0
Method 8318				
Carbaryl	2	2	2.0	2.4 – 22
Methiocarb	2	0	2.0	<2.0

Note: No. of Samples does not include QA Samples

All pesticides detected in the groundwater samples are considered as COPCs pending further sampling and testing.

7.0 HUMAN HEALTH SCREENING EVALUATION

7.1 Exposure Pathways and Media of Concern

Exposure assessment is the process of describing, measuring or estimating the intensity, frequency, and duration of potential human exposure to chemicals of potential concern (COPCs) in environmental media (e.g., soil, water and air) at a site. This section of the report discusses the mechanisms by which people (receptors) might come in contact with COPCs at the site. The exposure assessment follows the recommendations for conducting an exposure assessment provided in the U.S. EPA's "Risk Assessment Guidance for Superfund" ("RAGS"; U.S. EPA, 1989), and the more recent guidance in U.S. EPA's "Guidelines for Exposure Assessment" (U.S. EPA, 1992), as they are applied in the human risk assessment program known as CalTOX (Cal-EPA, 1993). In accordance with U.S. EPA (1989), an exposure assessment consists of three basic steps:

- Characterization of the exposure setting (physical environment and potential receptors).
- Identification of exposure pathways (potential sources, points of release, and exposure routes).
- Quantification of pathway-specific exposures (exposure point concentrations and intake (dose) assumptions).

The purpose of the first step is to characterize the salient features of the site that might influence current or future human exposure to COPCs and to identify potential receptors. Potential pathways of human exposure are identified in the second step by characterizing the sources of COPCs released to the environment, points of release, and potential exposure routes. In the third step, the qualitative information from the first two steps is integrated with estimates of exposure concentrations and intake assumptions to quantitatively estimate exposure (dose). The CalTOX model is capable of performing all of these functions.

Exposure assessment is conducted within the context of a site conceptual model (SCM). As described in DTSC's PEA Guidance Manual (Cal-EPA, 1994), the purpose of the SCM is to describe what is known about chemical sources, migration pathways, exposure routes, and possible exposure scenarios. Figure 5 presents the SCM developed for the Haley site.

An exposure pathway is a description of the mechanism by which an individual may come into contact with COPCs in the environment. In accordance with U.S. EPA RAGS (U.S. EPA, 1989), all potential exposure pathways applicable to the site have been identified and addressed. An exposure pathway is defined by four elements (U.S. EPA, 1989):

1. A source and mechanism of COPC release to the environment;
2. An environmental receiving or transport medium (e.g., air, soil) for the released COPC;
3. A point of potential contact with the medium of concern; and

4. An exposure route (e.g., inhalation, ingestion) at the contact point.

An exposure pathway is considered "complete" if all elements are present, and only complete exposure pathways need be evaluated. The characterization of the potential exposure pathways at the site based on existing information is presented in the SCM in Figure 5.

Based upon the COPC-affected media and migration pathways (Figure 5), points of potential human contact with site-related COPCs include surface water or groundwater, ambient (outdoor) air with dust-borne contaminants, and direct soil contact.

Potential exposure routes associated with the air are through dust inhalation or ingestion. Direct dermal contact or ingestion of impacted soil are routes associated with the soil media. Potential exposure routes associated with affected water consist of dermal contact or ingestion with groundwater or surface water (primarily storm water). The COPCs are not volatile and inhalation of vapors is not considered as likely exposure pathway.

Given the characteristics of the COPCs and release processes discussed above, the potential exposure pathways for future land use of the site are presented below. While it is recognized that the site is proposed for industrial development, the assumption is made that a potential human receptor will be a resident. This resident is assumed to be at the site 16 hours per day, 360 days per year for 70 years. This assumption is made in order to present a "worst case" scenario for the health-risk assessment.

7.2 Exposure Point Concentrations and Chemical Groups

The concentrations of chemicals at specific exposure points will vary over space and time. However, a single estimate of an exposure point concentration is required for risk assessment calculations consistent with PEA Guidelines (Cal-EPA, 1994). This single value must be representative of the average concentration to which a person would be exposed over the duration of the exposure.

Exposure point concentrations are generally estimated from measured concentrations in environmental media, or estimated based on fate and transport models. Depending on a number of factors, including the distribution of the data, the proportion of the samples reported as non-detect, and the total number of samples, there are several statistical algorithms that may be used to estimate exposure point concentrations. U.S. EPA Supplemental RAGS guidance (U.S. EPA, 1992) stipulates that the exposure point concentration estimates should be based on the 95 percent upper confidence limit (95% UCL) of the mean to estimate an exposure scenario. In the event that the calculated 95% UCLs exceeds the maximum detected value, the maximum value may be used as the exposure point concentration (U.S. EPA, 1989).

The presence of a chemical in some, but not all, samples suggests that it may also be present in the non-detect samples at some concentration between zero and the sample quantitation limit (SQL) for each sample. There are several methods for estimating the concentration in these non-detect samples (U.S. EPA, 1992). These include simple substitution methods,

distributional methods, and robust statistical methods. The default position of U.S. EPA (1989) is to substitute ½ the SQL for all non-detects. U.S. EPA (1992) guidance indicates that the substitution of ½ the SQL is adequate when the proportion of non-detect samples is less than 10 to 15 percent. If the fraction of non-detects becomes large, then assuming that the value of each non-detect is equal to ½ SQL will nearly always result in a substantial over-estimation of the mean of such data sets, with the degree of overestimation increasing with increasing proportions of non-detects.

The use of ½ SQL values for non-detect samples was used in this PEA. It must be noted however, that due to the high dilutions used in many of the sample extracts, this convention almost certainly has resulted in a considerable over-estimate of some exposure point concentrations, especially Dieldrin.

Soil

The Soil Sample Characterization Table (Text Table 3) in Section 6.2 summarizes and compares the number of detections with the number of samples. The U.S. EPA has generated an Excel-based program known as Pro-UCL, version 3.0 (US-EPA, 1994) that takes any series of contaminant concentrations, and performs a suite of statistical analyses on them to generate a best-fit 95% UCL exposure point concentration for each chemical. The 95% UCLs are calculated using a variety of methods, and based on the statistical distribution, the program recommends which calculated UCL value is best suited to the available data.

For the purposes of operating the Pro-UCL program, it was assumed that all shallow soil analyses for organo-chlorine pesticides were from the same population, and therefore the results provide 95% UCL contaminant concentrations that are applicable to the entire 10-acre site. For pesticides other than the organo-chlorine group and for herbicides, there are too few sample results to represent a statistically valid distribution. For these chemicals, the default assumption is made that the highest detected concentration is representative of the entire site. The actual concentrations input to Pro-UCL are contained in Summary Table 4.

The table below is a summary of exposure point concentrations based on the Pro-UCL results of the organo-chlorine pesticides as well as the maximum detected concentrations of other chemicals as described above. As discussed above, the minimum value input into the sample distribution is ½ the SQL value. Printouts from the Pro-UCL program are attached in Appendix D.

The Pro-UCL program's statistical analysis indicates that the distribution of all of the organo-chlorine pesticide chemicals do not follow normal distribution curves, and are considered non-parametric. The program recommends the "Hall's Bootstrap" UCL for all chemicals. The following table provides the recommended Hall's Bootstrap UCLs.

Text Table 6 - Imputed Mean Soil Exposure Point Concentrations

Chemical	95% UCL	Source
a Chlordane	48 mg/Kg	Pro-UCL
g Chlordane	30 mg/Kg	Pro-UCL
DDD	2,213 mg/Kg	Pro-UCL
DDE	318 mg/Kg	Pro-UCL
DDT	13,820 mg/Kg	Pro-UCL
Dieldrin	41 mg/Kg	Pro-UCL
Endosulfan I	239 mg/Kg	Pro-UCL
Endosulfan II	149 mg/Kg	Pro-UCL
Endosulfan Sulfate	35 mg/Kg	Pro-UCL
Endrin	15 mg/Kg	Pro-UCL
Toxaphene	9,724 mg/Kg	Pro-UCL
Elthion	7.3 mg/Kg	Max Detect
Ethyl Parathion	1.8 mg/Kg	Max Detect
Dinoseb	5.2 mg/Kg	Max Detect
Carbaryl	190 mg/Kg	Max Detect
Methiocarb	220 mg/Kg	Max Detect

The 41-mg/Kg contaminant point concentration for Dieldrin is far higher than the highest actual measured concentration of 3.8-mg/Kg. The reason for this result is the low concentration required for human risk impact in conjunction with the high SQL of 250 ppm caused by laboratory sample dilution (see discussion above).

Groundwater

Due to the absence of a statistically significant number of groundwater samples, the maximum detected concentrations of the COPCs were used as exposure point concentrations (EPCs).

Text Table 7 - Imputed Mean Groundwater Exposure Point Concentrations

Chemical	EPC	Source
DDD	27 (μg/L)	Max Detect
DDE	5.9 (μg/L)	Max Detect
DDT	350 (μg/L)	Max Detect
Endosulfan I	18 (μg/L)	Max Detect
Endosulfan II	33 (μg/L)	Max Detect
Endosulfan Sulfate	35 (μg/L)	Max Detect
Toxaphene	560 (μg/L)	Max Detect
Ethyl Parathion	40 (μg/L)	Max Detect
DCPA	2.0 (μg/L)	Max Detect
Carbaryl	22 (μg/L)	Max Detect

7.3 Toxicity Values and the CalTOX Model

The "Annual Average Daily Dose" (AADD) or "Lifetime Average Daily Dose" (LADD) are the general parameters used to quantify exposure doses in site risk assessments. The AADD is used as a standard measure for characterizing long-term non-carcinogenic effects. The

LADD addresses exposures that may occur over durations varying from a single event to an average 70-year human lifetime and are used to estimate potential carcinogenic risks.

The equations for calculating AADD and LADD for inhalation exposures are those presented by the U.S. EPA in their 1989 RAGS guidance (U.S. EPA, 1989) and are incorporated in the CalTOX model (Cal-EPA, 1993).

The purpose of the toxicity assessment is twofold (U.S. EPA, 1989):

- Hazard Identification evaluates the potential for a chemical to cause adverse health effects in exposed individuals, based on available information (hazard identification); and
- Dose-Response Assessment estimates the relationship between the extent of exposure and the increased likelihood and/or severity of adverse effects.

Hazard identification entails determining if a chemical can cause an increase in a particular adverse effect (e.g., cancer) and the likelihood that the adverse effect will occur in humans. The result of hazard identification is a profile of the available toxicological information and its relevance to human exposure under conditions present in the environment.

Dose-response assessment entails quantifying the relationship between the dose of a chemical and the incidence of adverse effects in the exposed population. The results of the dose response assessment are toxicity criteria that are used in the risk characterization to estimate the likelihood of adverse effects occurring in humans at different exposure levels. The toxicity criteria used to evaluate non-carcinogenic and carcinogenic health risks are commonly referred to as reference doses (RfDs) and slope factors (SFs), respectively. The bases for these criteria are described briefly in the following sections.

The potential health effects of the COPCs identified in the PEA were evaluated using the CalTOX (v.4.0 Beta) health risk-modeling program, which was produced for the State of California (McKone & Enoch, 2004). The CalTOX software includes toxicity and other information for a number of common contaminants including the majority of chemicals herein identified as COPCs. Several chemicals are, however, not in the database. These chemicals are, however, small contributors to the overall contaminant mass at the Haley site. The assumption was made that their contribution to the total potential heath risk is likely to be very small in comparison to the major COPCs, especially DDT and Toxaphene, and could therefore reasonably be excluded from the risk assessment. In general, the chemicals not found in the CalTOX database are those not included in the organ-chlorine pesticides group. In addition, the organo-chlorine pesticide, Endosulfan, is in the database, but it is non-specific for Endosulfan I, Endosulfan II, and Endosulfan Sulfate. For the purpose of these calculations, simply adding the mean exposure point concentrations for all 3 Endosulfan chemicals generated a single Endosulfan concentration. A similar situation exists with regard to the Chlordane group.

The following table summarizes the various exposure point concentrations used in the CalTOX software.

Text Table 8a – Exposure Point Concentrations Used in CalTOX

Chemical	95% UCL	Comment
Chlordane	78 mg/Kg	Sum of 2 chemicals
DDD	2,213 mg/Kg	Included in CalTox
DDE	318 mg/Kg	Included in CalTox
DDT	13,820 mg/Kg	Included in CalTox
Dieldrin	41 mg/Kg	Included in CalTox
Endosulfan	423 mg/Kg	Sum of 3 chemicals
Endrin	15 mg/Kg	Included in CalTox
Toxaphene	9,724 mg/Kg	Included in CalTox

The following are not in the CalTOX database and were not used in the human health risk assessment:

Text Table 8b – Exposure Point Concentrations Excluded From CalTOX

Chemical	95% UCL
Ethion	7.3 mg/Kg
Ethyl Parathion	1.8 mg/Kg
Dinoseb	5.2 mg/Kg
Carbaryl	190 mg/Kg
Methiocarb	220 mg/Kg

7.4 Risk Characteristics and Summary Table

Risk characterization represents the final step in the risk assessment process. In this step, the results of the exposure and toxicity assessments are integrated into quantitative or qualitative estimates of potential health risks. Potential non-carcinogenic health effects and carcinogenic health risks are characterized separately.

7.4.1 Non-Carcinogenic Health Effects

Potential adverse non-carcinogenic health effects are evaluated using the hazard index (HI) approach as recommended by U.S. EPA (1989). The general approach is to compare the AADD for each chemical to the appropriate RfD. This comparison is expressed in terms of a "hazard quotient," which is calculated as follows:

$$\text{Hazard Quotient}_i = \frac{\text{AADD}_i}{\text{RfD}_i}$$

A hazard quotient less than or equal to 1 indicates that the predicted exposure to that chemical should not result in an adverse non-carcinogenic health effect (U.S. EPA, 1989). In cases where individual chemicals potentially act on the same organs or result in the same health endpoint (e.g., respiratory irritants), potential additive effects may be addressed by summing the several Hazard Quotients to derive a calculated Hazard Index.

A hazard index of less than or equal to 1 indicates acceptable levels of exposure for chemicals having an additive effect. In this HHRA, a screening-level hazard index was calculated by summing the hazard quotients for all chemicals, regardless of toxic endpoint, as recommended by agency guidance (U.S. EPA, 1989). This approach is generally believed to overestimate the potential for non-carcinogenic health effects due to simultaneous exposure to multiple chemicals because it does not account for different toxic endpoints (U.S. EPA, 1989). It can, however, be used as a screening tool to rapidly identify those exposure scenarios for which exposure to multiple chemicals do not pose a non-carcinogenic health risk.

It should be noted that hazard quotients or hazard indices greater than 1 do not necessarily mean that adverse health effects will be observed. As discussed above, a substantial margin of safety has been incorporated into some of the RfDs developed for the COPCs. Therefore, for these chemicals, adverse health effects may not be observed even if the hazard quotient or hazard index is much larger than 1.

The CalTox model uses this general approach to estimate the non-carcinogenic risk for the receptors evaluated, but the estimate is more complex and sophisticated (Cal-EPA, 1993). Full details of the assumptions and toxicity information used in the health assessment are included in the tables in Appendix E. This appendix also includes details regarding soil, chemical, landscape, and exposure criteria used in the CalTOX model.

7.4.2 Carcinogenic Health Effects

Carcinogenic health risks are defined in terms of the increased probability of an individual developing cancer as the result of exposure to a given chemical at a given concentration. As required by Cal-EPA (1992) and U.S. EPA (1989), lifetime excess cancer risks are estimated as follows:

$$\text{Lifetime Excess Cancer Risk} = LADD_i \times SF_i$$

The CalTOX model uses this general approach to estimate the non-carcinogenic risk for the receptors evaluated, but the estimate is more complex and sophisticated (Cal-EPA, 1993). As with hazard indices, the estimated excess cancer risks for each chemical and exposure route are summed regardless of toxic endpoint to estimate the total excess cancer risk for the exposed individual.

Regulatory agencies such as Cal-EPA and U.S. EPA have defined what is considered an acceptable level of risk in generally similar ways. The U.S. EPA considers 1x10E-6 to 1x10E-4 to be the target range for acceptable risks at sites where remediation is considered. Estimates of lifetime excess cancer risk associated with exposure to chemicals of less than one-in-one-million (1x10E-6) are considered to be so low as to not warrant any further investigation or analysis. Within the State of California, Cal-EPA also tends to work within the same target range for acceptable risks. Pursuant to the California Safe Drinking Water & Toxic Enforcement Act of 1986, the Office of Environmental Health Hazard Assessment has

established a no significant risk level at 1x10E-5 (CCR Division 21.5, Title 22, Sec. 12703).

It should be noted that cancer risks in the 1x10E-6 to 1x10E-4 range or higher do not necessarily mean that adverse health effects will be observed. Current methodology for estimating the carcinogenic potential of chemicals is believed to not underestimate the true risk, but could overestimate the true risk by a considerable degree. In fact, the range of possible risks includes zero.

7.4.3 CalTOX Model Results

Individual CalTOX runs were made for each chemical and associated exposure point concentration shown in Table 8a. Except for these variables, all other inputs such as landscape properties, and exposure factors were held constant. In general, all soil contamination was deemed to reside in the root zone, which was set at the upper 1.4 meters of soil, while the vadose zone was set at 2-meter thickness. (See printouts in Appendix E for details.) The following table summarizes the results of the risk analysis for each chemical:

Text Table 9 – Summary of CalTOX Model Results

Chemical	Increased Cancer Risk	Hazard Ratio (non-Cancer)
Chlordane	2.2E-3	3.8E+2
DDD	4.9E-5	0.0
DDE	5.9E-4	0.0
DDT	6.8E-5	4E+0
Dieldrin	1.3E-2	3.3E+2
Endosulfan	0.0	4.6E-1
Endrin	0.0	1.8E+1
Toxaphene	1.3E-2	1.9E+2
TOTALS	**2.9E-2**	**9.2E+2**

The potential non-cancer hazard quotients and hazard indexes associated with exposure to the COPCs in the shallow soil by a hypothetical future on-site resident are 922, and the increased cancer risk is 0.028 (i.e. 1 in 35). The figures are both very high and clearly indicate that an unacceptable health risk is associated with the Haley site. The figures also suggest that Dieldrin and Toxaphene are the chemicals that pose most of the risk.

As discussed above, however, the risk associated with Dieldrin exposure is almost certainly unreasonably high due to the calculated 41-mg/Kg contaminant point concentration for this chemical compared with the highest actual measured concentration of 3.8-mg/Kg. Dieldrin was actually detected in only two samples, but even the elimination of this chemical would not change the risk management decision.

8.0 ECOLOGICAL SCREENING EVALUATION

In addition to obvious human receptors, potential receptors include plant and animal life. The undeveloped part of the site is periodically disked, and provides limited habitat to such species as lizards and small mammals including ground squirrels, field mice and jackrabbits. Other small animals such as lizards, snakes, and a variety of insects will also be present. Avian fauna will include a variety of birds that typically inhabit the area. No aquatic animals or plants are likely to be present except for microorganisms that may inhabit the irrigation ditch during those times when it is in use. No domestic animals such as cattle and sheep are present on the site or on adjacent lands. Several dairies are present in the area, but these are more than ¼ mile from the site.

According to information in the EDR database report contained in the Phase I ESA (Geo-Phase Environmental, 2004), there are no areas in the Federal Wetlands Inventory on, or within 1 mile of the Haley site. The nearest wetland area is about 1.25 miles northwest from the site.

The California Natural Diversity Database, operated by the Department of Fish and Game, provides information on sensitive flora and fauna habitats. No rare, threatened, or endangered species were identified in the immediate vicinity of the Property. The nearest habitat for such species is along Tom Paine Slough, about ¾ mile north of the site. Two species are identified between ¾ sand 1 mile of the Haley site as follows:

Agelaius Tricolor
Tricolored Blackbird. This was a colony of about 1,125 birds along Tom Paine Slough. This species has not been sighted since 1936 and is presumed extinct. It is not listed as a threatened or endangered species.

Buteo Swansoni
Swanson's Hawk. A single nest of this species was observed near Tom Paine Slough in 1984 in an oak tree just under 1 mile from the Haley site. A second nest was observed in 2000 in a cottonwood slightly closer to the Haley site. This bird is listed as "threatened".

Another species was identified near Banta at a location slightly over one mile from the Haley site.

Aster Lentus
Suisun Marsh Aster. This bird is most often seen along sloughs. An individual of this species was observed in 1920 near Banta, in a non-specific area centered slightly over 1 mile southeast of the Haley site. There has been no sighting of this animal since 1920, but it is "presumed extant". The species is not listed as threatened or endangered.

9.0 COMMUNITY PROFILE

Description of Surrounding Land Uses and Environmental Resources
The site is in a developing area at the extreme northeast limit of Tracy, and to date, there is very limited developed use of adjacent and nearby sites. The Haley site is in a mostly undeveloped area. The nearest developed industrial site is adjacent to the west end of the property, but other adjacent lands are either in agricultural use or serve as public roadways. The nearest residences are several farm houses about ½ mile to the north. Several other residences are about ½ mile to the south. The nearest residential tract is about 0.9 miles to the southeast in the small town of Banta. The only known highly sensitive receptor (such as schools, hospitals, nursing homes) within a mile of the site is Banta Elementary School at 22345 El Rancho Road, about 0.9 miles from the site.

North
The site adjacent north of the subject property is in agricultural use, most recently as a corn field. There are no residences or other structures on the adjacent site, which also abuts the south side of the I-205 freeway right of way.

South
Pescadero Avenue bounds the subject property on the south. South of the road is open land that has been used for agricultural purposes.

East
Paradise Road bounds the subject property on the East. Land east of the road is open land that has been used for agricultural purposes.

West
A large Yellow Freight truck terminal abuts the west line of the site. Beyond the yellow Freight facility is more undeveloped land.

Visibility of the Site to Neighbors
The site is open and clearly visible to persons passing by on Paradise or Pescadero Avenue, however there are no residents within approximately ½ mile of the site.

Community Demographics
The following information is from websites operated by the City of Tracy and San Joaquin County. The respective URLs are http://www.ci.tracy.ca. and http://www.sjpnet.org/.

	Tracy	S. J. County
Total Population	75,000	564,000
White	59%	47%
Hispanic	26%	32%
Asian	8%	11%
African-American	5%	6%
Native American	1%	1%
Other	1%	3%

Housing in the City of Tracy is 72 percent owner-occupied and 28 percent rented. The median age is 30.9 years and median annual household income is $62,800.

Community Contacts
No inquiries have been received from community members or groups.

Community Interactions
No meetings, events, or presentations have been conducted with, or for, the community or local government.

Media Coverage
There has been no news media coverage.

Government Contacts
With the exception of DTSC and the San Joaquin Environmental Health Department, no inquiries have been received from any governmental agency or elected officials.

Key Contact List
Below is a list of elected State and local government officials, regulatory agencies, and residents / businesses within a ½ mile radius of the site.

Federal Elected Officials	
US Senator Barbara Boxer 112 Hart Senate Office Building Washington DC 20510 (202) 224-2552	US Senator Diane Feinstein 331 Hart Senate Office Building Washington DC 20510 (202) 224-3841
US Representative Richard Pombo 2411 Rayburn House Office Bldg Washington DC 20510 (202) 225-1947	
State Elected Officials	
State Assemblywoman Barbara Mathews 17th District 31 E. Channel, Rm 306 Stockton 95202 (209) 948-7479	State Senator Michael Machado 5th District 31 E. Channel, Rm 440 Stockton 95202 (209) 948-7930
San Joaquin County	
Leroy Ornellas, Supervisor, District 5 222 E. Weber, Room 701 Stockton, CA 95202 (209) 468-3113	

Tracy Officials / Agencies	
Mayor, Dan Bilbrey Tracy City Hall 325 E. 10th Street Tracy 95376 (209) 831-4103	City Manager, Daniel Hobbs Tracy City Hall 325 E. 10th Street Tracy 95376 (209) 831-4103
Tracy Development & Engineering Services Planning Division 520 N. Tracy Blvd. Tracy, CA 95376 (209)831-4600	
State Regulatory Agencies	
Eric Wallberg Hazardous Substance Scientist Dept. of Toxic Substance Control 8800 Cal Center Drive Sacramento 95826 (916) 255-3749	Ms. Cori Condon Regional Water Quality Control Board 11020 Sun Center Drive #200 Rancho Cordova, CA 95670 464-4619
County Regulatory Agencies	
Harlin Knoll Sr. Registered Env. Health Specialist Environmental Health Department 304 E. Weber Ave., - 3rd Floor Stockton 95202 (209) 468-3442	

Residents and Businesses within ½ mile of the Site

Yellow Freight (adjacent to site)	1535 E. Pescadero Ave.
Travlin Toys	21200 Paradise Road
Moreda Dairy	20967 Paradise Road
Guido Bettinzoli	7350 Arbor Road
A.F. Ender	2119 E. Grant Line Road
Manuel Silva / Silva Bros. Dairy	2091 E. Grant Line Road

Sensitive Receptors

The only known highly sensitive receptor (such as schools, hospitals, nursing homes) within a mile of the site is Banta Elementary School at 22345 El Rancho Road, about 0.9 miles from the Haley site.

Past Public Involvement

Insofar as the public is unaware of environmental conditions pertaining to the site, there has been no public involvement.

Key Issues and Concerns

There is no public awareness or interest in the site. Given the relatively remote nature of the site, no concerns or issues regarding the facility or the proposed environmental activities are expected to be raised by the community or the local governmental agencies.

Recommended Public Participation Activities

For detailed information on the public participation policies, please refer to DTSC's Public Participation Manuel, which may be found on DTSC's website (http://www.dtsc.ca.gov) under the section pertaining laws, regulations, and policies.

As a part of the public participation process, repositories will be established where the public may go to view documents pertaining to remedial investigation / mitigation activities: We suggest the following venues be considered as possible data repositories:

Tracy Library 20 E Eaton Ave. Tracy, CA (209) 831-4222	City Manager's Office Tracy City Hall 325 E. 10th Street Tracy 95376 (209) 831-4103
San Joaquin County Environmental Health Dept. 304 E. Weber Ave., - 3rd Floor Stockton 95202 (209) 468-3442	

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

Based on the information developed for this PEA, the following conclusions are drawn:

1. The extremely high hazard index and cancer risk indicate that further risk characterization and remedial measures are necessary at the Haley site.

2. The distribution of chemicals in the various soil samples indicates that nearly all the contaminant mass as well as the health risk lies in a relatively small area very roughly estimated at 10,000 square feet in the immediate vicinity of where chemicals were stored and handled.

3. Samples collected from areas outside this highly contaminated zone generally appeared to contain trace or non-detectable concentrations of these chemicals. One deviation form this observation was in a sample from near the mid-point of the east-west trending airstrip. This sample point (S-5) had somewhat elevated concentrations of DDT and Endosulfan. Additional work is needed to characterize the risk in the vicinity of sample point S-5.

4. The actual presence of COPCs in the groundwater remains as an open question. Additional work is needed to make this determination.

10.2 Recommendations

Based on the above conclusions, the following recommendations are made to further investigate/mitigate the health risk associated with this site:

1. Additional groundwater samples should be collected in the assumed down-gradient direction (north) to obtain information on the possible presence of pesticides in the groundwater. The best location would be along the south line of the agricultural parcel that lies on the north side of the irrigation ditch that marks the boundary between these parcels.

2. The concrete loading dock, washout pit, and aircraft loading pad should be removed and the concrete properly disposed of. This would allow access to the underlying soil so that additional samples can be collected to better define the lateral and vertical extent of the intensely contaminated soil.

3. Once this additional soil characterization is complete, the highly contaminated soil should be excavated and either treated on-site, or hauled to a Class I hazardous waste landfill as an interim remedial measure. This work would be expected to remove nearly all of the contaminant mass. New soil samples would then be collected from the freshly exposed surface and new groundwater samples could be collected to determine if additional remedial action is needed.

4. Additional sampling is needed in the vicinity of sample point S-5 to characterize the extent of organ-chlorine pesticides found there.

5. No evidence was found to suggest the spill of 2 drums of oil, water, and diesel in the area in front of the west hangar has materially impacted the soil. The investigation of this incident should be officially closed, and an NFA letter issued with regard to this small release.

10.3 Preliminary Scoping Recommendation

Normally, contaminated sites enter the Remedial Investigation / Feasibility Study (RI/FS) process as the next step after the PEA is completed. In this case, the localized, but intense pesticide contamination is such that interim remediation along the lines suggested in the above recommendation would be appropriate. Upon completion of the interim remedial measures, addition samples should be collected and revised risk assessment should be completed before proceeding to the RI/FS process.

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12.0 SIGNATURE AND CERTIFICATION

Geo-Phase Environmental Inc. was performed in accordance with accepted geologic and hydrologic standards of the State of California including the DTSC document entitled Preliminary Endangerment Assessment, Guidance Manual. Geo-Phase Environmental Inc. is not responsible for undisclosed conditions.

This report was prepared by:

Geo-Phase Environmental Inc.

Stephen M Lankford,
California Professional Geologist #4283
Registered Environmental Assessor #05549

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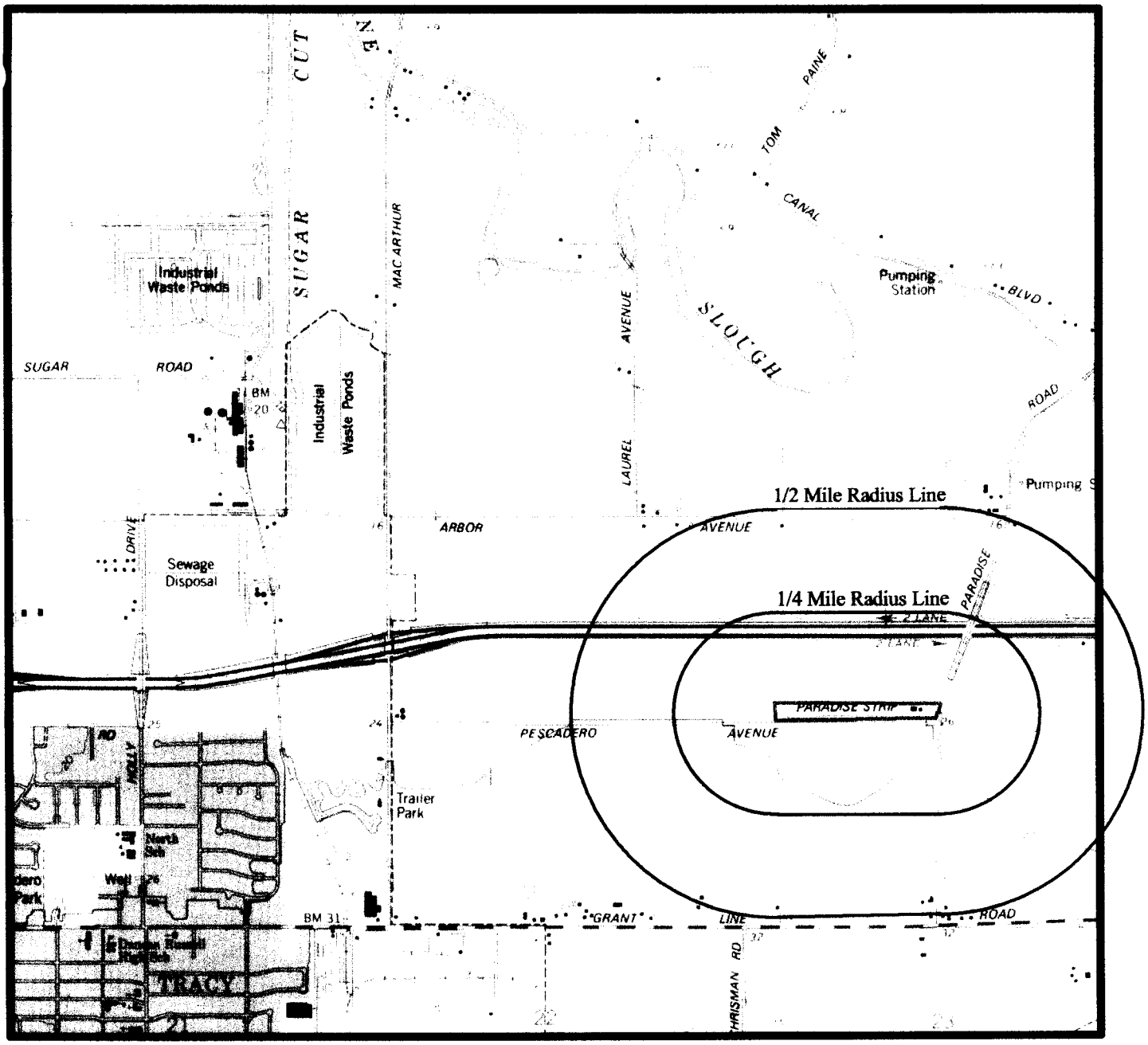
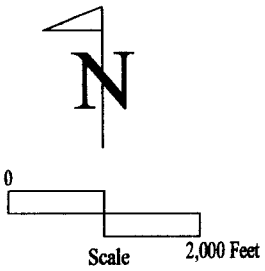


Modified from the USGS Topographic Map Union Island Quadrangle, 7.5 Minute Series.

Figure 1
USGS Topographic Map
Former Haley's Flying Service
21000 Paradise Road
Tracy, CA



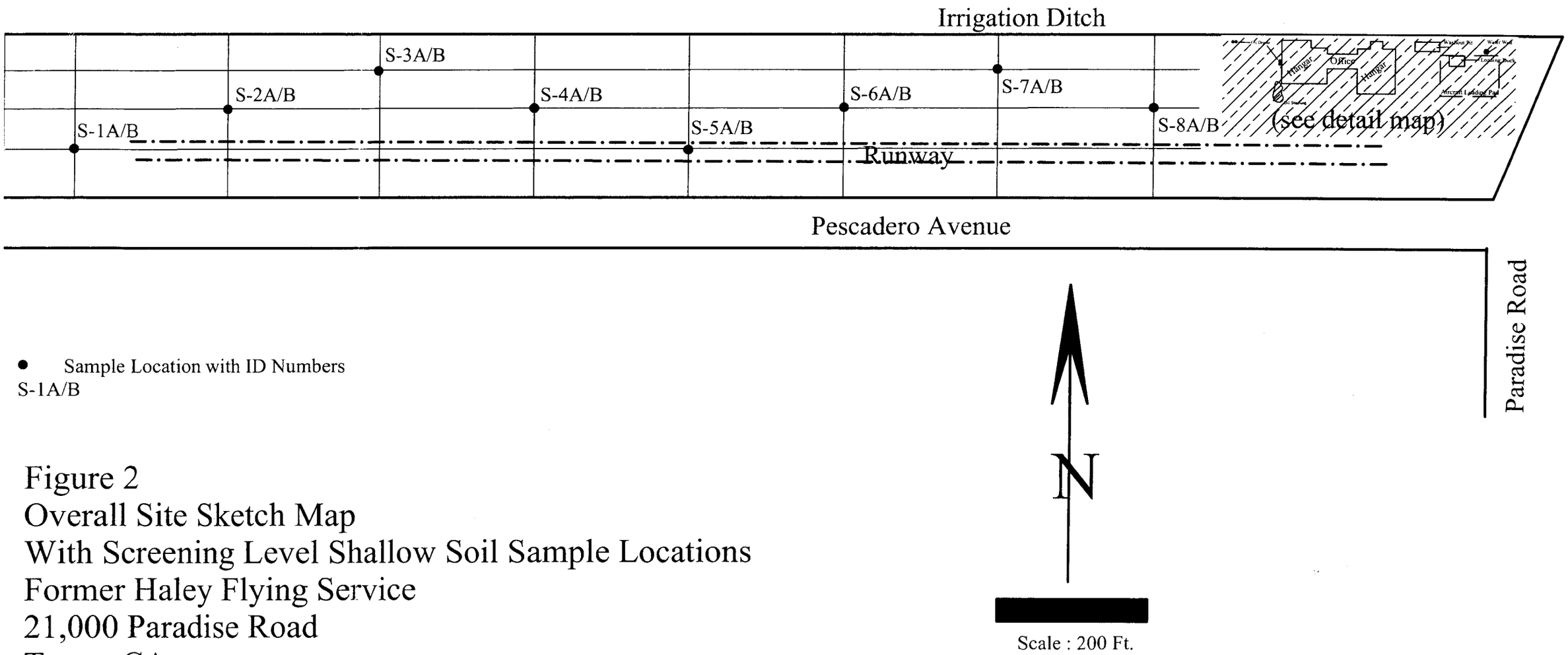


Figure 2
Overall Site Sketch Map
With Screening Level Shallow Soil Sample Locations
Former Haley Flying Service
21,000 Paradise Road
Tracy, CA

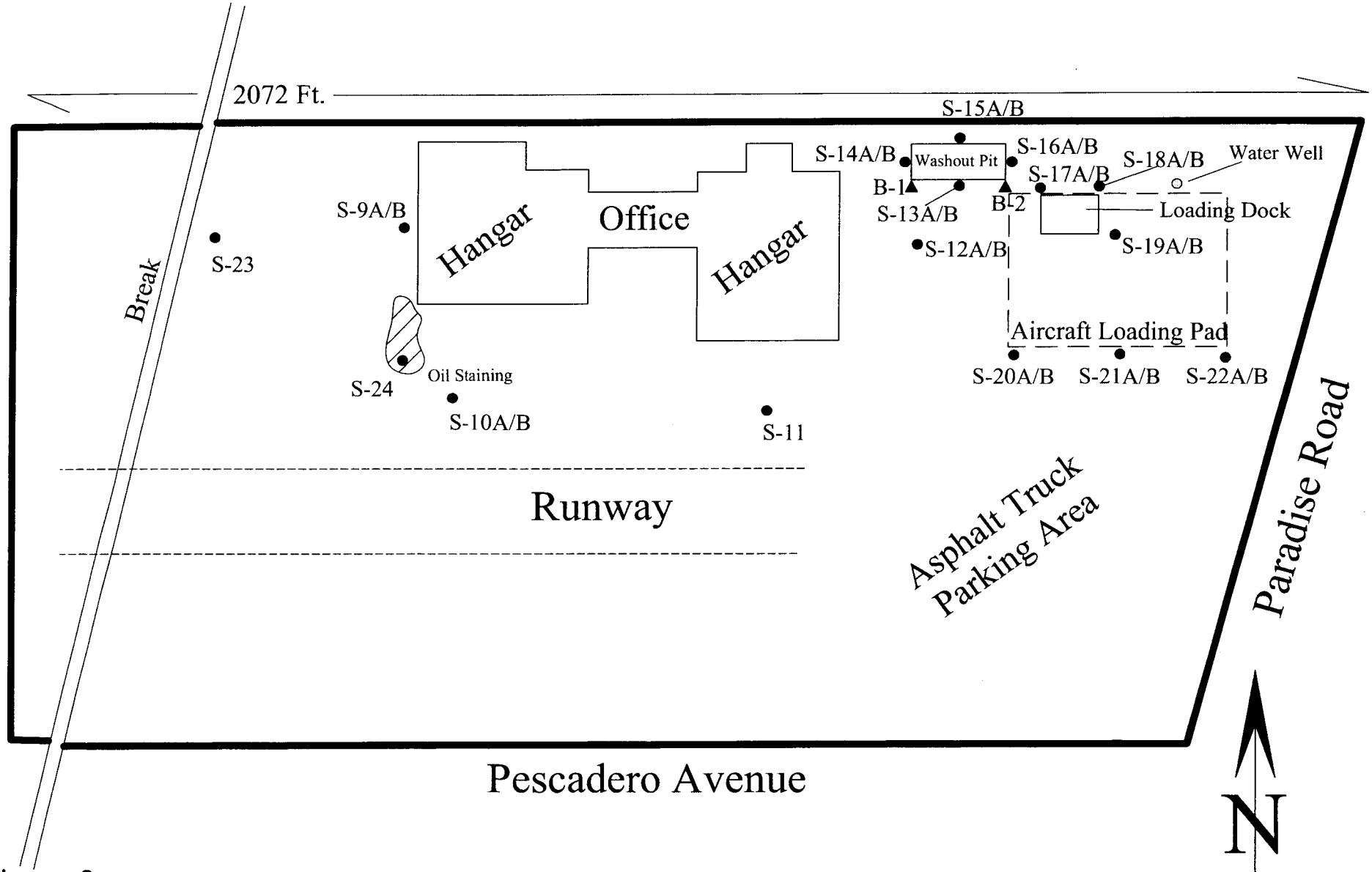


Figure 3
Detail Site Sketch Map
With Targeted Sample Locations
Former Haley's Flying Service
21,000 Paradise Ave.
Tracy, CA

S-2A/B — Soil Sample Location & ID

B-2 — GeoProbe Soil Boring & ID

Scale 1 In. = 50 Ft.

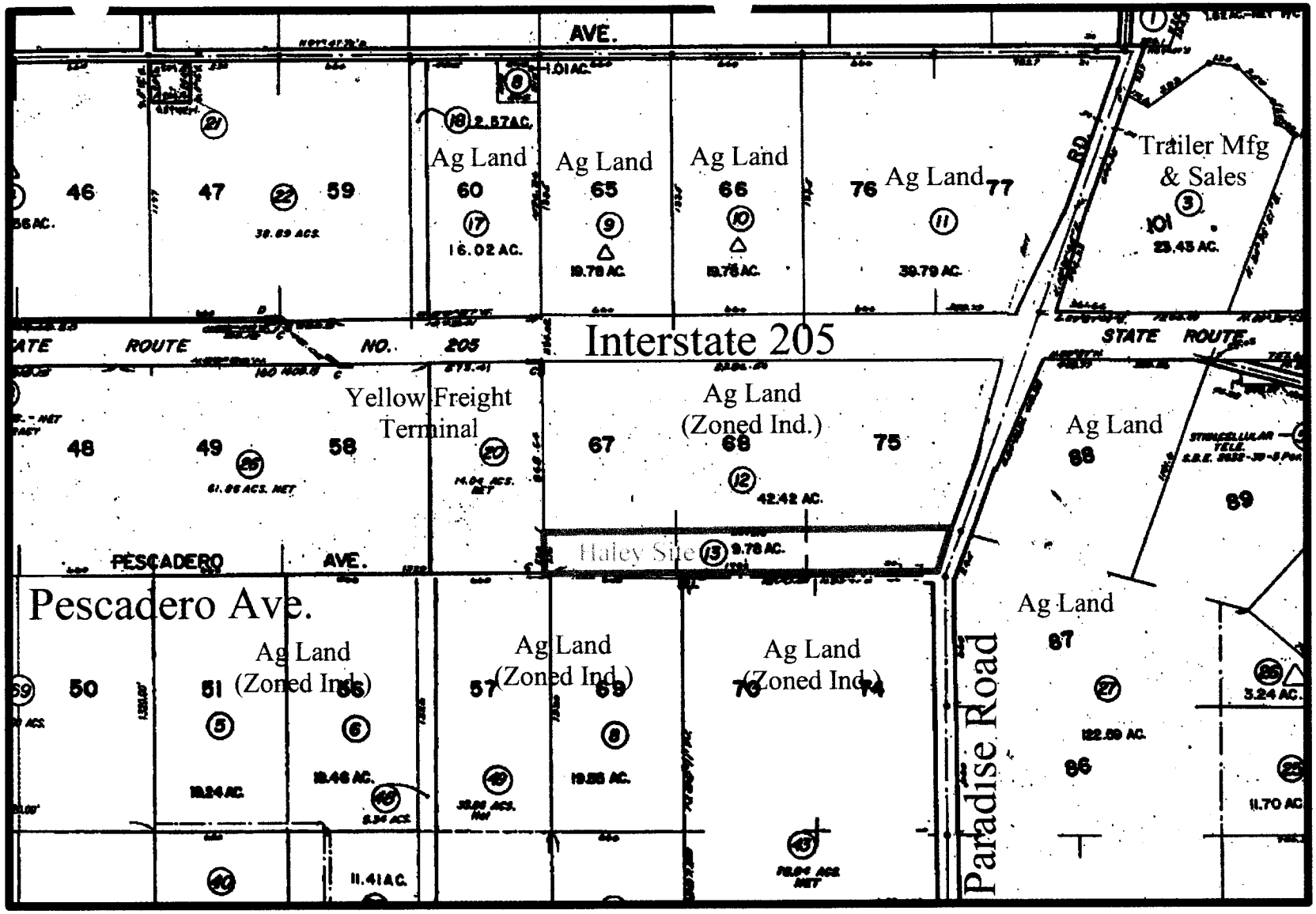


Figure 4
Assessor's Parcel Maps
With Adject Site Identification
Former Haley's Flying Service
21,000 Paradise Ave.
Tracy, CA

Scale 1 In. = 800 F

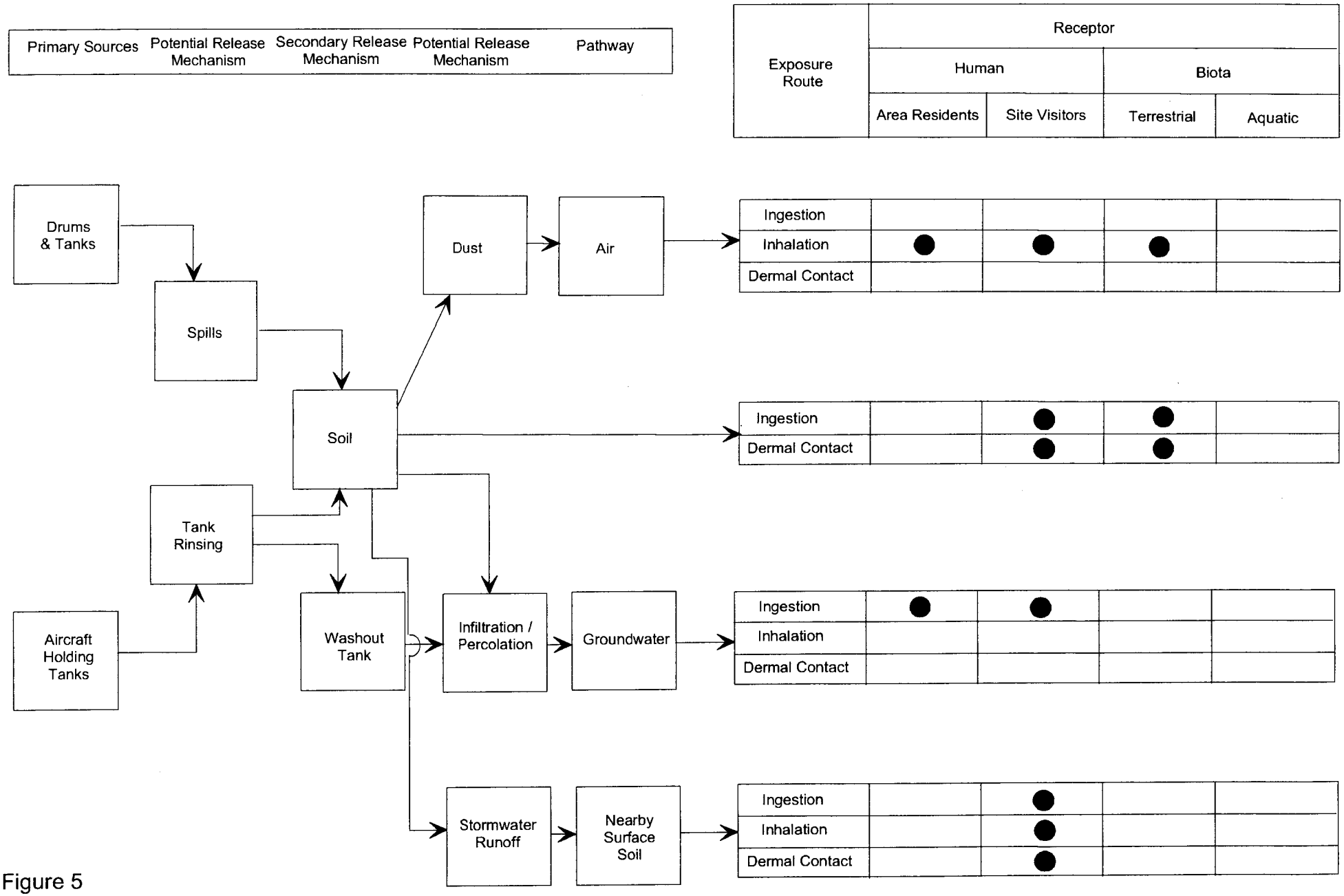
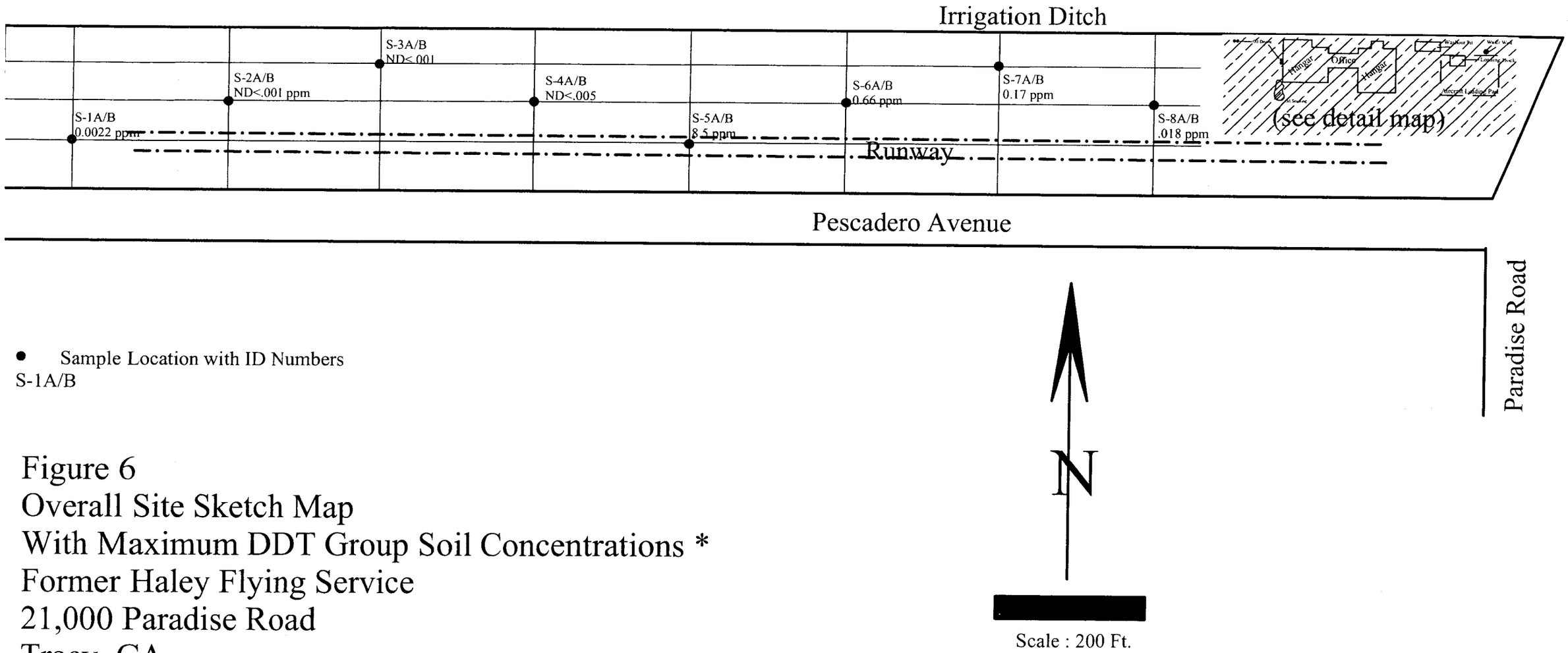


Figure 5
Conceptual Site Model Diagram



● Sample Location with ID Numbers
S-1A/B

Figure 6
Overall Site Sketch Map
With Maximum DDT Group Soil Concentrations *
Former Haley Flying Service
21,000 Paradise Road
Tracy, CA

* Includes DDD, DDE, DDT

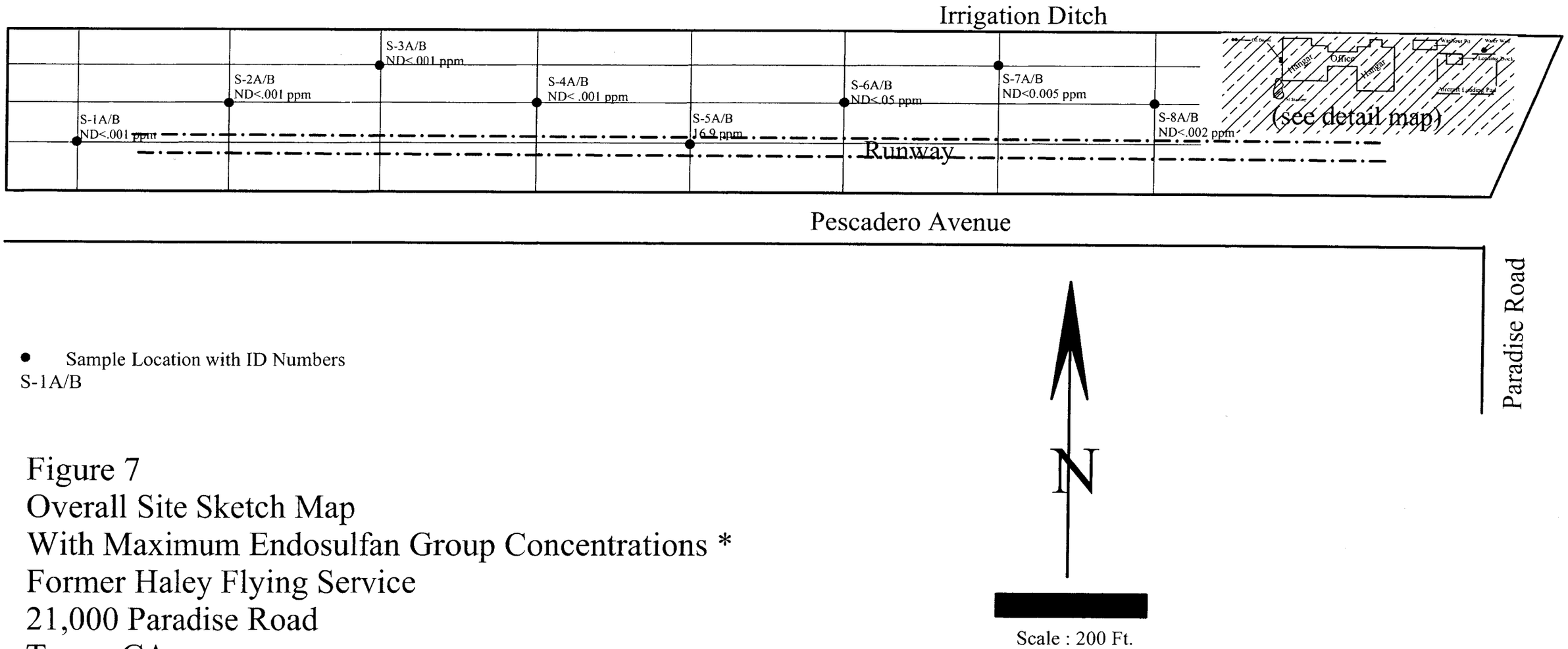


Figure 7
Overall Site Sketch Map
With Maximum Endosulfan Group Concentrations *
Former Haley Flying Service
21,000 Paradise Road
Tracy, CA

* Includes Endosulfan I, Endosulfan II, Endosulfan Sulfate

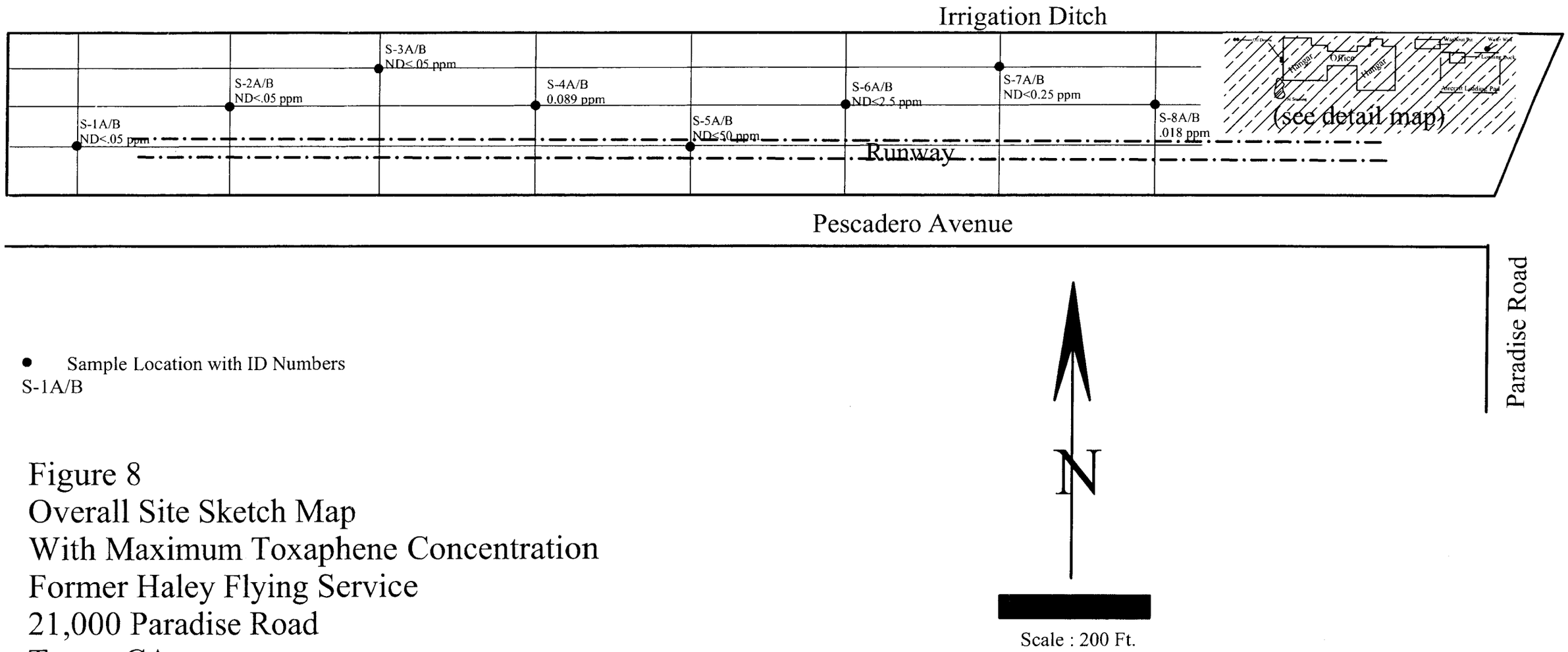


Figure 8
Overall Site Sketch Map
With Maximum Toxaphene Concentration
Former Haley Flying Service
21,000 Paradise Road
Tracy, CA

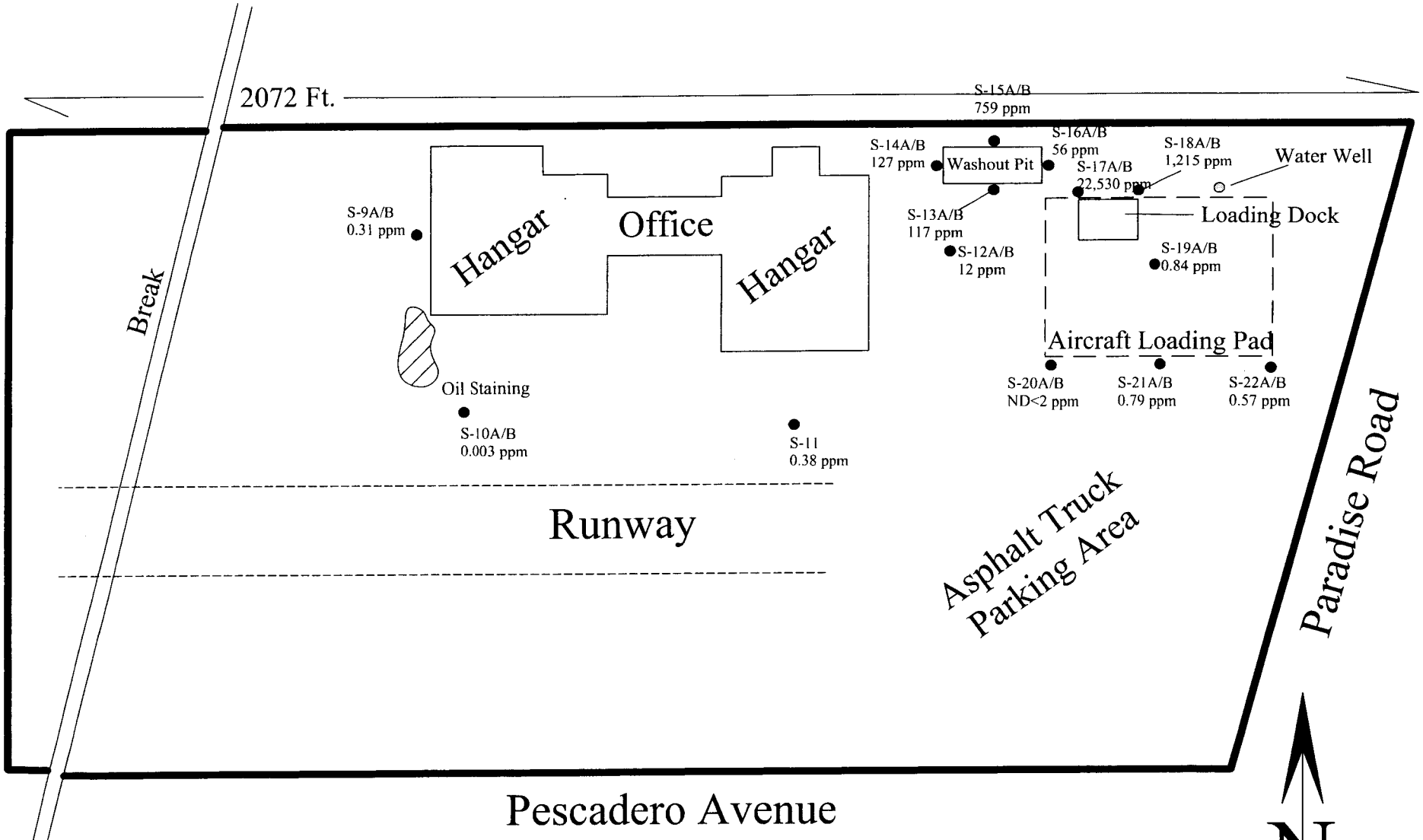


Figure 9
Detail Site Sketch Map
With Maximum DDT Group*
Soil Concentrations
Former Haley's Flying Service
21,000 Paradise Ave.
Tracy, CA

S-2A/B Soil Sample Location & ID

B-2 GeoProbe Soil Boring & ID

* Includes DDD, DDE, DDT

Scale 1 In. = 50 Ft.

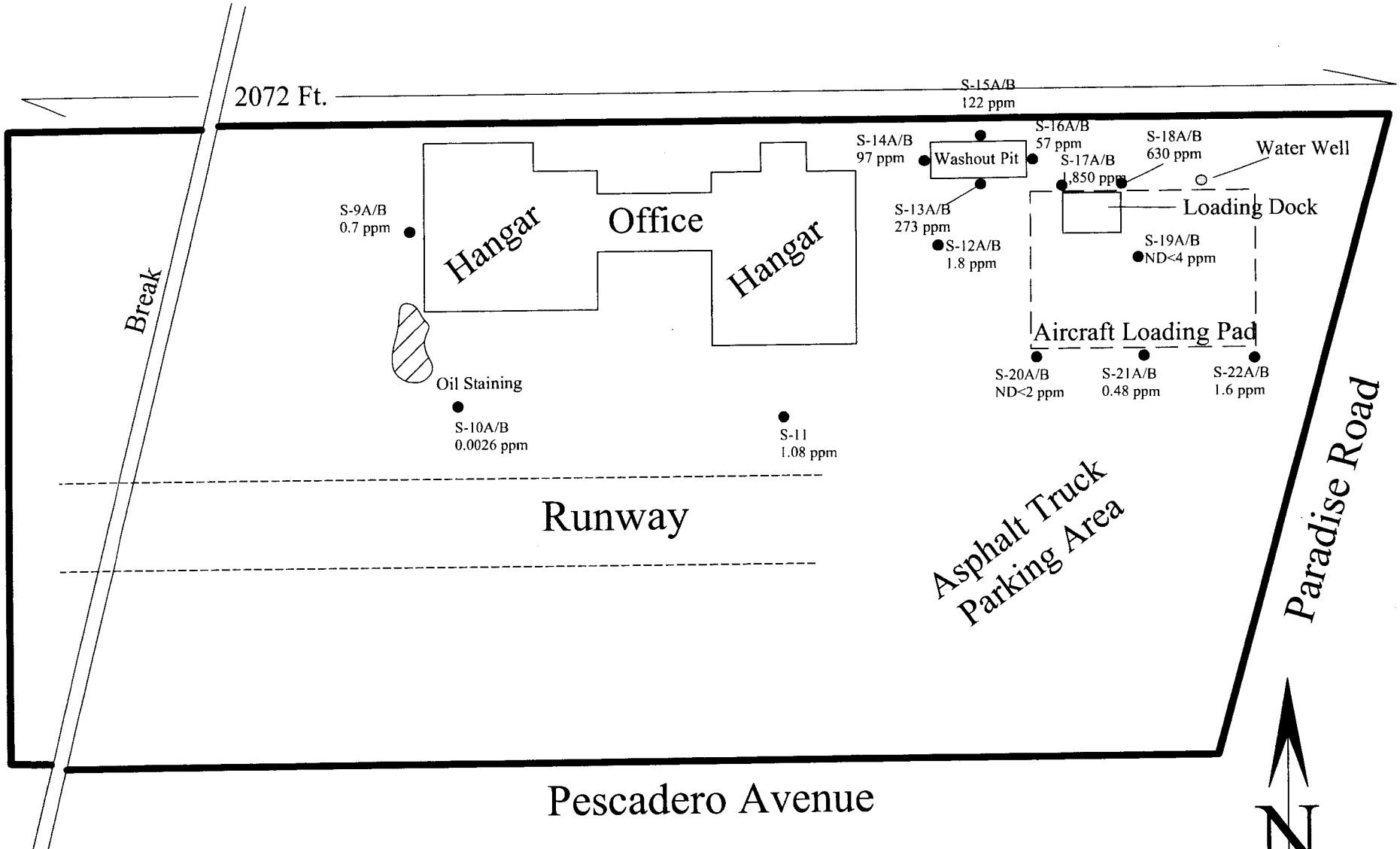


Figure 10
Detail Site Sketch Map
With Maximum Endosulfan Group*
Soil Concentrations
Former Haley's Flying Service
21,000 Paradise Ave.
Tracy, CA

● S-2A/B — Soil Sample Location & ID

▲ B-2 — GeoProbe Soil Boring & ID

Scale 1 In. = 50 Ft.

* Includes Endosulfan I, Endosulfan II, Endosulfan Sulfate

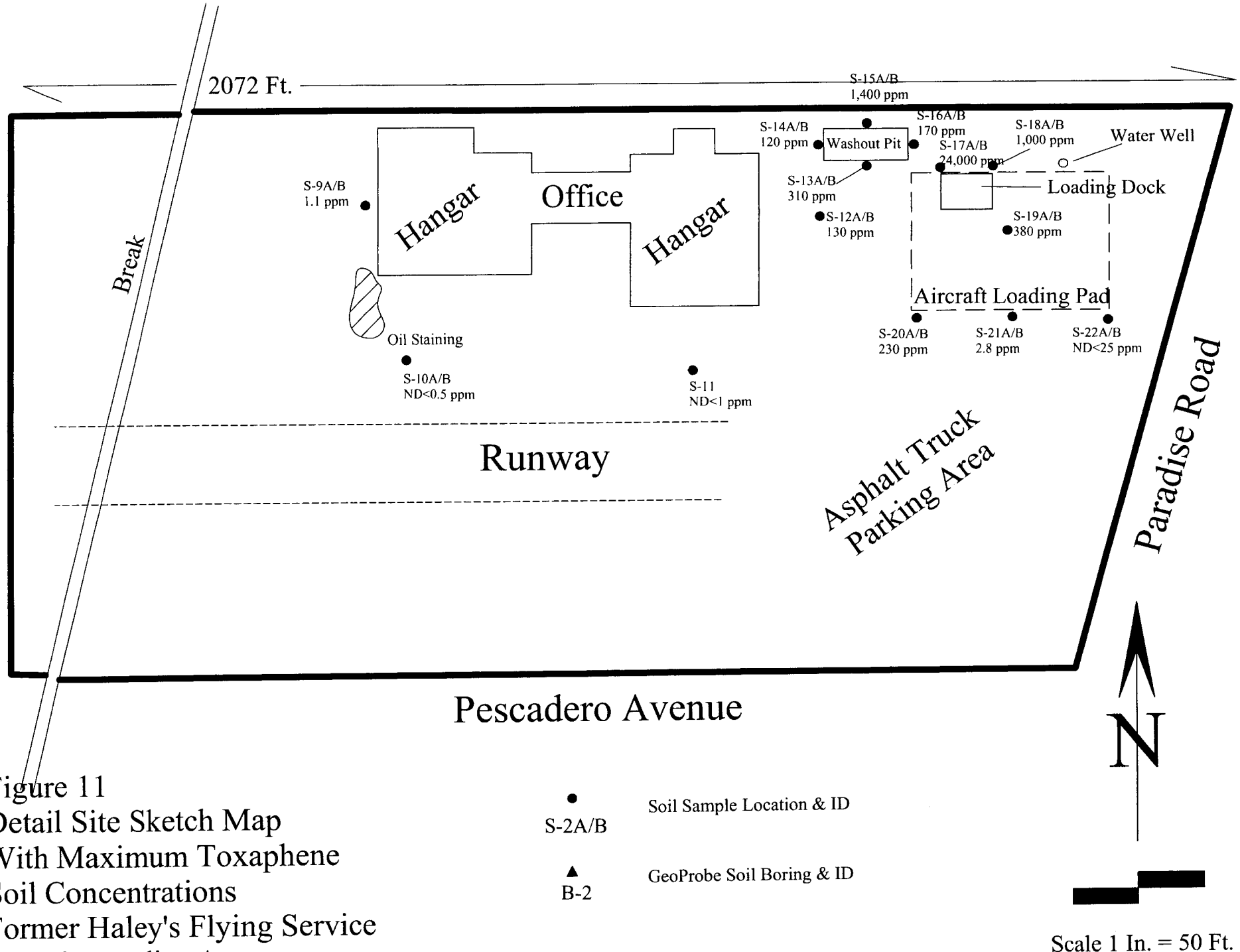


Figure 11
Detail Site Sketch Map
With Maximum Toxaphene
Soil Concentrations
Former Haley's Flying Service
21,000 Paradise Ave.
Tracy, CA

Summary Tables

Summary of Pesticide Laboratory Data - Soil	**1**
Summary of Laboratory Data - Groundwater	**2**
Summary of Hydrocarbon Laboratory Data – Soil	**3**
Summary of Organo-Chlorine Concentrations Input to Pro-UCL	**4**

Summary Table 1

Laboratory Data - Soil

Sample I.D.	S-1A	S-1B	S-2A	S-2B	S-3A	S3-B	S-4A	S-4B	S-5A	S5-B	S-6A	S-6B
Dilution (8081)	1	1	1	1	1	1	1	5	500	1000	50	1
8081 Analytes												
a-Chlordane	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.005	ND<0.50	ND<1.0	**0.69**	ND<.001
g-Chlordane	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.005	ND<0.50	ND<1.0	**0.06**	ND<.001
p,p-DDD	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.005	ND<0.50	**1.5**	ND<.05	ND<.001
p,p-DDE	**0.0022**	**0.0020**	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.005	ND<0.50	**2.2**	**0.42**	**0.0016**
p,p-DDT	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.005	ND<0.50	**4.8**	**0.24**	ND<.001
Dieldrin	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.005	ND<0.50	ND<1.0	ND<.05	ND<.001
Endosulfan I	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.005	**6.9**	**12.0**	ND<.05	ND<.001
Endosulfan II	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.005	**3.0**	**3.0**	ND<.05	ND<.001
Endosulfan sulfate	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.005	ND<0.50	ND<1.0	ND<.05	ND<.001
Endrin	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.005	ND<0.50	ND<1.0	ND<.05	ND<.001
Methoxychlor	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.001	ND<.005	ND<0.50	ND<1.0	ND<.05	ND<.001
Toxaphene	ND<.05	ND<.05	ND<.05	ND<.05	ND<.05	ND<.05	**0.89**	ND<0.25	ND<25	ND<50	ND<2.5	ND<.05
8141 Analytes												
Ethion	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl parathion	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8151 Analytes												
Dinoseb (DNBP)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8318 Analytes												
Carbaryl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methiocarb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg

Summary Table 1 - Continued

Laboratory Data - Soil

Sample I.D.	S-7A	S-7B	S-8A	S-8B	S-9A	S-9B	S-10A	S-10B	S-11	S-12A	S-12B
Dilution (8081)	5	1	2	2	10	5	1	1	20	1000	1
8081 Analytes											
a-Chlordane	ND<.005	ND<.001	ND<.0020	ND<.0020	ND<.010	ND<.005	ND<.001	ND<.001	ND<0.02	ND<1.0	ND<.001
g-Chlordane	ND<.005	ND<.001	ND<.0020	ND<.0020	ND<.010	ND<.005	ND<.001	ND<.001	ND<0.02	ND<1.0	ND<.001
p,p-DDD	ND<.005	ND<.001	ND<.0020	ND<.0020	ND<.010	ND<.005	ND<.001	ND<.001	**0.15**	**12**	**0.006**
p,p-DDE	**0.12**	**0.0028**	**0.0037**	**0.013**	**0.031**	ND<.005	ND<.001	**0.0012**	**0.15**	ND<1.0	**0.0055**
p,p-DDT	**0.045**	ND<.001	**0.014**	**0.0063**	ND<.010	ND<.005	ND<.001	**0.0017**	**0.085**	ND<1.0	**0.022**
Dieldrin	ND<.005	ND<.001	ND<.0020	ND<.0020	ND<.010	ND<.005	ND<.001	ND<.001	ND<0.02	ND<1.0	**0.0039**
Endosulfan I	ND<.005	ND<.001	ND<.0020	ND<.0020	**0.35**	**0.13**	ND<.001	**0.0015**	**0.022**	ND<1.0	ND<.001
Endosulfan II	ND<.005	ND<.001	ND<.0020	ND<.0020	**0.37**	**0.12**	ND<.001	**0.0011**	**0.086**	**1.8**	ND<.001
Endosulfan sulfate	ND<.005	ND<.001	ND<.0020	ND<.0020	**0.05**	**0.016**	ND<.001	ND<.001	ND<0.02	ND<1.0	ND<.001
Endrin	ND<.005	ND<.001	ND<.0020	ND<.0020	ND<.010	ND<.005	ND<.001	ND<.001	ND<0.02	ND<1.0	ND<.001
Methoxychlor	ND<.005	ND<.001	ND<.0020	ND<.0020	**0.2**	ND<.005	ND<.001	ND<.001	ND<0.02	ND<1.0	ND<.001
Toxaphene	ND<0.25	ND<.05	**0.18**	ND<0.10	**1.1**	**0.3**	ND<.05	ND<.05	ND<1.0	**130**	ND<.05
8141 Analytes											
Ethion	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl parathion	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8151 Analytes											
Dinoseb (DNBP)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8318 Analytes											
Carbaryl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methiocarb	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg

Summary Table 1 - Continued

Laboratory Data - Soil

Sample I.D.	S-13A	S-13B	S-14A	S-14A-X2	S-14B	S-15A	S-15B	S-16A	S-16B	S-17A	S-17B
Dilution (8081)	500	2500	2000	2000	2000	5000	10000	2000	1000	250000	1000
8081 Analytes											
a-Chlordane	ND<0.50	ND<2.5	ND<2.0	ND<2.0	ND<2.0	ND<5.0	ND<10	ND<2.0	ND<1.0	ND<250	ND<1.0
g-Chlordane	**0.82**	**8.5**	ND<2.0	ND<2.0	ND<2.0	ND<5.0	**17**	ND<2.0	**1.1**	ND<250	ND<1.0
p,p-DDD	ND<0.50	**14**	**9.1**	**7.3**	**14**	**14**	**84**	**8**	ND<1.0	**3000**	**31**
p,p-DDE	**1.5**	**10**	ND<2.0	ND<2.0	**3.6**	ND<5.0	**65**	**2.3**	**2.2**	**530**	ND<1.0
p,p-DDT	**0.95**	**93**	**100**	**120**	**97**	**100**	**610**	**81**	**54**	**19000**	ND<1.0
Dieldrin	ND<0.50	**3.8**	ND<2.0	ND<2.0	ND<2.0	ND<5.0	ND<10	ND<2.0	ND<1.0	ND<250	ND<1.0
Endosulfan I	**22**	**180**	**31**	**25**	**64**	**76**	**590**	**35**	**32**	**1100**	ND<1.0
Endosulfan II	**9.5**	**78**	**20**	**16**	**33**	**46**	**290**	**22**	**15**	**750**	ND<1.0
Endosulfan sulfate	**1.1**	**15**	ND<2.0	**16**	ND<2.0	ND<5.0	ND<10	ND<2.0	ND<1.0	ND<250	ND<1.0
Endrin	ND<0.50	**10**	ND<2.0	ND<2.0	ND<2.0	ND<5.0	**40**	ND<2.0	ND<1.0	ND<250	ND<1.0
Methoxychlor	ND<0.50	ND<2.5	ND<2.0	ND<2.0	**24**	ND<5.0	**260**	ND<2.0	ND<1.0	ND<250	ND<1.0
Toxaphene	ND<2.5	**310**	**120**	**110**	**270**	ND<250	**1400**	ND<100	**170**	**24000**	**79**
8141 Analytes											
Ethion	NA	NA	**6.8**	**7.3**	**7.7**	NA	NA	NA	NA	NA	NA
Ethyl parathion	NA	NA	**1.8**	**2**	**1.3**	NA	NA	NA	NA	NA	NA
8151 Analytes											
Dinoseb (DNBP)	NA	NA	**5.2**	**4.3**	**21**	NA	NA	NA	NA	NA	NA
8318 Analytes											
Carbaryl	NA	NA	**150**	**170**	**190**	NA	NA	NA	NA	NA	NA
Methiocarb	NA	NA	**160**	ND<0.04	**220**	NA	NA	NA	NA	NA	NA
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg

Summary Table 1 Continued

Laboratory Data - Soil

Sample I.D.	S-18A	S-18B	S-19A	S-19B	S-20A	S-20B	S-21A	S-21B	S-22A	S-22B
Dilution	20000	100	4000	200	2000	50	10	20	50	500
8081 Analytes										
a-Chlordane	ND<20	ND<0.10	ND<4.0	ND<0.20	ND<2.0	ND<0.050	ND<.010	ND<0.02	ND<.050	ND<0.50
g-Chlordane	ND<20	ND<0.10	ND<4.0	ND<0.20	ND<2.0	ND<0.050	ND<.010	ND<0.02	ND<.050	ND<0.50
p,p-DDD	**180**	ND<0.10	ND<4.0	**0.84**	ND<2.0	ND<0.050	**0.13**	**0.77**	ND<.050	ND<0.50
p,p-DDE	**35**	ND<0.10	ND<4.0	ND<0.20	ND<2.0	ND<0.050	**0.041**	ND<0.02	ND<.050	ND<0.50
p,p-DDT	**1000**	**1.3**	ND<4.0	ND<0.20	ND<2.0	ND<0.050	**0.025**	ND<0.02	**0.054**	**0.57**
Dieldrin	ND<20	ND<0.10	ND<4.0	ND<0.20	ND<2.0	ND<0.050	ND<.010	ND<0.02	ND<.050	ND<0.50
Endosulfan I	**400**	**0.52**	ND<4.0	ND<0.20	ND<2.0	ND<0.050	**0.026**	**0.10**	**0.054**	**1.6**
Endosulfan II	**230**	**0.38**	ND<4.0	ND<0.20	ND<2.0	ND<0.050	**0.022**	**0.13**	ND<.050	**0.93**
Endosulfan sulfate	ND<20	ND<0.10	ND<4.0	ND<0.20	ND<2.0	ND<0.050	ND<.010	ND<0.02	ND<.050	ND<0.50
Endrin	**31**	ND<0.10	ND<4.0	ND<0.20	ND<2.0	ND<0.050	ND<.010	ND<0.02	ND<.050	ND<0.50
Methoxychlor	ND<20	ND<0.10	ND<4.0	ND<0.20	ND<2.0	ND<0.050	**0.015**	ND<0.02	ND<.050	ND<0.50
Toxaphene	**1000**	ND<5.0	**380**	ND<10	**230**	**3.9**	ND<0.50	**2.8**	ND<2.5	ND<25
8141 Analyte List										
Ethion	NA	NA	ND<0.1	NA	NA	NA	NA	NA	NA	NA
Ethyl parathion	NA	NA	ND<0.1	NA	NA	NA	NA	NA	NA	NA
8151 Analytes										
Dinoseb (DNBP)	NA	NA	ND<0.50	NA	NA	NA	NA	NA	NA	NA
8318 Analytes										
Carbaryl	NA	NA	ND<0.04	NA	NA	NA	NA	NA	NA	NA
Methiocarb	NA	NA	ND<0.4	NA	NA	NA	NA	NA	NA	NA
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg

Summary Table 2

Laboratory Data - Groundwater

Sample I.D.	**B-1**	**B-2**
Dilution	100	50
8081 Analytes		
a-Chlordane	ND<5	ND<2.5
g-Chlordane	ND<5	ND<2.5
p,p-DDD	27	ND<0.50
p,p-DDE	5.9	ND<0.50
p,p-DDT	350	14
Dieldrin	ND<1.0	ND<1.0
Endosulfan I	23	18
Endosulfan II	33	7.9
Endosulfan sulfate	ND<5	ND<2.5
Endrin	ND<1.0	ND<0.50
Methoxychlor	ND<10	ND<5
Toxaphene	560	170
8141 Analytes		
Ethyl Parathion	40	13
8151 Analytes		
DCPA	ND<0.2	2
8318 Analytes		
Carbyl	2.4	22
Units	µg/L	µg/L

Summary Table 3

Petroleum Hydrocarbons and VOCs in Soil

Sample I.D.	**S-9A**	**S-9B**	**S-10A**	**S-10B**	**S-10C***	**S-23**	**S-24**
8260 Analytes							
all analytes	NA	NA	NA	ND<0.005	ND<0.005	NA	NA
8015m Analytes							
TEPH Diesel	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5
TEPH Oil	ND<20	ND<20	ND<20	ND<20	ND<20	ND<20	ND<20
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L

* S10C is Duplicate of S-10B

Summary Table 4

Soil Data Inputs to Pro-UCL

	a Chlordane	g Chlordane	DDD	DDE	DDT	Dieldrin	Endolsulf I	Endosulf II	Endosulf Sulf	Endrin	Methocychlor	Toxaphene
Sample #												
1a	0.0005	0.0005	0.0005	0.0022	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0250
1b	0.0005	0.0005	0.0005	0.0020	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0250
2a	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0250
2b	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0250
3a	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0250
3b	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0250
4a	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.8900
4b	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.1250
5a	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	6.9000	3.0000	0.2500	0.2500	0.2500	12.5000
5b	0.5000	0.5000	1.5000	2.2000	4.8000	0.5000	12.0000	4.9000	0.5000	0.5000	0.5000	25.0000
6a	0.0350	0.0300	0.0250	0.4200	0.2400	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	1.2500
6b	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0250
7a	0.0005	0.0005	0.0005	0.1200	0.0450	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.1250
7b	0.0005	0.0005	0.0005	0.0028	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0250
8a	0.0010	0.0010	0.0010	0.0037	0.0014	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.1800
8b	0.0010	0.0010	0.0010	0.0130	0.0063	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0500
9a	0.0050	0.0050	0.0050	0.0310	0.0050	0.0050	0.3500	0.3700	0.0500	0.0050	0.2000	1.1000
9b	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.1300	0.1200	0.0160	0.0025	0.0025	0.0250
10a	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0250
10b	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0250
11	0.0100	0.0100	0.1500	0.1500	0.0850	0.0100	0.0220	0.0860	0.0100	0.0100	0.0100	0.5000
12a	0.5000	0.5000	12.0000	0.5000	0.5000	0.5000	0.5000	1.8000	0.5000	0.5000	0.5000	130.0000
12b	0.0005	0.0005	0.0005	0.0060	0.0055	0.0220	0.0039	0.0005	0.0005	0.0005	0.0005	0.0250
13a	0.2500	0.8200	0.2500	1.5000	0.9500	0.2500	22.0000	9.5000	1.1000	0.2500	0.2500	1.2500
13b	1.2500	8.5000	14.0000	10.0000	93.0000	3.8000	180.0000	78.0000	15.0000	10.0000	1.2500	310.0000
14a	1.0000	1.0000	9.1000	1.0000	100.0000	1.0000	31.0000	20.0000	1.0000	1.0000	1.0000	120.0000
14b	1.0000	1.0000	14.0000	3.6000	97.0000	1.0000	64.0000	33.0000	1.0000	1.0000	24.0000	270.0000
15a	2.5000	2.5000	14.0000	2.5000	100.0000	2.5000	76.0000	46.0000	2.5000	2.5000	2.5000	125.0000
15b	5.0000	17.0000	84.0000	65.0000	610.0000	5.0000	590.0000	290.0000	5.0000	40.0000	260.0000	1,400.0000
16a	1.0000	1.0000	8.0000	2.3000	81.0000	1.0000	35.0000	22.0000	1.0000	1.0000	1.0000	50.0000
16b	0.5000	1.1000	0.5000	2.2000	54.0000	0.5000	32.0000	15.0000	0.5000	0.5000	0.5000	170.0000
17a	125.0000	125.0000	3,000.0000	530.0000	19,000.0000	125.0000	1,100.0000	750.0000	125.0000	125.0000	125.0000	24,000.0000
17b	0.5000	0.5000	31.0000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	79.0000
18a	10.0000	10.0000	180.0000	35.0000	1,000.0000	10.0000	400.0000	230.0000	10.0000	31.0000	10.0000	1,000.0000
18b	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	2.5000
19a	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	380.0000
19b	0.1000	0.1000	0.8400	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	5.0000
20a	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	230.0000
20b	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	3.9000
21a	0.0050	0.0050	0.1300	0.0410	0.0250	0.0050	0.0260	0.0220	0.0050	0.0050	0.0150	0.2500
21b	0.0100	0.0100	0.7700	0.0100	0.0100	0.0100	0.1000	0.1300	0.0100	0.0100	0.0100	2.8000
22a	0.0250	0.0250	0.0250	0.0250	0.0540	0.0250	0.0540	0.0250	0.0250	0.0250	0.0250	1.2500
22b	0.2500	0.2500	0.2500	0.2500	0.0570	0.2500	1.6000	0.9300	0.2500	0.2500	0.2500	12.5000

Appendix A

Laboratory Data Sheets

argon laboratories

GEOPHASE ENVIRONMENTAL
2937 VENEMAN AVE. #B240
MODESTO, CA 95356

REPORT DATE: 09/22/05
SAMPLE DATE: 08/24/05

ATTN: STEVE LANKFORD
CLIENT PROJ. ID: 474.2
HALEY FLYING SVC

AL JOB #: F08591

Project Summary:

On August 24, 2005, this laboratory received 1 water and 17 soil samples.

Samples were analyzed according to instructions in accompanying chain-of-custody. Results of the analysis are summarized on the following pages. Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Sample Control at (209) 581-9280.

Hiram Cueto
Lab Director

2905 Railroad Avenue, Ceres, CA 95307 • Phone (209) 581-9280 • Fax (209) 581-9282
email: info@argonlabs.com

ARGON ANALYTICAL SERVICES, INC.
CHAIN OF CUSTODY

Project Information:
Project No: 474.2
Project Title: Haley Flying Svc
Location:
Sampler's Name: S. Lankford
(print)
Sampler's Signature:

Report To:
Consultant: Geo Phase Env.
Address:
Contact: S Lankford
Phone: 569 0293
Fax:

Bill To:
Client:
Address:

Samples Submitted To:
Laboratory: Argon Laboratories
Address: 3037 5th Street, Ceres, CA 95307
Contact: Hiram Cueto
Phone: 209-581-9280
Fax: 209-581-9282

Date Results Required:
Date Report Required:

TURN AROUND TIME

RUSH	24 Hour	48 Hour	Standard (5 Day)	
☐	☐	☐	☒	☐

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8315	8260B	TEPH							COMMENTS / Preservative
S14A	8/24	758	2	S	X	X	X	X									blend containers & run dup
S14B		805	1	S	X	X	X	X									
S14C		810	3	W	X	X	X	X									eq blank
S10A		940	1	S	X				X	X							
S10B		945	4	S	X				X	X							
S10C		[illegible]	3	S					X								
S15A		941	1	S	X												
S15B		941	1	S	X												
S16A		1135	1	S	X												
S16B		1135	1	S	X												
S13 ~~S14A~~		1156	1	S	X												
S13 ~~S14B~~		1156	1	S	X												

delete

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	8/24/05	1533	[signature]	8/24/05	15:33

SPECIAL INSTRUCTIONS:

ARGON ANALYTICAL SERVICES, INC.

CHAIN OF CUSTODY

Project Information:

Project No: 474.2
Project Title: Haley Flying Svc
Location:

Sampler's Name: S. Lankford
(print)
Sampler's Signature: [signature]

Report To:

Consultant: Geo Phase Env.
Address:
Contact: S Lankford
Phone: 569 0293
Fax:

Bill To:

Client:
Address:

Samples Submitted To:

Laboratory: Argon Laboratories
Address: 3037 5th Street
Ceres, CA 95307
Contact: Hiram Cueto
Phone: 209-581-9280
Fax: 209-581-9282

Date Results Required:

Date Report Required:

TURN AROUND TIME

RUSH ☐ 24 Hour ☐ 48 Hour ☐ Standard (5 Day) ☒ ☐

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8315	8260B	TEPH	Temp/pH						COMMENTS Preservative
S18A	8/24	1240	1	S	X												
S18B	↓	1240	1	S	X												
S17A		1255	1	S	X												
S17B		1255	1	S	X												
S19A		1340	1	S	X	X	X	X									
S19B		1340	1	S	X												
Temp 1											X						3.6°C on ice pT
Temp 2											X						2-4°C " "

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	8/24/05	1523	[signature]	8/24/05	1533
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

SPECIAL INSTRUCTIONS:

argon laboratories

GeoPhase Environmental
2937 Veneman Ave., #B240
Modesto, CA 95356

Proj. ID: 474.2
Site: Haley Flying Svc
Matrix: Soil

Total Extractable Petroleum Hydrocarbons

Method: 8015M

Date Sampled: 08/24/05
Date Received: 08/24/05
Date Extracted: 08/26/05
Date Analyzed: 08/30/05

Lab ID	Sample ID	Kerosene mg/Kg	Diesel mg/Kg	Motor Oil mg/Kg	Surrogate % Recovery
F08594	S10A	ND	ND	ND	110
F08595	S10B	ND	ND	ND	123
Method Reporting Limit:		5.0 mg/Kg	5.0 mg/Kg	20 mg/Kg	

Note(s):
Water samples are reported in ug/L; soil/sludge samples in mg/Kg; product/oil/non-aqueous liquid samples in mg/L.
ND means not detected at or above the stated reporting limit; N/A means analyte not applicable to this analysis.

Hiram Cueto
Lab Director
DHS Certification No. 2359

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argon laboratories

GeoPhase Environmental
2937 Veneman Ave., #B240
Modesto, CA 95356

Blank / QC Data

Method: 8015M

Date Extracted: 08/26/05
ate Analyzed: 08/30/05

Proj. ID: 474.2
Site: Haley Flying Svc
Matrix: Water

Lab ID	Sample ID	Kerosene ug/L	Diesel ug/L	Motor Oil ug/L	Surrogate % Recovery
BLKF0830	Blank	<50	<50	<250	124

Method Reporting Limit:	Water	50 ug/L	50 ug/L	250 ug/L	
	Soil	5.0 mg/Kg	5.0 mg/Kg	20 mg/Kg	

MS / MSD Recovery Summary

Lab ID	Client ID	Analyte	Percent Recovery MS / MSD	%RPD
F08581	WCW MW-1	Diesel	104 / 114	9

LCS Recovery Summary

Lab ID	Analyte	Percent Recovery
LCS0830F	Diesel	106

Note(s):
Water samples are reported in ug/L; soil/sludge samples in mg/Kg; product/oil/non-aqueous liquid samples in mg/L.
ND means not detected at or above the stated reporting limit; N/A means analyte not applicable to this analysis.

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GeoPhase Environmental
2937 Veneman Ave., #B240
Modesto, CA 95356

Volatile Organics - GC/MS

Method: EPA 8260B

Date Sampled: 08/24/05
Date Received: 08/24/05
Date Analyzed: 08/30/05

Proj. ID: 474.2
Site: Haley Flying Svc
Matrix: Soil

Sample ID: S10B
Lab ID: F08595
DF: 1

Compound	Result, mg/Kg	Rep. Limit	Compound	Result, mg/Kg	Rep. Limit
Benzene	ND	0.005	1,3-Dichloropropane	ND	0.005
Bromobenzene	ND	0.005	2,2-Dichloropropane	ND	0.005
Bromochloromethane	ND	0.005	1,1-Dichloropropene	ND	0.005
Bromodichloromethane	ND	0.005	c-1,3-Dichloropropene	ND	0.005
Bromoform	ND	0.005	t-1,3-Dichloropropene	ND	0.005
Bromomethane	ND	0.005	Ethylene Dibromide	ND	0.005
n-Butyl benzene	ND	0.005	Ethylbenzene	ND	0.005
sec-Butyl benzene	ND	0.005	Hexachlorobutadiene	ND	0.005
tert-Butyl benzene	ND	0.005	Isopropylbenzene	ND	0.005
Carbon Tetrachloride	ND	0.005	p-Isopropyl toluene	ND	0.005
Chlorobenzene	ND	0.005	Methylene Chloride	ND	0.005
Chloroethane	ND	0.005	Naphthalene	ND	0.005
Chloroform	ND	0.005	n-Propyl benzene	ND	0.005
Chloromethane	ND	0.005	Styrene	ND	0.005
2-Chlorotoluene	ND	0.005	1,1,1,2-Tetrachloroethane	ND	0.005
4-Chlorotoluene	ND	0.005	1,1,2,2-Tetrachloroethane	ND	0.005
Dibromochloromethane	ND	0.005	Tetrachloroethene	ND	0.005
1,2-Dibromo-3-chloropropane	ND	0.005	Toluene	ND	0.005
Dibromomethane	ND	0.005	1,2,3-Trichlorobenzene	ND	0.005
1,2-Dichlorobenzene	ND	0.005	1,2,4-Trichlorobenzene	ND	0.005
1,3-Dichlorobenzene	ND	0.005	1,1,1-Trichloroethane	ND	0.005
1,4-Dichlorobenzene	ND	0.005	1,1,2-Trichloroethane	ND	0.005
Dichlorodifluoromethane	ND	0.005	Trichloroethene	ND	0.005
1,1-Dichloroethane	ND	0.005	Trichlorofluoromethane	ND	0.005
1,2-Dichloroethane	ND	0.005	1,2,3-Trichloropropane	ND	0.005
1,1-Dichloroethene	ND	0.005	1,2,4-Trimethylbenzene	ND	0.005
cis-1,2-Dichloroethene	ND	0.005	1,3,5-Trimethylbenzene	ND	0.005
trans-1,2-Dichloroethene	ND	0.005	Vinyl Chloride	ND	0.005
1,2-Dichloropropane	ND	0.005	Xylenes, total	ND	0.005
Methyl t-Butyl Ether	ND	0.005			

Note(s):
Water samples are reported in ug/L; soil/sludge samples in mg/Kg; product/oil/non-aqueous liquid samples in mg/L.
ND means not detected at or above the stated reporting limit; N/A means analyte not applicable to this analysis.

Hiram Cueto
Lab Director
DHS Certification No. 2359

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argon laboratories

GeoPhase Environmental
2937 Veneman Ave., #B240
Modesto, CA 95356

Volatile Organics - GC/MS

Method: EPA 8260B

Date Sampled: 08/24/05
Date Received: 08/24/05
Date Analyzed: 08/30/05

Proj. ID: 474.2
Site: Haley Flying Svc
Matrix: Soil

Sample ID: S10C
Lab ID: F08596
DF: 1

Compound	Result, mg/Kg	Rep. Limit	Compound	Result, mg/Kg	Rep. Limit
Benzene	ND	0.005	1,3-Dichloropropane	ND	0.005
Bromobenzene	ND	0.005	2,2-Dichloropropane	ND	0.005
Bromochloromethane	ND	0.005	1,1-Dichloropropene	ND	0.005
Bromodichloromethane	ND	0.005	c-1,3-Dichloropropene	ND	0.005
Bromoform	ND	0.005	t-1,3-Dichloropropene	ND	0.005
Bromomethane	ND	0.005	Ethylene Dibromide	ND	0.005
n-Butyl benzene	ND	0.005	Ethylbenzene	ND	0.005
sec-Butyl benzene	ND	0.005	Hexachlorobutadiene	ND	0.005
tert-Butyl benzene	ND	0.005	Isopropylbenzene	ND	0.005
Carbon Tetrachloride	ND	0.005	p-Isopropyl toluene	ND	0.005
Chlorobenzene	ND	0.005	Methylene Chloride	ND	0.005
Chloroethane	ND	0.005	Naphthalene	ND	0.005
Chloroform	ND	0.005	n-Propyl benzene	ND	0.005
Chloromethane	ND	0.005	Styrene	ND	0.005
2-Chlorotoluene	ND	0.005	1,1,1,2-Tetrachloroethane	ND	0.005
4-Chlorotoluene	ND	0.005	1,1,2,2-Tetrachloroethane	ND	0.005
Dibromochloromethane	ND	0.005	Tetrachloroethene	ND	0.005
1,2-Dibromo-3-chloropropane	ND	0.005	Toluene	ND	0.005
Dibromomethane	ND	0.005	1,2,3-Trichlorobenzene	ND	0.005
1,2-Dichlorobenzene	ND	0.005	1,2,4-Trichlorobenzene	ND	0.005
1,3-Dichlorobenzene	ND	0.005	1,1,1-Trichloroethane	ND	0.005
1,4-Dichlorobenzene	ND	0.005	1,1,2-Trichloroethane	ND	0.005
Dichlorodifluoromethane	ND	0.005	Trichloroethene	ND	0.005
1,1-Dichloroethane	ND	0.005	Trichlorofluoromethane	ND	0.005
1,2-Dichloroethane	ND	0.005	1,2,3-Trichloropropane	ND	0.005
1,1-Dichloroethene	ND	0.005	1,2,4-Trimethylbenzene	ND	0.005
cis-1,2-Dichloroethene	ND	0.005	1,3,5-Trimethylbenzene	ND	0.005
trans-1,2-Dichloroethene	ND	0.005	Vinyl Chloride	ND	0.005
1,2-Dichloropropane	ND	0.005	Xylenes, total	ND	0.005
Methyl t-Butyl Ether	ND	0.005			

Note(s):
Water samples are reported in ug/L; soil/sludge samples in mg/Kg; product/oil/non-aqueous liquid samples in mg/L.
ND means not detected at or above the stated reporting limit; N/A means analyte not applicable to this analysis.

Hiram Cueto
Lab Director
DHS Certification No. 2359

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email: info@argonlabs.com

argon laboratories

QUALITY CONTROL DATA
METHOD: EPA 8260B

AL Job No: F08595
Instrument: HP GC/MS
Matrix: Soil

Surrogate Standard Recovery Summary

Date Analyzed	Client ID	Lab ID	% Recovery Dibromofluoromethane	% Recovery Toluene-d8	% Recovery 4-Bromofluorobenzene
08/30/05	Blank	BLKC0418	98	99	96
08/30/05	S10B	F08595	104	99	90
08/30/05	S10C	F08596	108	98	80

Matrix Spike Recovery Summary

Lab ID	Client ID	Analyte	Percent Recovery MS / MSD	% RPD	%LCS
F08322	UST-B1-6"	1,1-Dichloroethene	126 / 127	1	126
		Benzene	118 / 111	6	111
		Trichloroethene	103 / 100	3	102
		Toluene	101 / 96	5	99
		Chlorobenzene	98 / 95	3	99

Note: Daily method blank showed no contamination at or above the reporting limits.
All laboratory quality control parameters were found to be within established limits.

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email: info@argonlabs.com

argon laboratories

GEOPHASE ENVIRONMENTAL
2937 VENEMAN AVE. #B240
MODESTO, CA 95356

REPORT DATE: 09/22/05
SAMPLE DATE: 08/25/05

ATTN: STEVE LANKFORD
CLIENT PROJ. ID: 474.2
HALEY FLYING SVC

AL JOB #: F08651

Project Summary:

On August 25, 2005, this laboratory received 17 soil samples.

Samples were analyzed according to instructions in accompanying chain-of-custody. Results of the analysis are summarized on the following pages. Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Sample Control at (209) 581-9280.

Hiram Cueto
Lab Director

2905 Railroad Avenue, Ceres, CA 95307 • Phone (209) 581-9280 • Fax (209) 581-9282
email: info@argonlabs.com

ARGON ANALYTICAL SERVICES, INC.
CHAIN OF CUSTODY

Project Information:	Report To:	Samples Submitted To:
Project No: 474.2 Project Title: Haley Flying Suc Location:	Consultant: Geo Phase Env. Address: Contact: S Lankford Phone: 569 0293 Fax:	Laboratory: Argon Laboratories Address: 3037 5th Street, Ceres, CA 95307 Contact: Hiram Cueto Phone: 209-581-9280 Fax: 209-581-9282
Sampler's Name: (print) S. Lankford Sampler's Signature:	Bill To: Client: Address:	Date Results Required: Date Report Required:

TURN AROUND TIME

RUSH	24 Hour	48 Hour	Standard (5 Day)	
☐	☐	☐	☒	☐

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8315	8260B	TEPH							COMMENTS / Preservative
S22A	8/25	805	1	S	X												
S22B		805	1	S	X												
S21A		822	1	S	X												
S21B		822	1	S	X												
S20A		835	1	S	X												
S20B		835	1	S	X												
S12A		844	1	S	X												
S12B		844	1	S	X												
S11A		925	1	S	X												
S11B		925	1	S	X												
S1A		1009	1	S	X												
S1B		1009	1	S	X												

lost

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	8/25	1455	[signature]	8/25/05	14:55
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

SPECIAL INSTRUCTIONS:

ARGON ANALYTICAL SERVICES, INC.

CHAIN OF CUSTODY

Project Information:

Project No: 474.2
Project Title: Haley Flying Svc
Location:

Sampler's Name: S. Lankford
(print)
Sampler's Signature:

Report To:

Consultant: Geo Phase Env.
Address:

Contact: S Lankford
Phone: 569 0293
Fax:

Bill To:

Client:
Address:

Samples Submitted To:

Laboratory: Argon Laboratories
Address: 3037 5th Street
Ceres, CA 95307
Contact: Hiram Cueto
Phone: 209-581-9280
Fax: 209-581-9282

Date Results Required:

Date Report Required:

TURN AROUND TIME

RUSH	24 Hour	48 Hour	Standard (5 Day)	
☐	☐	☐	☒	☐

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8315	8260B	TEPH		Temp					COMMENTS: Preservative
S2A	8/25	1045	1	S	X												
S2B		1045	1	S	X												
S3A		1122	1	S	X												
S3B		1122	1	S	X												
S4A		1143	1	S	X												
S4B		1143	1	S	X												
S5A		1220	1	S	X												
S5B		1220	1	S	X												
Temp1												X					3.2° when delivered

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
TM Jones	8/25	1455	Paul Jackson	8/25/05	14:55
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

SPECIAL INSTRUCTIONS:

0508443

ARGON ANALYTICAL SERVICES, INC.

CHAIN OF CUSTODY

PO No.: F1137

Project Information:

Project No: 474.2
Project Title: Haley Flying Svc
Location:

Sampler's Name:
(print)
Sampler's Signature:

Report To:

Consultant: GeoPhase Environmental
Address: 2937 Veneman Ave., #B240
Modesto, CA 95356
Contact: Steve Lankford
Phone: (209)569-0293
Fax: (209)569-0295

Bill To:

Client: Argon Labs
Address: 2905 Railroad Ave.
Ceres, CA 95307

Samples Submitted To:

Laboratory: McCampbell Analytical
Address: 110 2nd Avenue South, #D7
Pacheco, CA 94553
Contact:
Phone: 925-798-1620
Fax: 925-798-1622

Date Results Required:

Date Report Required:

TURN AROUND TIME

RUSH	24 Hour	48 Hour	5 Day	
			X	

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8318	5035/8260B				Read Special Instructions		Comments
S14A	08/24/05	12:40	2	Soil	X	X	X	X					X		Blend containers 1 and 2 and then run in dup. all (4) tests.
S14B	08/24/05	12:55	1	Soil	X	X	X	X							
S14C	08/24/05	12:55	3	Water	X	X	X	X							
S10A	08/24/05	9:40	1	Soil	X										
S10B	08/24/05	9:45	4	Soil	X				X						
S10C	08/24/05		3	Soil					X						
S15A	08/24/05	9:41	1	Soil	X										
S15B	08/24/05	9:41	1	Soil	X										
S16A	08/24/05	11:35	1	Soil	X										
S16B	08/24/05	11:35	1	Soil	X										
S13A	08/24/05	11:56	1	Soil	X										
S13B	08/24/05	11:56	1	Soil	X										

ICE/t° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT
DECHLORINATED IN LAB
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB

PRESERVATION	VOAS	O&G	METALS	OTHER

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	8/25/05	15:40	[signature]	8/25/05	1840

Special Instructions:
* Report to GeoPhase Environmental as indicated above.
* Email results to: data@argonlabs.com
* Mail reports to Argon
* Invoice to Argon

ARGON ANALYTICAL SERVICES, INC.

CHAIN OF CUSTODY

Project Information:

Project No: 474.2
Project Title: Haley Flying Svc
Location:

Sampler's Name:
(print)
Sampler's Signature:

Report To:

Consultant: GeoPhase Environmental
Address: 2937 Veneman Ave., #B240
Modesto, CA 95356
Contact: Steve Lankford
Phone: (209)569-0293
Fax: (209)569-0295

Bill To:

Client: Argon Labs
Address: 2905 Railroad Ave.
Ceres, CA 95307

Samples Submitted To:

Laboratory: McCampbell Analytical
Address: 110 2nd Avenue South, #D7
Pacheco, CA 94553
Contact:
Phone: 925-798-1620
Fax: 925-798-1622

Date Results Required:

Date Report Required:

TURN AROUND TIME

RUSH	24 Hour	48 Hour	5 Day	
☐	☐	☐	X	☐

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8318							Comments
S18A	08/24/05	12:40	1	Soil	X										
S18B	08/24/05	12:40	1	Soil	X										
S17A	08/24/05	12:55	1	Soil	X										
S17B	08/24/05	12:55	1	Soil	X										
S19A	08/24/05	13:40	1	Soil	X	X	X	X							
S19B	08/24/05	13:40	1	Soil	X										

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[illegible]	8/25/05	18:40	[illegible]	8/25/05	1840

Special Instructions:
* Report to GeoPhase Environmental as indicated above.
* Email results to: data@argonlabs.com
* Mail reports to Argon
* Invoice to Argon

ARGON ANALYTICAL SERVICES, INC.

CHAIN OF CUSTODY

Project Information:

Project No: 474.2
Project Title: Haley Flying Svc
Location:

Sampler's Name:
(print)
Sampler's Signature:

Report To:

Consultant: GeoPhase Environmental
Address: 2937 Veneman Ave., #B240
Modesto, CA 95356
Contact: Steve Lankford
Phone: (209)569-0293
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Bill To:

Client: Argon Labs
Address: 2905 Railroad Ave.
Ceres, CA 95307

Samples Submitted To:

Laboratory: McCampbell Analytical
Address: 110 2nd Avenue South, #D7
Pacheco, CA 94553
Contact:
Phone: 925-798-1620
Fax: 925-798-1622

Date Results Required:

Date Report Required:

TURN AROUND TIME

RUSH	24 Hour	48 Hour	5 Day	
			X	

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8318					Read Special instructions		Comments
S22A	08/25/05	8:05	1	Soil	X										
S22B	08/25/05	8:05	1	Soil	X										
S21A	08/25/05	8:22	1	Soil	X										
S21B	08/25/05	8:22	1	Soil	X										
S12A	08/25/05	8:44	1	Soil	X										
S12B	08/25/05	8:44	1	Soil	X										
S11	08/25/05	9:28	1	Soil	X										
S1A	08/25/05	10:09	1	Soil	X										
S1B	08/25/05	10:09	1	Soil	X										
S2A	08/25/05	10:45	1	Soil	X										
S2B	08/25/05	10:45	1	Soil	X										

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[illegible]	8/25/05	~~16:40~~ ~~8:40~~	[illegible]	8/25/05	1840

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
		18:40			

Special Instructions:
* Report to GeoPhase Environmental as indicated above.
* Email results to: data@argonlabs.com
* Mail reports to Argon
* Invoice to Argon

ARGON ANALYTICAL SERVICES, INC.
CHAIN OF CUSTODY

Project Information:

Project No: 474.2
Project Title: Haley Flying Svc
Location:

Sampler's Name:
(print)
Sampler's Signature:

Report To:

Consultant: GeoPhase Environmental
Address: 2937 Veneman Ave., #B240
Modesto, CA 95356
Contact: Steve Lankford
Phone: (209)569-0293
Fax: (209)569-0295

Bill To:

Client: Argon Labs
Address: 2905 Railroad Ave.
Ceres, CA 95307

Samples Submitted To:

Laboratory: McCampbell Analytical
Address: 110 2nd Avenue South, #D7
Pacheco, CA 94553
Contact:
Phone: 925-798-1620
Fax: 925-798-1622

Date Results Required:

Date Report Required:

TURN AROUND TIME

RUSH	24 Hour	48 Hour	5 Day	
☐	☐	☐	X	☐

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8318					Read Special instructions		Comments
S3A	08/25/05	11:22	1	Soil	X										
S3B	08/25/05	11:22	1	Soil	X										
S4A	08/25/05	11:43	1	Soil	X										
S4B	08/25/05	11:43	1	Soil	X										
S5A	08/25/05	12:20	1	Soil	X										
S5B	08/25/05	12:20	1	Soil	X										

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[illegible]	8/25/05	18:40	[illegible]	8/25/05	1840
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Special Instructions:
* Report to GeoPhase Environmental as indicated above.
* Email results to: data@argonlabs.com
* Mail reports to Argon
* Invoice to Argon

McCampbell Analytical, Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0508443 **ClientID: GPEM** **EDF: NO**

Report to:
Steve Lankford
Geophase Environmental
2937 Veneman Ave., Suite B240
Modesto, CA 95356

TEL: (209) 581-9280
FAX: (209) 581-9282
ProjectNo: #474.2; Haley Flying Svc
PO: #F1137

Bill to:
Accounts Payable
Argon Analytical Services, Inc.
2905 Railroad Avenue
Ceres, CA 95307

Requested TAT: 5 days

Date Received: 08/25/2005
Date Printed: 09/21/2005

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0508443-001	S14A Ext 1	Soil	8/24/05 12:40:00	☐	A		A		A			A							
0508443-001	S14A Ext 2	Soil	8/24/05 12:40:00	☐	B		B		B			B							
0508443-002	S14B	Soil	8/24/05 12:55:00	☐	A		A		A			A							
0508443-003	S14C	Water	8/24/05 12:55:00	☐		A		B		C			A						
0508443-004	S10A	Soil	8/24/05 9:40:00 AM	☐	A														
0508443-005	S10B	Soil	8/24/05 9:45:00 AM	☐	A						B								
0508443-006	S10C	Soil	8/24/05	☐							A								
0508443-007	S15A	Soil	8/24/05 9:41:00 AM	☐	A														
0508443-008	S15B	Soil	8/24/05 9:41:00 AM	☐	A														
0508443-009	S16A	Soil	8/24/05 11:35:00	☐	A														
0508443-010	S16B	Soil	8/24/05 11:35:00	☐	A														
0508443-011	S13A	Soil	8/24/05 11:56:00	☐	A														
0508443-012	S13B	Soil	8/24/05 11:56:00	☐	A														
0508443-013	S18A	Soil	8/24/05 12:40:00	☐	A														
0508443-014	S18B	Soil	8/24/05 12:40:00	☐	A														

Test Legend:

1	8081_S	2	8081_W	3	8141B_S	4	8141B_W	5	8151A_S
6	8151A_W	7	8260B_ENCORE	8	8318A_S	9	8318A_W	10	
11		12		13		14		15	

Prepared by: Maria Venegas

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0508443 **ClientID: GPEM** **EDF: NO**

Report to:
Steve Lankford
Geophase Environmental
2937 Veneman Ave., Suite B240
Modesto, CA 95356

TEL: (209) 581-9280
FAX: (209) 581-9282
ProjectNo: #474.2; Haley Flying Svc
PO: #F1137

Bill to:
Accounts Payable
Argon Analytical Services, Inc.
2905 Railroad Avenue
Ceres, CA 95307

Requested TAT: 5 days

Date Received: 08/25/2005
Date Printed: 09/21/2005

Sample ID	ClientSampID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					Requested Tests (See legend below)														
0508443-015	S17A	Soil	8/24/05 12:55:00	☐	A														
0508443-016	S17B	Soil	8/24/05 12:55:00	☐	A														
0508443-017	S19A	Soil	8/24/05 1:40:00 PM	☐	A		A		A			A							
0508443-018	S19B	Soil	8/24/05 1:40:00 PM	☐	A														
0508443-019	S22A	Soil	8/25/05 8:05:00 AM	☐	A														
0508443-020	S22B	Soil	8/25/05 8:05:00 AM	☐	A														
0508443-021	S21A	Soil	8/25/05 8:22:00 AM	☐	A														
0508443-022	S21B	Soil	8/25/05 8:22:00 AM	☐	A														
0508443-023	S12A	Soil	8/25/05 8:44:00 AM	☐	A														
0508443-024	S12B	Soil	8/25/05 8:44:00 AM	☐	A														
0508443-025	S11	Soil	8/25/05 9:28:00 AM	☐	A														
0508443-026	S1A	Soil	8/25/05 10:09:00	☐	A														
0508443-027	S1B	Soil	8/25/05 10:09:00	☐	A														
0508443-028	S2A	Soil	8/25/05 10:45:00	☐	A														
0508443-029	S2B	Soil	8/25/05 10:45:00	☐	A														

Test Legend:

1	8081_S	2	8081_W	3	8141B_S	4	8141B_W	5	8151A_S
6	8151A_W	7	8260B_ENCORE	8	8318A_S	9	8318A_W	10	
11		12		13		14		15	

Prepared by: Maria Venegas

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0508443 **ClientID: GPEM** **EDF: NO**

Requested TAT: 5 days

Report to:
Steve Lankford
Geophase Environmental
2937 Veneman Ave., Suite B240
Modesto, CA 95356

TEL: (209) 581-9280
FAX: (209) 581-9282
ProjectNo: #474.2; Haley Flying Svc
PO: #F1137

Bill to:
Accounts Payable
Argon Analytical Services, Inc.
2905 Railroad Avenue
Ceres, CA 95307

Date Received: 08/25/2005
Date Printed: 09/21/2005

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0508443-030	S3A	Soil	8/25/05 11:22:00	☐	A														
0508443-031	S3B	Soil	8/25/05 11:22:00	☐	A														
0508443-032	S4A	Soil	8/25/05 11:43:00	☐	A														
0508443-033	S4B	Soil	8/25/05 11:43:00	☐	A														
0508443-034	S5A	Soil	8/25/05 12:20:00	☐	A														
0508443-035	S5B	Soil	8/25/05 12:20:00	☐	A														

Test Legend:

1	8081_S	2	8081_W	3	8141B_S	4	8141B_W	5	8151A_S
6	8151A_W	7	8260B_ENCORE	8	8318A_S	9	8318A_W	10	
11		12		13		14		15	

Prepared by: Maria Venegas

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental 2937 Veneman Ave., Suite B240 Modesto, CA 95356	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05
		Date Received: 08/25/05
	Client Contact: Steve Lankford	Date Reported: 09/08/05
	Client P.O.: #F1137	Date Completed: 09/21/05

WorkOrder: 0508443

September 21, 2005

Dear Steve:

Enclosed are:

1). the results of **35** analyzed samples from your **#474.2; Haley Flying Svc project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05
		Date Received: 08/25/05
2937 Veneman Ave., Suite B240	Client Contact Steve Lankford	Date Extracted: 08/26/05
Modesto, CA 95356	Client P.O. #F1137	Date Analyzed: 08/26/05

Volatile Organics by P&T and GC/MS (Basic Target List) [Encore Sampling]*

Extraction Method: SW5035 Analytical Method: SW8260B Work Order: 0508443

Lab ID	0508443-005B
Client ID	S10B
Matrix	Soil

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND<0.042	1.0	0.05	Acrolein (Propenal)	ND<0.042	1.0	0.05
Acrylonitrile	ND<0.017	1.0	0.02	tert-Amyl methyl ether (TAME)	ND<0.0042	1.0	0.005
Benzene	ND<0.0042	1.0	0.005	Bromobenzene	ND<0.0042	1.0	0.005
Bromochloromethane	ND<0.0042	1.0	0.005	Bromodichloromethane	ND<0.0042	1.0	0.005
Bromomethane	ND<0.0042	1.0	0.005	2-Butanone (MEK)	ND<0.017	1.0	0.02
Bromoform	ND<0.0042	1.0	0.005	t-Butyl alcohol (TBA)	ND<0.042	1.0	0.05
n-Butyl benzene	ND<0.0042	1.0	0.005	sec-Butyl benzene	ND<0.0042	1.0	0.005
tert-Butyl benzene	ND<0.0042	1.0	0.005	Carbon Disulfide	ND<0.0042	1.0	0.005
Carbon Tetrachloride	ND<0.0042	1.0	0.005	Chlorobenzene	ND<0.0042	1.0	0.005
Chloroethane	ND<0.0042	1.0	0.005	2-Chloroethyl Vinyl Ether	ND<0.0083	1.0	0.01
Chloroform	ND<0.0042	1.0	0.005	Chloromethane	ND<0.0042	1.0	0.005
2-Chlorotoluene	ND<0.0042	1.0	0.005	4-Chlorotoluene	ND<0.0042	1.0	0.005
Dibromochloromethane	ND<0.0042	1.0	0.005	1,2-Dibromo-3-chloropropane	ND<0.0042	1.0	0.005
1,2-Dibromoethane (EDB)	ND<0.0042	1.0	0.005	Dibromomethane	ND<0.0042	1.0	0.005
1,2-Dichlorobenzene	ND<0.0042	1.0	0.005	1,3-Dichlorobenzene	ND<0.0042	1.0	0.005
1,4-Dichlorobenzene	ND<0.0042	1.0	0.005	Dichlorodifluoromethane	ND<0.0042	1.0	0.005
1,1-Dichloroethane	ND<0.0042	1.0	0.005	1,2-Dichloroethane (1,2-DCA)	ND<0.0042	1.0	0.005
1,1-Dichloroethene	ND<0.0042	1.0	0.005	cis-1,2-Dichloroethene	ND<0.0042	1.0	0.005
trans-1,2-Dichloroethene	ND<0.0042	1.0	0.005	1,2-Dichloropropane	ND<0.0042	1.0	0.005
1,3-Dichloropropane	ND<0.0042	1.0	0.005	2,2-Dichloropropane	ND<0.0042	1.0	0.005
1,1-Dichloropropene	ND<0.0042	1.0	0.005	cis-1,3-Dichloropropene	ND<0.0042	1.0	0.005
trans-1,3-Dichloropropene	ND<0.0042	1.0	0.005	Diisopropyl ether (DIPE)	ND<0.0042	1.0	0.005
Ethylbenzene	ND<0.0042	1.0	0.005	Ethyl tert-butyl ether (ETBE)	ND<0.0042	1.0	0.005
Freon 113	ND<0.083	1.0	0.1	Hexachlorobutadiene	ND<0.0042	1.0	0.005
Hexachloroethane	ND<0.0042	1.0	0.005	2-Hexanone	ND<0.0042	1.0	0.005
Isopropylbenzene	ND<0.0042	1.0	0.005	4-Isopropyl toluene	ND<0.0042	1.0	0.005
Methyl-t-butyl ether (MTBE)	ND<0.0042	1.0	0.005	Methylene chloride	ND<0.0042	1.0	0.005
4-Methyl-2-pentanone (MIBK)	ND<0.0042	1.0	0.005	Naphthalene	ND<0.0042	1.0	0.005
Nitrobenzene	ND<0.083	1.0	0.1	n-Propyl benzene	ND<0.0042	1.0	0.005
Styrene	ND<0.0042	1.0	0.005	1,1,1,2-Tetrachloroethane	ND<0.0042	1.0	0.005
1,1,2,2-Tetrachloroethane	ND<0.0042	1.0	0.005	Tetrachloroethene	ND<0.0042	1.0	0.005
Toluene	ND<0.0042	1.0	0.005	1,2,3-Trichlorobenzene	ND<0.0042	1.0	0.005
1,2,4-Trichlorobenzene	ND<0.0042	1.0	0.005	1,1,1-Trichloroethane	ND<0.0042	1.0	0.005
1,1,2-Trichloroethane	ND<0.0042	1.0	0.005	Trichloroethene	ND<0.0042	1.0	0.005
Trichlorofluoromethane	ND<0.0042	1.0	0.005	1,2,3-Trichloropropane	ND<0.0042	1.0	0.005
1,2,4-Trimethylbenzene	ND<0.0042	1.0	0.005	1,3,5-Trimethylbenzene	ND<0.0042	1.0	0.005
Vinyl Chloride	ND<0.0042	1.0	0.005	Xylenes	ND<0.0042	1.0	0.005

Surrogate Recoveries (%)

%SS1:	98	%SS2:	100
%SS3:	105		

Comments: k

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference; k) reporting limit near, but not identical to our standard reporting limit due to variable Encore sample weight; m) reporting limit raised due to insufficient sample amount; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05
		Date Received: 08/25/05
2937 Veneman Ave., Suite B240	Client Contact Steve Lankford	Date Extracted: 08/26/05
Modesto, CA 95356	Client P.O. #F1137	Date Analyzed: 08/26/05

Volatile Organics by P&T and GC/MS (Basic Target List) [Encore Sampling]*

Extraction Method: SW5035 Analytical Method: SW8260B Work Order: 0508443

Lab ID	0508443-006A
Client ID	S10C
Matrix	Soil

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND<0.042	1.0	0.05	Acrolein (Propenal)	ND<0.042	1.0	0.05
Acrylonitrile	ND<0.017	1.0	0.02	tert-Amyl methyl ether (TAME)	ND<0.0042	1.0	0.005
Benzene	ND<0.0042	1.0	0.005	Bromobenzene	ND<0.0042	1.0	0.005
Bromochloromethane	ND<0.0042	1.0	0.005	Bromodichloromethane	ND<0.0042	1.0	0.005
Bromomethane	ND<0.0042	1.0	0.005	2-Butanone (MEK)	ND<0.017	1.0	0.02
Bromoform	ND<0.0042	1.0	0.005	t-Butyl alcohol (TBA)	ND<0.042	1.0	0.05
n-Butyl benzene	ND<0.0042	1.0	0.005	sec-Butyl benzene	ND<0.0042	1.0	0.005
tert-Butyl benzene	ND<0.0042	1.0	0.005	Carbon Disulfide	ND<0.0042	1.0	0.005
Carbon Tetrachloride	ND<0.0042	1.0	0.005	Chlorobenzene	ND<0.0042	1.0	0.005
Chloroethane	ND<0.0042	1.0	0.005	2-Chloroethyl Vinyl Ether	ND<0.0083	1.0	0.01
Chloroform	ND<0.0042	1.0	0.005	Chloromethane	ND<0.0042	1.0	0.005
2-Chlorotoluene	ND<0.0042	1.0	0.005	4-Chlorotoluene	ND<0.0042	1.0	0.005
Dibromochloromethane	ND<0.0042	1.0	0.005	1,2-Dibromo-3-chloropropane	ND<0.0042	1.0	0.005
1,2-Dibromoethane (EDB)	ND<0.0042	1.0	0.005	Dibromomethane	ND<0.0042	1.0	0.005
1,2-Dichlorobenzene	ND<0.0042	1.0	0.005	1,3-Dichlorobenzene	ND<0.0042	1.0	0.005
1,4-Dichlorobenzene	ND<0.0042	1.0	0.005	Dichlorodifluoromethane	ND<0.0042	1.0	0.005
1,1-Dichloroethane	ND<0.0042	1.0	0.005	1,2-Dichloroethane (1,2-DCA)	ND<0.0042	1.0	0.005
1,1-Dichloroethene	ND<0.0042	1.0	0.005	cis-1,2-Dichloroethene	ND<0.0042	1.0	0.005
trans-1,2-Dichloroethene	ND<0.0042	1.0	0.005	1,2-Dichloropropane	ND<0.0042	1.0	0.005
1,3-Dichloropropane	ND<0.0042	1.0	0.005	2,2-Dichloropropane	ND<0.0042	1.0	0.005
1,1-Dichloropropene	ND<0.0042	1.0	0.005	cis-1,3-Dichloropropene	ND<0.0042	1.0	0.005
trans-1,3-Dichloropropene	ND<0.0042	1.0	0.005	Diisopropyl ether (DIPE)	ND<0.0042	1.0	0.005
Ethylbenzene	ND<0.0042	1.0	0.005	Ethyl tert-butyl ether (ETBE)	ND<0.0042	1.0	0.005
Freon 113	ND<0.083	1.0	0.1	Hexachlorobutadiene	ND<0.0042	1.0	0.005
Hexachloroethane	ND<0.0042	1.0	0.005	2-Hexanone	ND<0.0042	1.0	0.005
Isopropylbenzene	ND<0.0042	1.0	0.005	4-Isopropyl toluene	ND<0.0042	1.0	0.005
Methyl-t-butyl ether (MTBE)	ND<0.0042	1.0	0.005	Methylene chloride	ND<0.0042	1.0	0.005
4-Methyl-2-pentanone (MIBK)	ND<0.0042	1.0	0.005	Naphthalene	ND<0.0042	1.0	0.005
Nitrobenzene	ND<0.083	1.0	0.1	n-Propyl benzene	ND<0.0042	1.0	0.005
Styrene	ND<0.0042	1.0	0.005	1,1,1,2-Tetrachloroethane	ND<0.0042	1.0	0.005
1,1,2,2-Tetrachloroethane	ND<0.0042	1.0	0.005	Tetrachloroethene	ND<0.0042	1.0	0.005
Toluene	ND<0.0042	1.0	0.005	1,2,3-Trichlorobenzene	ND<0.0042	1.0	0.005
1,2,4-Trichlorobenzene	ND<0.0042	1.0	0.005	1,1,1-Trichloroethane	ND<0.0042	1.0	0.005
1,1,2-Trichloroethane	ND<0.0042	1.0	0.005	Trichloroethene	ND<0.0042	1.0	0.005
Trichlorofluoromethane	ND<0.0042	1.0	0.005	1,2,3-Trichloropropane	ND<0.0042	1.0	0.005
1,2,4-Trimethylbenzene	ND<0.0042	1.0	0.005	1,3,5-Trimethylbenzene	ND<0.0042	1.0	0.005
Vinyl Chloride	ND<0.0042	1.0	0.005	Xylenes	ND<0.0042	1.0	0.005

Surrogate Recoveries (%)

%SS1:	100	%SS2:	100
%SS3:	105		

Comments: k

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference; k) reporting limit near, but not identical to our standard reporting limit due to variable Encore sample weight; m) reporting limit raised due to insufficient sample amount; n) results are reported on a dry weight basis; p) see attached narrative.

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Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05-08/25/05
2937 Veneman Ave., Suite B240		Date Received: 08/25/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted 08/26/05
	Client P.O. #F1137	Date Analyzed 08/30/05-09/08/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3510C/SW3550C Analytical Method: SW8081B Work Order: 0508443

Lab ID	0508443-001A	0508443-001B	0508443-002A	0508443-003A	Reporting Limit for DF =1	
Client ID	S14A Ext 1	S14A Ext 2	S14B	S14C		
Matrix	S	S	S	W		
DF	2000	2000	2000	1	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.005
a-BHC	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.01
b-BHC	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.005
d-BHC	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.005
g-BHC	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.02
Chlordane (Technical)	ND<50	ND<50	ND<50	ND	0.025	0.1
a-Chlordane	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.05
g-Chlordane	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.05
p,p-DDD	9.1	7.3	14	0.018	0.001	0.01
p,p-DDE	ND<2.0	ND<2.0	3.6	0.011	0.001	0.01
p,p-DDT	100	120	97	0.18	0.001	0.05
Dieldrin	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.01
Endosulfan I	31	25	64	0.10	0.001	0.02
Endosulfan II	20	16	33	0.058	0.001	0.01
Endosulfan sulfate	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.05
Endrin	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.01
Endrin aldehyde	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.05
Heptachlor	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.01
Heptachlor epoxide	ND<2.0	ND<2.0	ND<2.0	ND	0.001	0.01
Methoxychlor	ND<2.0	ND<2.0	24	ND	0.001	0.1
Toxaphene	120	110	270	ND	0.05	1.0
Surrogate Recoveries (%)						
%SS:	---#	---#	---#	112		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

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Geophase Environmental 2937 Veneman Ave., Suite B240 Modesto, CA 95356	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05-08/25/05
		Date Received: 08/25/05
	Client Contact: Steve Lankford	Date Extracted 08/26/05
	Client P.O. #F1137	Date Analyzed 08/30/05-09/08/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3510C/SW3550C Analytical Method: SW8081B Work Order: 0508443

Lab ID	0508443-004A	0508443-005A	0508443-007A	0508443-008A	Reporting Limit for DF =1	
Client ID	S10A	S10B	S15A	S15B		
Matrix	S	S	S	S		
DF	1	1	5000	10000	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND	ND	ND<5.0	ND<10	0.001	0.005
a-BHC	ND	ND	ND<5.0	ND<10	0.001	0.01
b-BHC	ND	ND	ND<5.0	ND<10	0.001	0.005
d-BHC	ND	ND	ND<5.0	ND<10	0.001	0.005
g-BHC	ND	ND	ND<5.0	ND<10	0.001	0.02
Chlordane (Technical)	ND	ND	ND<120	ND<250	0.025	0.1
a-Chlordane	ND	ND	ND<5.0	ND<10	0.001	0.05
g-Chlordane	ND	ND	ND<5.0	17	0.001	0.05
p,p-DDD	ND	ND	14	84	0.001	0.01
p,p-DDE	ND	0.0012	ND<5.0	65	0.001	0.01
p,p-DDT	ND	0.0017	100	610	0.001	0.05
Dieldrin	ND	ND	ND<5.0	ND<10	0.001	0.01
Endosulfan I	ND	0.0015	76	590	0.001	0.02
Endosulfan II	ND	0.0011	46	290	0.001	0.01
Endosulfan sulfate	ND	ND	ND<5.0	ND<10	0.001	0.05
Endrin	ND	ND	ND<5.0	40	0.001	0.01
Endrin aldehyde	ND	ND	ND<5.0	ND<10	0.001	0.05
Heptachlor	ND	ND	ND<5.0	ND<10	0.001	0.01
Heptachlor epoxide	ND	ND	ND<5.0	ND<10	0.001	0.01
Methoxychlor	ND	ND	ND<5.0	260	0.001	0.1
Toxaphene	ND	ND	ND<250	1400	0.05	1.0
Surrogate Recoveries (%)						
%SS:	112	115	---#	---#		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

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Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05-08/25/05
2937 Veneman Ave., Suite B240		Date Received: 08/25/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted 08/26/05
	Client P.O. #F1137	Date Analyzed 08/30/05-09/08/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3510C/SW3550C Analytical Method: SW8081B Work Order: 0508443

Lab ID	0508443-009A	0508443-010A	0508443-011A	0508443-012A	Reporting Limit for DF =1	
Client ID	S16A	S16B	S13A	S13B		
Matrix	S	S	S	S		
DF	2000	1000	500	2500	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND<2.0	ND<1.0	ND<0.50	ND<2.5	0.001	0.005
a-BHC	ND<2.0	ND<1.0	ND<0.50	ND<2.5	0.001	0.01
b-BHC	ND<2.0	ND<1.0	ND<0.50	ND<2.5	0.001	0.005
d-BHC	ND<2.0	ND<1.0	ND<0.50	ND<2.5	0.001	0.005
g-BHC	ND<2.0	ND<1.0	ND<0.50	ND<2.5	0.001	0.02
Chlordane (Technical)	ND<50	ND<25	ND<12	ND<62	0.025	0.1
a-Chlordane	ND<2.0	ND<1.0	ND<0.50	ND<2.5	0.001	0.05
g-Chlordane	ND<2.0	1.1	0.82	8.5	0.001	0.05
p,p-DDD	8.0	ND<1.0	ND<0.50	14	0.001	0.01
p,p-DDE	2.3	2.2	1.5	10	0.001	0.01
p,p-DDT	81	54	0.95	93	0.001	0.05
Dieldrin	ND<2.0	ND<1.0	ND<0.50	3.8	0.001	0.01
Endosulfan I	35	32	22	180	0.001	0.02
Endosulfan II	22	15	9.5	78	0.001	0.01
Endosulfan sulfate	ND<2.0	ND<1.0	1.1	15	0.001	0.05
Endrin	ND<2.0	ND<1.0	ND<0.50	10	0.001	0.01
Endrin aldehyde	ND<2.0	ND<1.0	ND<0.50	ND<2.5	0.001	0.05
Heptachlor	ND<2.0	ND<1.0	ND<0.50	ND<2.5	0.001	0.01
Heptachlor epoxide	ND<2.0	ND<1.0	ND<0.50	ND<2.5	0.001	0.01
Methoxychlor	ND<2.0	ND<1.0	ND<0.50	ND<2.5	0.001	0.1
Toxaphene	ND<100	170	ND<25	310	0.05	1.0
Surrogate Recoveries (%)						
%SS:	---#	89	85	---#		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

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Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05-08/25/05
2937 Veneman Ave., Suite B240		Date Received: 08/25/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted 08/26/05
	Client P.O. #F1137	Date Analyzed 08/30/05-09/08/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3510C/SW3550C Analytical Method: SW8081B Work Order: 0508443

Lab ID	0508443-013A	0508443-014A	0508443-015A	0508443-016A	Reporting Limit for DF =1	
Client ID	S18A	S18B	S17A	S17B		
Matrix	S	S	S	S		
DF	20000	100	250000	1000	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.005
a-BHC	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.01
b-BHC	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.005
d-BHC	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.005
g-BHC	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.02
Chlordane (Technical)	ND<500	ND<2.5	ND<6200	ND<25	0.025	0.1
a-Chlordane	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.05
g-Chlordane	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.05
p,p-DDD	180	ND<0.10	3000	31	0.001	0.01
p,p-DDE	35	ND<0.10	530	ND<1.0	0.001	0.01
p,p-DDT	1000	1.3	19,000	ND<1.0	0.001	0.05
Dieldrin	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.01
Endosulfan I	400	0.52	1100	ND<1.0	0.001	0.02
Endosulfan II	230	0.38	750	ND<1.0	0.001	0.01
Endosulfan sulfate	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.05
Endrin	31	ND<0.10	ND<250	ND<1.0	0.001	0.01
Endrin aldehyde	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.05
Heptachlor	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.01
Heptachlor epoxide	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.01
Methoxychlor	ND<20	ND<0.10	ND<250	ND<1.0	0.001	0.1
Toxaphene	1000	ND<5.0	24,000	79	0.05	1.0
Surrogate Recoveries (%)						
%SS:	---#	111	---#	112		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

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Geophase Environmental 2937 Veneman Ave., Suite B240 Modesto, CA 95356	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05-08/25/05
		Date Received: 08/25/05
	Client Contact: Steve Lankford	Date Extracted 08/26/05
	Client P.O. #F1137	Date Analyzed 08/30/05-09/08/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3510C/SW3550C Analytical Method: SW8081B Work Order: 0508443

Lab ID	0508443-017A	0508443-018A	0508443-019A	0508443-020A	Reporting Limit for DF =1	
Client ID	S19A	S19B	S22A	S22B		
Matrix	S	S	S	S		
DF	4000	200	50	500	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.005
a-BHC	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.01
b-BHC	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.005
d-BHC	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.005
g-BHC	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.02
Chlordane (Technical)	ND<100	ND<5.0	ND<1.2	ND<12	0.025	0.1
a-Chlordane	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.05
g-Chlordane	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.05
p,p-DDD	ND<4.0	0.84	ND<0.050	ND<0.50	0.001	0.01
p,p-DDE	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.01
p,p-DDT	ND<4.0	ND<0.20	0.054	0.57	0.001	0.05
Dieldrin	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.01
Endosulfan I	ND<4.0	ND<0.20	0.054	1.6	0.001	0.02
Endosulfan II	ND<4.0	ND<0.20	ND<0.050	0.93	0.001	0.01
Endosulfan sulfate	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.05
Endrin	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.01
Endrin aldehyde	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.05
Heptachlor	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.01
Heptachlor epoxide	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.01
Methoxychlor	ND<4.0	ND<0.20	ND<0.050	ND<0.50	0.001	0.1
Toxaphene	380	ND<10	ND<2.5	ND<25	0.05	1.0
Surrogate Recoveries (%)						
%SS:	---#	109	102	---#		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

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Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05-08/25/05
2937 Veneman Ave., Suite B240		Date Received: 08/25/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted 08/26/05
	Client P.O. #F1137	Date Analyzed 08/30/05-09/08/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3510C/SW3550C Analytical Method: SW8081B Work Order: 0508443

Lab ID	0508443-021A	0508443-022A	0508443-023A	0508443-024A	Reporting Limit for DF =1	
Client ID	S21A	S21B	S12A	S12B		
Matrix	S	S	S	S		
DF	10	20	1000	1	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.005
a-BHC	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.01
b-BHC	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.005
d-BHC	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.005
g-BHC	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.02
Chlordane (Technical)	ND<0.25	ND<0.50	ND<25	ND	0.025	0.1
a-Chlordane	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.05
g-Chlordane	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.05
p,p-DDD	0.13	0.77	12	0.0060	0.001	0.01
p,p-DDE	0.041	ND<0.020	ND<1.0	0.0055	0.001	0.01
p,p-DDT	0.025	ND<0.020	ND<1.0	0.022	0.001	0.05
Dieldrin	ND<0.010	ND<0.020	ND<1.0	0.0039	0.001	0.01
Endosulfan I	0.026	0.10	ND<1.0	ND	0.001	0.02
Endosulfan II	0.022	0.13	1.8	ND	0.001	0.01
Endosulfan sulfate	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.05
Endrin	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.01
Endrin aldehyde	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.05
Heptachlor	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.01
Heptachlor epoxide	ND<0.010	ND<0.020	ND<1.0	ND	0.001	0.01
Methoxychlor	0.015	ND<0.020	ND<1.0	ND	0.001	0.1
Toxaphene	ND<0.50	2.8	130	ND	0.05	1.0
Surrogate Recoveries (%)						
%SS:	96	102	---#	109		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

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Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05-08/25/05
2937 Veneman Ave., Suite B240		Date Received: 08/25/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted 08/26/05
	Client P.O. #F1137	Date Analyzed 08/30/05-09/08/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3510C/SW3550C Analytical Method: SW8081B Work Order: 0508443

Lab ID	0508443-025A	0508443-026A	0508443-027A	0508443-028A	Reporting Limit for DF =1	
Client ID	S11	S1A	S1B	S2A		
Matrix	S	S	S	S		
DF	20	1	1	1	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND<0.020	ND	ND	ND	0.001	0.005
a-BHC	ND<0.020	ND	ND	ND	0.001	0.01
b-BHC	ND<0.020	ND	ND	ND	0.001	0.005
d-BHC	ND<0.020	ND	ND	ND	0.001	0.005
g-BHC	ND<0.020	ND	ND	ND	0.001	0.02
Chlordane (Technical)	ND<0.50	ND	ND	ND	0.025	0.1
a-Chlordane	ND<0.020	ND	ND	ND	0.001	0.05
g-Chlordane	ND<0.020	ND	ND	ND	0.001	0.05
p,p-DDD	0.15	ND	ND	ND	0.001	0.01
p,p-DDE	0.15	0.0022	0.0020	ND	0.001	0.01
p,p-DDT	0.085	ND	ND	ND	0.001	0.05
Dieldrin	ND<0.020	ND	ND	ND	0.001	0.01
Endosulfan I	0.022	ND	ND	ND	0.001	0.02
Endosulfan II	0.086	ND	ND	ND	0.001	0.01
Endosulfan sulfate	ND<0.020	ND	ND	ND	0.001	0.05
Endrin	ND<0.020	ND	ND	ND	0.001	0.01
Endrin aldehyde	ND<0.020	ND	ND	ND	0.001	0.05
Heptachlor	ND<0.020	ND	ND	ND	0.001	0.01
Heptachlor epoxide	ND<0.020	ND	ND	ND	0.001	0.01
Methoxychlor	ND<0.020	ND	ND	ND	0.001	0.1
Toxaphene	ND<1.0	ND	ND	ND	0.05	1.0
Surrogate Recoveries (%)						
%SS:	110	113	112	109		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

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Geophase Environmental 2937 Veneman Ave., Suite B240 Modesto, CA 95356	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05-08/25/05
		Date Received: 08/25/05
	Client Contact: Steve Lankford	Date Extracted 08/26/05
	Client P.O. #F1137	Date Analyzed 08/30/05-09/08/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3510C/SW3550C Analytical Method: SW8081B Work Order: 0508443

Lab ID	0508443-029A	0508443-030A	0508443-031A	0508443-032A	Reporting Limit for DF =1	
Client ID	S2B	S3A	S3B	S4A		
Matrix	S	S	S	S		
DF	1	1	1	1	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND	ND	ND	ND	0.001	0.005
a-BHC	ND	ND	ND	ND	0.001	0.01
b-BHC	ND	ND	ND	ND	0.001	0.005
d-BHC	ND	ND	ND	ND	0.001	0.005
g-BHC	ND	ND	ND	ND	0.001	0.02
Chlordane (Technical)	ND	ND	ND	ND	0.025	0.1
a-Chlordane	ND	ND	ND	ND	0.001	0.05
g-Chlordane	ND	ND	ND	ND	0.001	0.05
p,p-DDD	ND	ND	ND	ND	0.001	0.01
p,p-DDE	ND	ND	ND	ND	0.001	0.01
p,p-DDT	ND	ND	ND	ND	0.001	0.05
Dieldrin	ND	ND	ND	ND	0.001	0.01
Endosulfan I	ND	ND	ND	ND	0.001	0.02
Endosulfan II	ND	ND	ND	ND	0.001	0.01
Endosulfan sulfate	ND	ND	ND	ND	0.001	0.05
Endrin	ND	ND	ND	ND	0.001	0.01
Endrin aldehyde	ND	ND	ND	ND	0.001	0.05
Heptachlor	ND	ND	ND	ND	0.001	0.01
Heptachlor epoxide	ND	ND	ND	ND	0.001	0.01
Methoxychlor	ND	ND	ND	ND	0.001	0.1
Toxaphene	ND	ND	ND	0.089	0.05	1.0
Surrogate Recoveries (%)						
%SS:	107	111	117	102		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

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Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05-08/25/05
2937 Veneman Ave., Suite B240		Date Received: 08/25/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted 08/26/05
	Client P.O. #F1137	Date Analyzed 08/30/05-09/08/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3510C/SW3550C Analytical Method: SW8081B Work Order: 0508443

Lab ID	0508443-033A	0508443-034A	0508443-035A		Reporting Limit for DF =1	
Client ID	S4B	S5A	S5B			
Matrix	S	S	S			
DF	5	500	1000		S	W
Compound	**Concentration**				**mg/kg**	**µg/L**
Aldrin	ND<0.0050	ND<0.50	ND<1.0		0.001	0.005
a-BHC	ND<0.0050	ND<0.50	ND<1.0		0.001	0.01
b-BHC	ND<0.0050	ND<0.50	ND<1.0		0.001	0.005
d-BHC	ND<0.0050	ND<0.50	ND<1.0		0.001	0.005
g-BHC	ND<0.0050	ND<0.50	ND<1.0		0.001	0.02
Chlordane (Technical)	ND<0.12	ND<12	ND<25		0.025	0.1
a-Chlordane	ND<0.0050	ND<0.50	ND<1.0		0.001	0.05
g-Chlordane	ND<0.0050	ND<0.50	ND<1.0		0.001	0.05
p,p-DDD	ND<0.0050	ND<0.50	1.5		0.001	0.01
p,p-DDE	ND<0.0050	ND<0.50	2.2		0.001	0.01
p,p-DDT	ND<0.0050	ND<0.50	4.8		0.001	0.05
Dieldrin	ND<0.0050	ND<0.50	ND<1.0		0.001	0.01
Endosulfan I	ND<0.0050	6.9	12		0.001	0.02
Endosulfan II	ND<0.0050	3.0	4.9		0.001	0.01
Endosulfan sulfate	ND<0.0050	ND<0.50	ND<1.0		0.001	0.05
Endrin	ND<0.0050	ND<0.50	ND<1.0		0.001	0.01
Endrin aldehyde	ND<0.0050	ND<0.50	ND<1.0		0.001	0.05
Heptachlor	ND<0.0050	ND<0.50	ND<1.0		0.001	0.01
Heptachlor epoxide	ND<0.0050	ND<0.50	ND<1.0		0.001	0.01
Methoxychlor	ND<0.0050	ND<0.50	ND<1.0		0.001	0.1
Toxaphene	ND<0.25	ND<25	ND<50		0.05	1.0
Surrogate Recoveries (%)						
%SS:	101	---#	88			
Comments	j					

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

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Geophase Environmental 2937 Veneman Ave., Suite B240 Modesto, CA 95356	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05
		Date Received: 08/25/05
	Client Contact Steve Lankford	Date Extracted: 08/26/05
	Client P.O.: #F1137	Date Analyzed: 09/01/05

Organophosphorous Pesticides by GC-NPD (Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8141B Work Order: 0508443

Lab ID	0508443-001A
Client ID	S14A Ext 1
Matrix	Soil

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Alachlor	ND<1.0	10	0.1	Atrazine	ND<1.0	10	0.1
Azinphos methyl (Guthion)	ND<1.0	10	0.1	Bolstar (Sulprofos)	ND<1.0	10	0.1
Chloropyrifos	ND<1.0	10	0.1	Coumaphos	ND<1.0	10	0.1
Demeton-O	ND<1.0	10	0.1	Diazinon	ND<1.0	10	0.1
Dichlorvos (DDVP)	ND<1.0	10	0.1	Dimethoate	ND<4.0	10	0.4
Disulfoton (Di-Syston)	ND<1.0	10	0.1	EPN	ND<1.0	10	0.1
EPTC	ND<1.0	10	0.1	Ethion	6.8	10	0.1
Ethoprop	ND<1.0	10	0.1	Fensulfothion	ND<1.0	10	0.1
Fenthion	ND<1.0	10	0.1	Fonofos	ND<1.0	10	0.1
Malathion	ND<1.0	10	0.1	Merphos	ND<4.0	10	0.4
Mevinphos (Phosdrin)	ND<1.0	10	0.1	Molinate	ND<1.0	10	0.1
Ethyl parathion	1.8	10	0.1	Methyl parathion	ND<1.0	10	0.1
Phorate (Thimet)	ND<1.0	10	0.1	Prometon	ND<1.0	10	0.1
Ronnel	ND<1.0	10	0.1	Simazine	ND<1.0	10	0.1
Stirofos (Tetrachlorvinphos)	ND<1.0	10	0.1	Terbacil	ND<1.0	10	0.1
Terbufos (Terbuphos)	ND<1.0	10	0.1	Thiobencarb	ND<1.0	10	0.1
Tokuthion (Prothiofos)	ND<1.0	10	0.1	Trichloronate (Agritox)	ND<4.0	10	0.4

Surrogate Recoveries (%)

%SS:	96	

Comments:

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

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Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05
2937 Veneman Ave., Suite B240		Date Received: 08/25/05
Modesto, CA 95356	Client Contact Steve Lankford	Date Extracted: 08/26/05
	Client P.O.: #F1137	Date Analyzed: 09/01/05

Organophosphorous Pesticides by GC-NPD (Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8141B Work Order: 0508443

Lab ID	0508443-001B
Client ID	S14A Ext 2
Matrix	Soil

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Alachlor	ND<1.0	10	0.1	Atrazine	ND<1.0	10	0.1
Azinphos methyl (Guthion)	ND<1.0	10	0.1	Bolstar (Sulprofos)	ND<1.0	10	0.1
Chloropyrifos	ND<1.0	10	0.1	Coumaphos	ND<1.0	10	0.1
Demeton-O	ND<1.0	10	0.1	Diazinon	ND<1.0	10	0.1
Dichlorvos (DDVP)	ND<1.0	10	0.1	Dimethoate	ND<4.0	10	0.4
Disulfoton (Di-Syston)	ND<1.0	10	0.1	EPN	ND<1.0	10	0.1
EPTC	ND<1.0	10	0.1	Ethion	7.3	10	0.1
Ethoprop	ND<1.0	10	0.1	Fensulfothion	ND<1.0	10	0.1
Fenthion	ND<1.0	10	0.1	Fonofos	ND<1.0	10	0.1
Malathion	ND<1.0	10	0.1	Merphos	ND<4.0	10	0.4
Mevinphos (Phosdrin)	ND<1.0	10	0.1	Molinate	ND<1.0	10	0.1
Ethyl parathion	2.0	10	0.1	Methyl parathion	ND<1.0	10	0.1
Phorate (Thimet)	ND<1.0	10	0.1	Prometon	ND<1.0	10	0.1
Ronnel	ND<1.0	10	0.1	Simazine	ND<1.0	10	0.1
Stirofos (Tetrachlorvinphos)	ND<1.0	10	0.1	Terbacil	ND<1.0	10	0.1
Terbufos (Terbuphos)	ND<1.0	10	0.1	Thiobencarb	ND<1.0	10	0.1
Tokuthion (Prothiofos)	ND<1.0	10	0.1	Trichloronate (Agritox)	ND<4.0	10	0.4

Surrogate Recoveries (%)

%SS:	103	

Comments:

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

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Geophase Environmental 2937 Veneman Ave., Suite B240 Modesto, CA 95356	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05
		Date Received: 08/25/05
	Client Contact Steve Lankford	Date Extracted: 08/26/05
	Client P.O.: #F1137	Date Analyzed: 09/01/05

Organophosphorous Pesticides by GC-NPD (Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8141B Work Order: 0508443

Lab ID	0508443-002A
Client ID	S14B
Matrix	Soil

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Alachlor	ND<1.0	10	0.1	Atrazine	ND<1.0	10	0.1
Azinphos methyl (Guthion)	ND<1.0	10	0.1	Bolstar (Sulprofos)	ND<1.0	10	0.1
Chloropyrifos	ND<1.0	10	0.1	Coumaphos	ND<1.0	10	0.1
Demeton-O	ND<1.0	10	0.1	Diazinon	ND<1.0	10	0.1
Dichlorvos (DDVP)	ND<1.0	10	0.1	Dimethoate	ND<4.0	10	0.4
Disulfoton (Di-Syston)	ND<1.0	10	0.1	EPN	ND<1.0	10	0.1
EPTC	ND<1.0	10	0.1	Ethion	7.7	10	0.1
Ethoprop	ND<1.0	10	0.1	Fensulfothion	ND<1.0	10	0.1
Fenthion	ND<1.0	10	0.1	Fonofos	ND<1.0	10	0.1
Malathion	ND<1.0	10	0.1	Merphos	ND<4.0	10	0.4
Mevinphos (Phosdrin)	ND<1.0	10	0.1	Molinate	ND<1.0	10	0.1
Ethyl parathion	1.3	10	0.1	Methyl parathion	ND<1.0	10	0.1
Phorate (Thimet)	ND<1.0	10	0.1	Prometon	ND<1.0	10	0.1
Ronnel	ND<1.0	10	0.1	Simazine	ND<1.0	10	0.1
Stirofos (Tetrachlorvinphos)	ND<1.0	10	0.1	Terbacil	ND<1.0	10	0.1
Terbufos (Terbuphos)	ND<1.0	10	0.1	Thiobencarb	ND<1.0	10	0.1
Tokuthion (Prothiofos)	ND<1.0	10	0.1	Trichloronate (Agritox)	ND<4.0	10	0.4

Surrogate Recoveries (%)		
%SS:	88	

Comments:

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

DHS Certification No. 1644

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Geophase Environmental 2937 Veneman Ave., Suite B240 Modesto, CA 95356	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05
		Date Received: 08/25/05
	Client Contact Steve Lankford	Date Extracted: 09/01/05
	Client P.O.: #F1137	Date Analyzed: 09/01/05

Organophosphorous Pesticides by GC-NPD (Basic Target List)*

Extraction Method: SW3535A Analytical Method: SW8141B Work Order: 0508443

Lab ID	0508443-003B
Client ID	S14C
Matrix	Water

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Alachlor	ND	1.0	1.0	Atrazine	ND	1.0	0.5
Azinphos methyl (Guthion)	ND	1.0	1.0	Bolstar (Sulprofos)	ND	1.0	1.0
Chloropyrifos	ND	1.0	1.0	Coumaphos	ND	1.0	1.0
Demeton-O	ND	1.0	1.0	Diazinon	ND	1.0	0.25
Dichlorvos (DDVP)	ND	1.0	1.0	Dimethoate	ND	1.0	2.5
Disulfoton (Di-Syston)	ND	1.0	0.5	EPN	ND	1.0	1.0
EPTC	ND	1.0	1.0	Ethion	ND	1.0	1.0
Ethoprop	ND	1.0	1.0	Fensulfothion	ND	1.0	1.0
Fenthion	ND	1.0	2.5	Fonofos	ND	1.0	0.5
Malathion	ND	1.0	1.0	Merphos	ND	1.0	1.0
Mevinphos (Phosdrin)	ND	1.0	1.0	Molinate	ND	1.0	0.9
Ethyl parathion	ND	1.0	1.0	Methyl parathion	ND	1.0	1.0
Phorate (Thimet)	ND	1.0	1.0	Prometon	ND	1.0	0.5
Ronnel	ND	1.0	1.0	Simazine	ND	1.0	1.0
Stirofos (Tetrachlorvinphos)	ND	1.0	1.0	Terbacil	ND	1.0	2.0
Terbufos (Terbuphos)	ND	1.0	0.5	Thiobencarb	ND	1.0	1.0
Tokuthion (Prothiofos)	ND	1.0	2.5	Trichloronate (Agritox)	ND	1.0	1.0

Surrogate Recoveries (%)

%SS:	91	

Comments:

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

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Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05
2937 Veneman Ave., Suite B240		Date Received: 08/25/05
Modesto, CA 95356	Client Contact Steve Lankford	Date Extracted: 08/26/05
	Client P.O.: #F1137	Date Analyzed: 09/01/05

Organophosphorous Pesticides by GC-NPD (Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8141B Work Order: 0508443

Lab ID	0508443-017A
Client ID	S19A
Matrix	Soil

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Alachlor	ND<1.0	10	0.1	Atrazine	ND<1.0	10	0.1
Azinphos methyl (Guthion)	ND<1.0	10	0.1	Bolstar (Sulprofos)	ND<1.0	10	0.1
Chloropyrifos	ND<1.0	10	0.1	Coumaphos	ND<1.0	10	0.1
Demeton-O	ND<1.0	10	0.1	Diazinon	ND<1.0	10	0.1
Dichlorvos (DDVP)	ND<1.0	10	0.1	Dimethoate	ND<4.0	10	0.4
Disulfoton (Di-Syston)	ND<1.0	10	0.1	EPN	ND<1.0	10	0.1
EPTC	ND<1.0	10	0.1	Ethion	ND<1.0	10	0.1
Ethoprop	ND<1.0	10	0.1	Fensulfothion	ND<1.0	10	0.1
Fenthion	ND<1.0	10	0.1	Fonofos	ND<1.0	10	0.1
Malathion	ND<1.0	10	0.1	Merphos	ND<4.0	10	0.4
Mevinphos (Phosdrin)	ND<1.0	10	0.1	Molinate	ND<1.0	10	0.1
Ethyl parathion	ND<1.0	10	0.1	Methyl parathion	ND<1.0	10	0.1
Phorate (Thimet)	ND<1.0	10	0.1	Prometon	ND<1.0	10	0.1
Ronnel	ND<1.0	10	0.1	Simazine	ND<1.0	10	0.1
Stirofos (Tetrachlorvinphos)	ND<1.0	10	0.1	Terbacil	ND<1.0	10	0.1
Terbufos (Terbuphos)	ND<1.0	10	0.1	Thiobencarb	ND<1.0	10	0.1
Tokuthion (Prothiofos)	ND<1.0	10	0.1	Trichloronate (Agritox)	ND<4.0	10	0.4

Surrogate Recoveries (%)		
%SS:	90	

Comments: j

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

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Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05
2937 Veneman Ave., Suite B240		Date Received: 08/25/05
Modesto, CA 95356	Client Contact Steve Lankford	Date Extracted: 08/26/05
	Client P.O. #F1137	Date Analyzed: 09/07/05

Chlorinated Herbicides by GC-ECD (Basic Target List)*

Extraction Method: SW3535A/SW3550C Analytical Method: SW8151A Work Order: 0508443

Lab ID	0508443-001A	0508443-001B	0508443-002A	0508443-003C	Reporting Limit for DF =1	
Client ID	S14A Ext 1	S14A Ext 2	S14B	S14C		
Matrix	S	S	S	W		
DF	50	50	100	1	S	W
Compound	**Concentration**				mg/kg	µg/L
Acifluorfen	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
Bentazon	ND<2.5	ND<2.5	ND<5.0	ND	0.05	2.0
Chloramben	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
2,4-D (Dichlorophenoxyacetic acid)	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
2,4-DB	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
Dalapon	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
DCPA (mono & diacid)	ND<2.5	ND<2.5	ND<5.0	ND	0.05	0.1
Dicamba	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
3,5-Dichlorobenzoic Acid	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
Dichloroprop	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
Dinoseb (DNBP)	5.2	4.3	21	ND	0.05	2.0
MCPA	ND<250	ND<250	ND<500	ND	5.0	20
MCPP	ND<250	ND<250	ND<500	ND	5.0	20
4-Nitrophenol	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
Pentachlorophenol (PCP)	ND<2.5	ND<2.5	ND<5.0	ND	0.05	0.2
Picloram	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
2,4,5-T (Trichlorophenoxy acetic acid)	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
2,4,5-TP (Silvex)	ND<2.5	ND<2.5	ND<5.0	ND	0.05	1.0
Surrogate Recoveries (%)						
%SS:	113	99	123	83		
Comments						

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

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2937 Veneman Ave., Suite B240		Date Received: 08/25/05
Modesto, CA 95356	Client Contact Steve Lankford	Date Extracted: 08/26/05
	Client P.O. #F1137	Date Analyzed: 09/07/05

Chlorinated Herbicides by GC-ECD (Basic Target List)*

Extraction Method: SW3535A/SW3550C Analytical Method: SW8151A Work Order: 0508443

Lab ID	0508443-017A				Reporting Limit for DF =1	
Client ID	S19A					
Matrix	S					
DF	10				S	W
Compound	**Concentration**				mg/kg	µg/L
Acifluorfen	ND<0.50				0.05	1.0
Bentazon	ND<0.50				0.05	2.0
Chloramben	ND<0.50				0.05	1.0
2,4-D (Dichlorophenoxyacetic acid)	ND<0.50				0.05	1.0
2,4-DB	ND<0.50				0.05	1.0
Dalapon	ND<0.50				0.05	1.0
DCPA (mono & diacid)	ND<0.50				0.05	0.1
Dicamba	ND<0.50				0.05	1.0
3,5-Dichlorobenzoic Acid	ND<0.50				0.05	1.0
Dichloroprop	ND<0.50				0.05	1.0
Dinoseb (DNBP)	ND<0.50				0.05	2.0
MCPA	ND<50				5.0	20
MCPP	ND<50				5.0	20
4-Nitrophenol	ND<0.50				0.05	1.0
Pentachlorophenol (PCP)	ND<0.50				0.05	0.2
Picloram	ND<0.50				0.05	1.0
2,4,5-T (Trichlorophenoxy acetic acid)	ND<0.50				0.05	1.0
2,4,5-TP (Silvex)	ND<0.50				0.05	1.0
Surrogate Recoveries (%)						
%SS:	77					
Comments	j					

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

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		Date Received: 08/25/05
	Client Contact: Steve Lankford	Date Extracted: 08/26/05
	Client P.O.: #F1137	Date Analyzed: 09/02/05

Carbamates by HPLC*

Extraction Method: SW8318A | Analytical Method: SW8318A | Work Order: 0508443

Lab ID	0508443-001A	0508443-001B	0508443-002A	0508443-017A	Reporting Limit for DF =1	
Client ID	S14A Ext 1	S14A Ext 2	S14B	S19A		
Matrix	S	S	S	S		
DF	1	1	1	1	S	W
Compound	**Concentration**				mg/Kg	ug/L
Aldicarb	ND	ND	ND	ND	0.04	NA
Aldoxycarb	ND	ND	ND	ND	0.04	NA
Aldicarb Sulfoxide	ND	ND	ND	ND	0.04	NA
Carbaryl	0.15	0.17	0.19	ND	0.04	NA
Carbofuran	ND	ND	ND	ND	0.04	NA
3-OH-carbofuran	ND	ND	ND	ND	0.04	NA
Methiocarb	0.16	0.17	0.20	ND	0.04	NA
Methomyl	ND	ND	ND	ND	0.04	NA
Oxamyl	ND	ND	ND	ND	0.04	NA
Propoxur	ND	ND	ND	ND	0.04	NA
Surrogate Recoveries (%)						
%SS:	107	116	117	118		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) sample diluted due to high organic content.

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QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Soil | QC Matrix: Soil | WorkOrder: 0508443

EPA Method: SW8260B **Extraction: SW5035** **BatchID: 17682** **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
tert-Amyl methyl ether (TAME)	N/A	0.050	N/A	N/A	N/A	114	113	0.867	N/A	70 - 130
Benzene	N/A	0.050	N/A	N/A	N/A	114	109	3.95	N/A	70 - 130
t-Butyl alcohol (TBA)	N/A	0.25	N/A	N/A	N/A	97.2	103	5.73	N/A	70 - 130
Chlorobenzene	N/A	0.050	N/A	N/A	N/A	109	115	5.88	N/A	70 - 130
1,2-Dibromoethane (EDB)	N/A	0.050	N/A	N/A	N/A	99.3	106	6.25	N/A	70 - 130
1,2-Dichloroethane (1,2-DCA)	N/A	0.050	N/A	N/A	N/A	112	118	4.87	N/A	70 - 130
1,1-Dichloroethene	N/A	0.050	N/A	N/A	N/A	112	110	1.63	N/A	70 - 130
Diisopropyl ether (DIPE)	N/A	0.050	N/A	N/A	N/A	115	113	1.41	N/A	70 - 130
Ethyl tert-butyl ether (ETBE)	N/A	0.050	N/A	N/A	N/A	112	109	3.02	N/A	70 - 130
Methyl-t-butyl ether (MTBE)	N/A	0.050	N/A	N/A	N/A	112	111	0.560	N/A	70 - 130
Toluene	N/A	0.050	N/A	N/A	N/A	109	111	1.70	N/A	70 - 130
Trichloroethene	N/A	0.050	N/A	N/A	N/A	91.1	86.7	4.95	N/A	70 - 130
%SS1:	N/A	0.050	N/A	N/A	N/A	104	98	6.28	N/A	70 - 130
%SS2:	N/A	0.050	N/A	N/A	N/A	98	98	0	N/A	70 - 130
%SS3:	N/A	0.050	N/A	N/A	N/A	113	110	3.05	N/A	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17682 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508443-005B	8/24/05 9:45 AM	8/26/05	8/26/05 9:11 PM	0508443-006A	8/24/05	8/26/05	8/26/05 8:28 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

DHS Certification No. 1644

QA/QC Officer

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Geophase Environmental 2937 Veneman Ave., Suite B240 Modesto, CA 95356	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/24/05
		Date Received: 08/25/05
	Client Contact: Steve Lankford	Date Extracted: 08/26/05
	Client P.O.: #F1137	Date Analyzed: 09/01/05

Carbamates by HPLC*

Extraction Method: SW8318A | Analytical Method: SW8318A | Work Order: 0508443

Lab ID	0508443-003A				Reporting Limit for DF =1	
Client ID	S14C					
Matrix	W					
DF	1				S	W
Compound	**Concentration**				ug/kg	µg/L
3-Hydroxycarbofuran	ND				NA	2.0
Aldicarb	ND				NA	2.0
Aldicarb Sulfone	ND				NA	2.0
Aldicarb Sulfoxide	ND				NA	2.0
Carbaryl	ND				NA	2.0
Carbofuran	ND				NA	2.0
Methiocarb	ND				NA	2.0
Methomyl	ND				NA	2.0
Oxamyl	ND				NA	2.0
Propoxur	ND				NA	2.0
Surrogate Recoveries (%)						
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) sample diluted due to high organic content.

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QC SUMMARY REPORT FOR SW8081B

W.O. Sample Matrix: Soil | QC Matrix: Soil | WorkOrder: 0508443

EPA Method: SW8081B | **Extraction: SW3550C** | **BatchID: 17721** | **Spiked Sample ID: 0508443-004A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Aldrin	ND	0.010	114	114	0	106	107	0.145	70 - 130	70 - 130
g-BHC	ND	0.010	90.9	92.3	1.55	93.6	93.8	0.251	70 - 130	70 - 130
p,p-DDT	ND	0.025	104	105	1.31	111	112	0.199	70 - 130	70 - 130
Dieldrin	ND	0.025	116	119	2.35	119	118	0.313	70 - 130	70 - 130
Endrin	ND	0.025	110	112	1.67	116	116	0	70 - 130	70 - 130
Heptachlor	ND	0.010	98.9	109	9.66	102	102	0	70 - 130	70 - 130
%SS:	111	0.050	113	115	2.06	116	115	0.511	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17721 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508443-001A	8/24/05 12:40 PM	8/26/05	9/06/05 5:34 PM	0508443-001B	8/24/05 12:40 PM	8/26/05	9/06/05 6:31 PM
0508443-002A	8/24/05 12:55 PM	8/26/05	9/08/05 12:54 PM	0508443-004A	8/24/05 9:40 AM	8/26/05	8/30/05 11:36 AM
0508443-005A	8/24/05 9:45 AM	8/26/05	8/30/05 12:32 PM	0508443-007A	8/24/05 9:41 AM	8/26/05	9/06/05 7:27 PM
0508443-008A	8/24/05 9:41 AM	8/26/05	9/06/05 8:23 PM	0508443-009A	8/24/05 11:35 AM	8/26/05	9/07/05 5:03 PM
0508443-010A	8/24/05 11:35 AM	8/26/05	9/03/05 9:13 AM	0508443-011A	8/24/05 11:56 AM	8/26/05	9/03/05 10:08 AM
0508443-012A	8/24/05 11:56 AM	8/26/05	9/06/05 10:15 PM	0508443-013A	8/24/05 12:40 PM	8/26/05	9/07/05 12:20 PM
0508443-014A	8/24/05 12:40 PM	8/26/05	9/03/05 11:03 AM	0508443-015A	8/24/05 12:55 PM	8/26/05	9/03/05 8:01 AM
0508443-016A	8/24/05 12:55 PM	8/26/05	9/03/05 5:15 AM	0508443-017A	8/24/05 1:40 PM	8/26/05	9/07/05 12:06 AM
0508443-018A	8/24/05 1:40 PM	8/26/05	9/02/05 1:56 PM	0508443-019A	8/25/05 8:05 AM	8/26/05	9/03/05 6:10 AM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

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QC SUMMARY REPORT FOR SW8081B

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder: 0508443

EPA Method: SW8081B **Extraction: SW3550C** **BatchID: 17738** **Spiked Sample ID: 0508443-030A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Aldrin	ND	0.010	101	101	0	112	111	0.375	70 - 130	70 - 130
g-BHC	ND	0.010	90.3	90.7	0.397	92.4	92.6	0.287	70 - 130	70 - 130
p,p-DDT	ND	0.025	92.5	92.9	0.478	91.7	91.5	0.207	70 - 130	70 - 130
Dieldrin	ND	0.025	109	108	0.736	120	119	0.820	70 - 130	70 - 130
Endrin	ND	0.025	101	101	0	111	111	0	70 - 130	70 - 130
Heptachlor	ND	0.010	100	100	0	105	107	2.23	70 - 130	70 - 130
%SS:	111	0.050	107	106	0.459	113	115	2.20	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17738 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508443-020A	8/25/05 8:05 AM	8/26/05	9/07/05 1:57 AM	0508443-021A	8/25/05 8:22 AM	8/26/05	9/07/05 6:56 PM
0508443-022A	8/25/05 8:22 AM	8/26/05	9/07/05 5:38 AM	0508443-023A	8/25/05 8:44 AM	8/26/05	9/07/05 6:33 AM
0508443-024A	8/25/05 8:44 AM	8/26/05	9/07/05 7:28 AM	0508443-025A	8/25/05 9:28 AM	8/26/05	9/07/05 8:23 AM
0508443-026A	8/25/05 10:09 AM	8/26/05	9/07/05 9:32 AM	0508443-027A	8/25/05 10:09 AM	8/26/05	9/07/05 10:27 AM
0508443-028A	8/25/05 10:45 AM	8/26/05	9/08/05 10:30 AM	0508443-029A	8/25/05 10:45 AM	8/26/05	9/03/05 7:18 PM
0508443-030A	8/25/05 11:22 AM	8/26/05	9/02/05 11:11 PM	0508443-031A	8/25/05 11:22 AM	8/26/05	9/08/05 11:25 AM
0508443-032A	8/25/05 11:43 AM	8/26/05	9/08/05 11:01 AM	0508443-033A	8/25/05 11:43 AM	8/26/05	9/03/05 12:41 PM
0508443-034A	8/25/05 12:20 PM	8/26/05	9/08/05 11:57 AM	0508443-035A	8/25/05 12:20 PM	8/26/05	9/03/05 2:34 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QC SUMMARY REPORT FOR SW8081B

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0508443

EPA Method: SW8081B **Extraction: SW3510C** **BatchID: 17740** **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Aldrin	N/A	0.50	N/A	N/A	N/A	115	115	0	N/A	70 - 130
g-BHC	N/A	0.50	N/A	N/A	N/A	88.8	83.6	6.03	N/A	70 - 130
p,p-DDT	N/A	1.25	N/A	N/A	N/A	101	94.7	6.80	N/A	70 - 130
Dieldrin	N/A	1.25	N/A	N/A	N/A	115	113	1.13	N/A	70 - 130
Endrin	N/A	1.25	N/A	N/A	N/A	114	107	6.40	N/A	70 - 130
Heptachlor	N/A	0.50	N/A	N/A	N/A	102	95.8	6.53	N/A	70 - 130
%SS:	N/A	2.5	N/A	N/A	N/A	110	111	0.726	N/A	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17740 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508443-003A	8/24/05 12:55 PM	8/26/05	9/03/05 11:44 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

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QC SUMMARY REPORT FOR SW8141B

W.O. Sample Matrix: Soil | QC Matrix: Soil | WorkOrder: 0508443

EPA Method: SW8141B | **Extraction: SW3550C** | **BatchID: 17668** | **Spiked Sample ID: 0508362-001A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Diazinon	ND	1	61.2	62.9	2.62	65.3	64	2.01	60 - 140	60 - 140
Disulfoton (Di-Syston)	ND	1	61.2	70.2	13.6	69.3	64.8	6.76	60 - 140	60 - 140
Fenthion	ND	1	62.5	70	11.4	66.4	63.8	4.01	60 - 140	60 - 140
Methyl parathion	ND	1	73.7	69.7	5.52	75.1	69.9	7.28	60 - 140	60 - 140
%SS:	88	0.20	90	88	1.71	92	91	1.24	60 - 140	60 - 140

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17668 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508443-001A	8/24/05 12:40 PM	8/26/05	9/01/05 7:26 PM	0508443-001B	8/24/05 12:40 PM	8/26/05	9/01/05 8:37 PM
0508443-002A	8/24/05 12:55 PM	8/26/05	9/01/05 6:14 PM	0508443-017A	8/24/05 1:40 PM	8/26/05	9/01/05 5:02 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

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QC SUMMARY REPORT FOR SW8141B

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0508443

EPA Method: SW8141B **Extraction: SW3535A** **BatchID: 17742** **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Diazinon	N/A	2.5	N/A	N/A	N/A	77.9	73.7	5.62	N/A	60 - 140
Disulfoton (Di-Syston)	N/A	2.5	N/A	N/A	N/A	95.6	78.5	19.7	N/A	60 - 140
Fenthion	N/A	2.5	N/A	N/A	N/A	82.1	73.6	10.9	N/A	60 - 140
Methyl parathion	N/A	2.5	N/A	N/A	N/A	86.9	74.8	15.0	N/A	60 - 140
%SS:	N/A	0.50	N/A	N/A	N/A	72	84	14.6	N/A	60 - 140

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17742 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508443-003B	8/24/05 12:55 PM	8/26/05	9/01/05 2:38 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QC SUMMARY REPORT FOR SW8151A

W.O. Sample Matrix: Soil | QC Matrix: Soil | WorkOrder: 0508443

EPA Method: SW8151A | **Extraction: SW3550C** | **BatchID: 17669** | **Spiked Sample ID: 0508363-001A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
2,4-D (Dichlorophenoxyacetic acid	ND<0.10	0.10	85.2	71.2	17.9	92.7	90.4	2.57	60 - 140	60 - 140
2,4-DB	ND<0.10	0.10	83.9	89.6	6.60	87.9	103	16.0	60 - 140	60 - 140
Dalapon	ND<0.10	0.10	103	99.3	3.42	106	103	2.17	60 - 140	60 - 140
Dicamba	ND<0.10	0.10	71.2	72	1.03	67	64.2	4.22	60 - 140	60 - 140
2,4,5-TP (Silvex)	ND<0.10	0.10	73	70.6	3.38	83.5	79.2	5.38	60 - 140	60 - 140
%SS:	67	0.10	77	74	4.01	69	65	5.58	60 - 140	60 - 140

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17669 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508443-001A	8/24/05 12:40 PM	8/26/05	9/07/05 7:49 AM	0508443-001B	8/24/05 12:40 PM	8/26/05	9/07/05 8:44 AM
0508443-002A	8/24/05 12:55 PM	8/26/05	9/07/05 4:19 PM	0508443-017A	8/24/05 1:40 PM	8/26/05	9/07/05 10:35 AM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

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QC SUMMARY REPORT FOR SW8151A

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0508443

EPA Method: SW8151A | **Extraction: SW3535A** | **BatchID: 17743** | **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
2,4-D (Dichlorophenoxyacetic acid	N/A	0.50	N/A	N/A	N/A	84.7	84.5	0.224	N/A	60 - 140
2,4-DB	N/A	0.50	N/A	N/A	N/A	92.6	94.6	2.14	N/A	60 - 140
Dalapon	N/A	0.50	N/A	N/A	N/A	87.5	82.8	5.51	N/A	60 - 140
Dicamba	N/A	0.50	N/A	N/A	N/A	73.4	74.3	1.13	N/A	60 - 140
2,4,5-TP (Silvex)	N/A	0.50	N/A	N/A	N/A	82.4	83.8	1.66	N/A	60 - 140
%SS:	N/A	0.50	N/A	N/A	N/A	85	84	1.80	N/A	60 - 140

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17743 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508443-003C	8/24/05 12:55 PM	8/26/05	9/07/05 6:54 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

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QC SUMMARY REPORT FOR SW8318A

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder: 0508443

EPA Method: SW8318A **Extraction: SW8318A** **BatchID: 17739** **Spiked Sample ID: 0508443-017a**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Aldicarb	ND	0.050	113	111	2.02	110	111	0.201	80 - 120	80 - 120
Aldoxycarb	ND	0.050	98	89.3	9.29	105	104	1.49	80 - 120	80 - 120
Aldicarb Sulfoxide	ND	0.050	112	111	1.32	97.9	97.8	0.0552	80 - 120	80 - 120
Carbaryl	ND	0.050	112	113	0.734	90.3	87.4	3.26	80 - 120	80 - 120
Carbofuran	ND	0.050	112	112	0	107	104	3.20	80 - 120	80 - 120
3-OH-carbofuran	ND	0.050	114	102	12.0	99.9	91.2	9.16	80 - 120	80 - 120
Methiocarb	ND	0.050	108	106	1.46	93.5	88.1	6.04	80 - 120	80 - 120
Methomyl	ND	0.050	82.5	87.7	6.15	110	111	0.387	80 - 120	80 - 120
Oxamyl	ND	0.050	104	93.4	10.6	96.6	86.7	10.7	80 - 120	80 - 120
Propoxur	ND	0.050	106	107	0.882	102	100	1.46	80 - 120	80 - 120
%SS:	118	0.10	107	104	2.22	113	107	5.58	80 - 120	80 - 120

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17739 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508443-001a	8/24/05 12:40 PM	8/26/05	9/02/05 6:31 PM	0508443-001b	8/24/05 12:40 PM	8/26/05	9/02/05 7:28 PM
0508443-002a	8/24/05 12:55 PM	8/26/05	9/02/05 5:33 PM	0508443-017a	8/24/05 1:40 PM	8/26/05	9/02/05 4:35 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

DHS Certification No. 1644

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QC SUMMARY REPORT FOR SW8318A

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0508443

EPA Method: SW8318A | **Extraction: SW8318A** | **BatchID: 17741** | **Spiked Sample ID: 0508443-003a**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
3-OH-carbofuran	ND	50	104	94	10.2	97.2	92.8	4.65	80 - 120	80 - 120
Aldicarb	ND	50	110	111	0.833	111	110	0.865	80 - 120	80 - 120
Aldicarb Sulfone	ND	50	110	110	0	110	110	0	80 - 120	80 - 120
Aldicarb Sulfoxide	ND	50	98	98.6	0.566	97.7	97.9	0.151	80 - 120	80 - 120
Carbaryl	ND	50	89.6	89.5	0.0719	90.7	87.5	3.56	80 - 120	80 - 120
Carbofuran	ND	50	109	109	0	103	111	7.41	80 - 120	80 - 120
Methiocarb	ND	50	88.6	91.1	2.85	92.3	90.7	1.74	80 - 120	80 - 120
Methomyl	ND	50	112	113	1.30	111	115	3.90	80 - 120	80 - 120
Oxamyl	ND	50	98.7	101	1.92	99.8	92	8.10	80 - 120	80 - 120
Propoxur	ND	50	102	103	0.686	101	101	0	80 - 120	80 - 120
%SS:	115	100	112	113	0.587	111	106	4.69	80 - 120	80 - 120

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17741 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508443-003a	8/24/05 12:55 PM	8/26/05	9/01/05 8:57 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

DHS Certification No. 1644

QA/QC Officer

argon laboratories

GEOPHASE ENVIRONMENTAL
2937 VENEMAN AVE. #B240
MODESTO, CA 95356

REPORT DATE: 09/22/05
SAMPLE DATE: 08/26/05

ATTN: STEVE LANKFORD
CLIENT PROJ. ID: 474.2
HALEY FLYING SVC

AL JOB #: F08691

Project Summary:

On August 26, 2005, this laboratory received 12 soil samples.

Samples were analyzed according to instructions in accompanying chain-of-custody. Results of the analysis are summarized on the following pages. Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Sample Control at (209) 581-9280.

Hiram Cueto
Lab Director

2905 Railroad Avenue, Ceres, CA 95307 • Phone (209) 581-9280 • Fax (209) 581-9282
email: info@argonlabs.com

ARGON ANALYTICAL SERVICES, INC.

CHAIN OF CUSTODY

Project Information:

Project No: 474.2
Project Title: Haley Flying Svc
Location:

Sampler's Name: S. Lankford
(print)
Sampler's Signature:

Report To:

Consultant: Geo Phase Env.
Address:
Contact: S Lankford
Phone: 569 0293
Fax:

Bill To:

Client:
Address:

Samples Submitted To:

Laboratory: Argon Laboratories
Address: 3037 5th Street
Ceres, CA 95307
Contact: Hiram Cueto
Phone: 209-581-9280
Fax: 209-581-9282

Date Results Required:

Date Report Required:

TURN AROUND TIME

RUSH ☐ 24 Hour ☐ 48 Hour ☐ Standard (5 Day) ☒ ☐

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8318	8260B	TEPH							COMMENTS / Preservative
S20A	8/26	654	1	S	X												
S20B		654	1	S	X												
S6A		728	1	S	X												
S6B		728	1	S	X												
S7A		753	1	S	X												
S7B		753	1	S	X												
S8A		811	1	S	X												
S8B		811	1	S	X												
S9A		835	1	S	X					X							
S9A		835	1	S	X					X							
S23		844	1	S						X							
S24		905	1	S						X							

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	8/26/05	1454	[signature]	8/26/05	14:54
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

SPECIAL INSTRUCTIONS:

3-2° on delivery to lab

argon laboratories

GeoPhase Env.
2937 Veneman Ave., #B240
Modesto, CA 95356

Proj. ID: 474.2
Site: Haley Flying Svc
Matrix: Soil

Total Extractable Petroleum Hydrocarbons

Method: 8015M

Date Sampled: 08/26/05
Date Received: 08/26/05
Date Extracted: 08/29/05
Date Analyzed: 08/30/05

Lab ID	Sample ID	Kerosene mg/Kg	Diesel mg/Kg	Motor Oil mg/Kg	Surrogate % Recovery
F08699	S9A	ND	ND	ND	103
F08700	S9B	ND	ND	ND	107
F08701	S23	ND	ND	ND	122
F08702	S24	ND	ND	ND	117

Method Reporting Limit:	5.0 mg/Kg	5.0 mg/Kg	20 mg/Kg	

Note(s):
Water samples are reported in ug/L; soil/sludge samples in mg/Kg; product/oil/non-aqueous liquid samples in mg/L.
ND means not detected at or above the stated reporting limit; N/A means analyte not applicable to this analysis.

Hiram Cueto
Lab Director
DHS Certification No. 2359

2905 Railroad Avenue, Ceres, CA 95307 • Phone (209) 581-9280 • Fax (209) 581-9282
email: info@argonlabs.com

argon laboratories

GeoPhase Env.
2937 Veneman Ave., #B240
Modesto, CA 95356

Proj. ID: 474.2
Site: Haley Flying Svc
Matrix: Water

Blank / QC Data

Method: 8015M

Date Extracted: 08/29/05
ate Analyzed: 08/30/05

Lab ID	Sample ID	Kerosene ug/L	Diesel ug/L	Motor Oil ug/L	Surrogate % Recovery
BLKF0830	Blank	<50	<50	<250	124

Method Reporting Limit:	Water	50 ug/L	50 ug/L	250 ug/L	
	Soil	5.0 mg/Kg	5.0 mg/Kg	20 mg/Kg	

MS / MSD Recovery Summary

Lab ID	Client ID	Analyte	Percent Recovery MS / MSD	%RPD
F08701	S 23	Kerosene	101 / 89	13

LCS Recovery Summary

Lab ID	Analyte	Percent Recovery
LCS0830F	Diesel	106

Note(s):
Water samples are reported in ug/L; soil/sludge samples in mg/Kg; product/oil/non-aqueous liquid samples in mg/L.
ND means not detected at or above the stated reporting limit; N/A means analyte not applicable to this analysis.

2905 Railroad Avenue, Ceres, CA 95307 • Phone (209) 581-9280 • Fax (209) 581-9282
email: info@argonlabs.com

ARGON ANALYTICAL SERVICES, INC.

CHAIN OF CUSTODY

PO No.: F1137

Project Information:

Project No: 474.2
Project Title: Haley Flying Svc
Location:

Sampler's Name: (print)
Sampler's Signature:

ICE/ ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT
DECHLORINATED IN LAB
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB

VOAS	O&G	METALS	OTHER

PRESERVATION

Report To:

Consultant: GeoPhase Environmental
Address: 2937 Veneman Ave., #B240
Modesto, CA 95356
Contact: Steve Lankford
Phone: (209)569-0293
Fax: (209)569-0295

Bill To:

Client: Argon Labs
Address: 2905 Railroad Ave.
Ceres, CA 95307

Samples Submitted To:

Laboratory: McCampbell Analytical
Address: 110 2nd Avenue South, #D7
Pacheco, CA 94553
Contact:
Phone: 925-798-1620
Fax: 925-798-1622

Date Results Required:

Date Report Required:

TURN AROUND TIME

RUSH	24 Hour	48 Hour	5 Day	
			X	

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8318	5035/8260B						Comments
S20A	08/26/05	6:54	1	Soil	X										
S20B	08/26/05	6:54	1	Soil	X										
S6A	08/26/05	7:28	1	Soil	X										
S6B	08/26/05	7:28	1	Soil	X										
S7A	08/26/05	7:53	1	Soil	X										
S7B	08/26/05	7:53	1	Soil	X										
S8A	08/26/05	8:11	1	Soil	X										
S8B	08/26/05	8:11	1	Soil	X										
S9A	08/26/05	8:35	1	Soil	X										
S9B	08/26/05	8:35	1	Soil	X										

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	8/26/05	15:00	[signature]	8/26	1800
Relinquished By:	Date	Time:	Received By:	Date:	Time:
Relinquished By:	Date	Time:	Received By:	Date:	Time:

Special Instructions:
- Report to GeoPhase Environmental as indicated above
- Email results to: data@argonlabs.com
- Mail reports to Argon
- Invoice to Argon

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled:	08/26/05
2937 Veneman Ave., Suite B240		Date Received:	08/26/05
Modesto, CA 95356	Client Contact: Paul Huckaba	Date Reported:	09/06/05
	Client P.O.:	Date Completed:	09/21/05

WorkOrder: 0508483

September 21, 2005

Dear Paul:

Enclosed are:

1). the results of **10** analyzed samples from your **#474.2; Haley Flying Svc project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental 2937 Veneman Ave., Suite B240 Modesto, CA 95356	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/26/05
		Date Received: 08/26/05
	Client Contact: Paul Huckaba	Date Extracted 08/26/05
	Client P.O.	Date Analyzed 08/30/05-09/02/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081B Work Order: 0508483

Lab ID	0508483-001A	0508483-002A	0508483-003A	0508483-004A	Reporting Limit for DF =1	
Client ID	S20A	S20B	S6A	S6B		
Matrix	S	S	S	S		
DF	2000	50	50	1	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
a-BHC	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
b-BHC	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
d-BHC	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
g-BHC	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
Chlordane (Technical)	ND<50	ND<1.2	ND<1.2	ND	0.025	NA
a-Chlordane	ND<2.0	ND<0.050	0.069	ND	0.001	NA
g-Chlordane	ND<2.0	ND<0.050	0.060	ND	0.001	NA
p,p-DDD	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
p,p-DDE	ND<2.0	ND<0.050	0.42	0.0016	0.001	NA
p,p-DDT	ND<2.0	ND<0.050	0.24	ND	0.001	NA
Dieldrin	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
Endosulfan I	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
Endosulfan II	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
Endosulfan sulfate	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
Endrin	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
Endrin aldehyde	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
Heptachlor	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
Heptachlor epoxide	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
Methoxychlor	ND<2.0	ND<0.050	ND<0.050	ND	0.001	NA
Toxaphene	230	3.9	ND<2.5	ND	0.05	NA
Surrogate Recoveries (%)						
%SS:	---#	---#	---#	106		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/26/05
2937 Veneman Ave., Suite B240		Date Received: 08/26/05
Modesto, CA 95356	Client Contact: Paul Huckaba	Date Extracted 08/26/05
	Client P.O.	Date Analyzed 08/30/05-09/02/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081B Work Order: 0508483

Lab ID	0508483-005A	0508483-006A	0508483-007A	0508483-008A	Reporting Limit for DF =1	
Client ID	S7A	S7B	S8A	S8B		
Matrix	S	S	S	S		
DF	5	1	2	2	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
a-BHC	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
b-BHC	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
d-BHC	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
g-BHC	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
Chlordane (Technical)	ND<0.12	ND	ND<0.050	ND<0.050	0.025	NA
a-Chlordane	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
g-Chlordane	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
p,p-DDD	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
p,p-DDE	0.12	0.0028	0.037	0.013	0.001	NA
p,p-DDT	0.045	ND	0.014	0.0063	0.001	NA
Dieldrin	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
Endosulfan I	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
Endosulfan II	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
Endosulfan sulfate	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
Endrin	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
Endrin aldehyde	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
Heptachlor	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
Heptachlor epoxide	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
Methoxychlor	ND<0.0050	ND	ND<0.0020	ND<0.0020	0.001	NA
Toxaphene	ND<0.25	ND	0.18	ND<0.10	0.05	NA
Surrogate Recoveries (%)						
%SS:	93	107	114	115		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

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Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc	Date Sampled: 08/26/05
2937 Veneman Ave., Suite B240		Date Received: 08/26/05
Modesto, CA 95356	Client Contact: Paul Huckaba	Date Extracted 08/26/05
	Client P.O.	Date Analyzed 08/30/05-09/02/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081B Work Order: 0508483

Lab ID	0508483-009A	0508483-010A			Reporting Limit for DF =1	
Client ID	S9A	S9B				
Matrix	S	S				
DF	10	5			S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND<0.010	ND<0.0050			0.001	NA
a-BHC	ND<0.010	ND<0.0050			0.001	NA
b-BHC	ND<0.010	ND<0.0050			0.001	NA
d-BHC	ND<0.010	ND<0.0050			0.001	NA
g-BHC	ND<0.010	ND<0.0050			0.001	NA
Chlordane (Technical)	ND<0.25	ND<0.12			0.025	NA
a-Chlordane	ND<0.010	ND<0.0050			0.001	NA
g-Chlordane	ND<0.010	ND<0.0050			0.001	NA
p,p-DDD	ND<0.010	ND<0.0050			0.001	NA
p,p-DDE	0.031	ND<0.0050			0.001	NA
p,p-DDT	ND<0.010	ND<0.0050			0.001	NA
Dieldrin	ND<0.010	ND<0.0050			0.001	NA
Endosulfan I	0.35	0.13			0.001	NA
Endosulfan II	0.37	0.12			0.001	NA
Endosulfan sulfate	0.050	0.016			0.001	NA
Endrin	ND<0.010	ND<0.0050			0.001	NA
Endrin aldehyde	ND<0.010	ND<0.0050			0.001	NA
Heptachlor	ND<0.010	ND<0.0050			0.001	NA
Heptachlor epoxide	ND<0.010	ND<0.0050			0.001	NA
Methoxychlor	0.20	ND<0.0050			0.001	NA
Toxaphene	1.1	0.30			0.05	NA
Surrogate Recoveries (%)						
%SS:	116	107				
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR SW8081B

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder: 0508483

EPA Method: SW8081B **Extraction: SW3550C** **BatchID: 17738** **Spiked Sample ID: 0508443-030A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Aldrin	ND	0.010	101	101	0	112	111	0.375	70 - 130	70 - 130
g-BHC	ND	0.010	90.3	90.7	0.397	92.4	92.6	0.287	70 - 130	70 - 130
p,p-DDT	ND	0.025	92.5	92.9	0.478	91.7	91.5	0.207	70 - 130	70 - 130
Dieldrin	ND	0.025	109	108	0.736	120	119	0.820	70 - 130	70 - 130
Endrin	ND	0.025	101	101	0	111	111	0	70 - 130	70 - 130
Heptachlor	ND	0.010	100	100	0	105	107	2.23	70 - 130	70 - 130
%SS:	111	0.050	107	106	0.459	113	115	2.20	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17738 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508483-001A	8/26/05 6:54 AM	8/26/05	9/02/05 11:09 AM	0508483-002A	8/26/05 6:54 AM	8/26/05	9/02/05 7:31 PM
0508483-003A	8/26/05 7:28 AM	8/26/05	9/02/05 10:13 AM	0508483-004A	8/26/05 7:28 AM	8/26/05	8/30/05 3:45 AM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR SW8081B

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder: 0508483

EPA Method: SW8081B **Extraction: SW3550C** **BatchID: 17755** **Spiked Sample ID: 0508483-010A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Aldrin	ND<0.0050	0.010	89.6	89.2	0.386	109	109	0	70 - 130	70 - 130
g-BHC	ND<0.0050	0.010	82	83.6	1.95	93.4	94.1	0.749	70 - 130	70 - 130
p,p-DDT	ND<0.0050	0.025	105	106	0.882	99.3	99.2	0.109	70 - 130	70 - 130
Dieldrin	ND<0.0050	0.025	119	104	13.5	119	119	0	70 - 130	70 - 130
Endrin	ND<0.0050	0.025	101	105	4.08	113	113	0	70 - 130	70 - 130
Heptachlor	ND<0.0050	0.010	91.2	92.7	1.63	110	110	0	70 - 130	70 - 130
%SS:	107	0.050	117	119	2.04	113	114	0.426	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 17755 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0508483-005A	8/26/05 7:53 AM	8/26/05	8/30/05 4:40 AM	0508483-006A	8/26/05 7:53 AM	8/26/05	8/30/05 5:34 AM
0508483-007A	8/26/05 8:11 AM	8/26/05	8/30/05 8:18 AM	0508483-008A	8/26/05 8:11 AM	8/26/05	8/30/05 9:13 AM
0508483-009A	8/26/05 8:35 PM	8/26/05	8/30/05 10:09 AM	0508483-010A	8/26/05 8:35 PM	8/26/05	8/30/05 11:04 AM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

McCampbell Analytical, Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0508483 **ClientID: GPEM** **EDF: NO**

Report to:
Paul Huckaba
Geophase Environmental
2937 Veneman Ave., Suite B240
Modesto, CA 95356

TEL: (209) 581-9280
FAX: (209) 581-9282
ProjectNo: #474.2; Haley Flying Svc
PO:

Bill to:
Accounts Payable
Argon Analytical Services, Inc.
2905 Railroad Avenue
Ceres, CA 95307

Requested TAT: **5 days**

Date Received: **08/26/2005**
Date Printed: **08/26/2005**

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0508483-001	S20A	Soil	8/26/05 6:54:00 AM	☐	A														
0508483-002	S20B	Soil	8/26/05 6:54:00 AM	☐	A														
0508483-003	S6A	Soil	8/26/05 7:28:00 AM	☐	A														
0508483-004	S6B	Soil	8/26/05 7:28:00 AM	☐	A														
0508483-005	S7A	Soil	8/26/05 7:53:00 AM	☐	A														
0508483-006	S7B	Soil	8/26/05 7:53:00 AM	☐	A														
0508483-007	S8A	Soil	8/26/05 8:11:00 AM	☐	A														
0508483-008	S8B	Soil	8/26/05 8:11:00 AM	☐	A														
0508483-009	S9A	Soil	8/26/05 8:35:00 PM	☐	A														
0508483-010	S9B	Soil	8/26/05 8:35:00 PM	☐	A														

Test Legend:

1	8081_S	2		3		4		5	
6		7		8		9		10	
11		12		13		14		15	

Prepared by: Rosa Venegas

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

argon laboratories

GEOPHASE ENVIRONMENTAL
2937 VENEMAN AVE. #B240
MODESTO, CA 95356

REPORT DATE: 10/19/05
SAMPLE DATE: 10/06/05

ATTN: STEVE LANKFORD
CLIENT PROJ. ID: 474.2
HALEY FLYING SVC

AL JOB #: F10151

Project Summary:

On October 6, 2005, this laboratory received 4 water samples.

Samples were analyzed according to instructions in accompanying chain-of-custody.

Samples were subcontracted to: McCampbell Analytical

Results of the analysis are summarized on the following pages. Please see quality control report for a summary of QC data pertaining to this project.
Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Sample Control at (209) 581-9280.

Hiram Cueto
Lab Director

2905 Railroad Avenue, Ceres, CA 95307 • Phone (209) 581-9280 • Fax (209) 581-9282
email: info@argonlabs.com

ARGON ANALYTICAL SERVICES, INC.

CHAIN OF CUSTODY

Project Information:

Project No: H74-2
Project Title: Haley Flying Svc
Location:

Sampler's Name: S. Lankford
(print)
Sampler's Signature: [signature]

Report To:

Consultant: Geo Phase Env.
Address:
Contact: S Lankford
Phone: 569 0293
Fax:

Bill To:

Client:
Address:

Samples Submitted To:

Laboratory: Argon Laboratories
Address: 3037 5th Street
Ceres, CA 95307
Contact: Hiram Cueto
Phone: 209-581-9280
Fax: 209-581-9282

Date Results Required:

Date Report Required:

TURN AROUND TIME

RUSH	24 Hour	48 Hour	Standard (5 Day)	
☐	☐	☐	☒	☐

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8318	8260B	TEPH							COMMENTS / Preservative
B-1	10/6	1125	4	W	X	X	X	X									
B-2	10/6	1015	4	W	X	X	X	X									
Trip BK	10/6	—	4	W	X	X	X	X									
Eq BK	10/6	—	4	W	X	X	X	X									#1 Trip Blank 2.3°C @ lab
																	#2 Trip Blank 1.4° @ lab

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	10/6/05	1328	[signature]	10/6/05	13:28
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

SPECIAL INSTRUCTIONS:

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental 2937 Veneman Ave., Suite B240 Modesto, CA 95356	Client Project ID: #474.2; Haley Flying Svc.	Date Sampled: 10/06/05
		Date Received: 10/07/05
	Client Contact: Steve Lankford	Date Reported: 10/14/05
	Client P.O.: #F1168	Date Completed: 10/14/05

WorkOrder: 0510129

October 14, 2005

Dear Steve:

Enclosed are:

1). the results of 4 analyzed samples from your **#474.2; Haley Flying Svc. project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

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Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc.	Date Sampled: 10/06/05
2937 Veneman Ave., Suite B240		Date Received: 10/07/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted 10/07/05
	Client P.O.: #F1168	Date Analyzed 10/08/05-10/10/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3510C Analytical Method: SW8081B Work Order: 0510129

Lab ID	0510129-001A	0510129-002A	0510129-003A	0510129-004A	Reporting Limit for DF =1	
Client ID	B-1	B-2	TRIP BK	EQ		
Matrix	W	W	W	W		
DF	100	50	1	1	S	W
Compound	**Concentration**				µg/kg	µg/L
Aldrin	ND<0.50	ND<0.25	ND	ND	NA	0.005
a-BHC	ND<1.0	ND<0.50	ND	ND	NA	0.01
b-BHC	ND<0.50	ND<0.25	ND	ND	NA	0.005
d-BHC	ND<0.50	ND<0.25	ND	ND	NA	0.005
g-BHC	ND<2.0	ND<1.0	ND	ND	NA	0.02
Chlordane (Technical)	ND<10	ND<5.0	ND	ND	NA	0.1
a-Chlordane	ND<5.0	ND<2.5	ND	ND	NA	0.05
g-Chlordane	ND<5.0	ND<2.5	ND	ND	NA	0.05
p,p-DDD	27	ND<0.50	ND	0.051	NA	0.01
p,p-DDE	5.9	ND<0.50	ND	ND	NA	0.01
p,p-DDT	350	14	ND	0.19	NA	0.05
Dieldrin	ND<1.0	ND<0.50	ND	ND	NA	0.01
Endosulfan I	23	18	ND	0.12	NA	0.02
Endosulfan II	33	7.9	ND	0.052	NA	0.01
Endosulfan sulfate	ND<5.0	ND<2.5	ND	ND	NA	0.05
Endrin	ND<1.0	ND<0.50	ND	ND	NA	0.01
Endrin aldehyde	ND<5.0	ND<2.5	ND	ND	NA	0.05
Heptachlor	ND<1.0	ND<0.50	ND	ND	NA	0.01
Heptachlor epoxide	ND<1.0	ND<0.50	ND	ND	NA	0.01
Methoxychlor	ND<10	ND<5.0	ND	ND	NA	0.1
Toxaphene	560	170	ND	ND	NA	0.5
Surrogate Recoveries (%)						
%SS:	120	91	108	109		
Comments	i	i				

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

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Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc.	Date Sampled: 10/06/05
2937 Veneman Ave., Suite B240		Date Received: 10/07/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted: 10/13/05
	Client P.O.: #F1168	Date Analyzed: 10/13/05

Organophosphorous Pesticides by GC-NPD (Basic Target List)*

Extraction Method: SW3535A Analytical Method: SW8141B Work Order: 0510129

Lab ID	0510129-001B
Client ID	B-1
Matrix	Water

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Alachlor	ND<10	10	1.0	Atrazine	ND<5.0	10	0.5
Azinphos methyl (Guthion)	ND<10	10	1.0	Bolstar (Sulprofos)	ND<10	10	1.0
Chloropyrifos	ND<10	10	1.0	Coumaphos	ND<10	10	1.0
Demeton-O	ND<10	10	1.0	Diazinon	ND<2.5	10	0.25
Dichlorvos (DDVP)	ND<10	10	1.0	Dimethoate	ND<25	10	2.5
Disulfoton (Di-Syston)	ND<5.0	10	0.5	EPN	ND<10	10	1.0
EPTC	ND<10	10	1.0	Ethion	ND<10	10	1.0
Ethoprop	ND<10	10	1.0	Fensulfothion	ND<10	10	1.0
Fenthion	ND<25	10	2.5	Fonofos	ND<5.0	10	0.5
Malathion	ND<10	10	1.0	Merphos	ND<10	10	1.0
Mevinphos (Phosdrin)	ND<10	10	1.0	Molinate	ND<9.0	10	0.9
Ethyl parathion	40	10	1.0	Methyl parathion	ND<10	10	1.0
Phorate (Thimet)	ND<10	10	1.0	Prometon	ND<5.0	10	0.5
Ronnel	ND<10	10	1.0	Simazine	ND<10	10	1.0
Stirofos (Tetrachlorvinphos)	ND<10	10	1.0	Terbacil	ND<20	10	2.0
Terbufos (Terbuphos)	ND<5.0	10	0.5	Thiobencarb	ND<10	10	1.0
Tokuthion (Prothiofos)	ND<25	10	2.5	Trichloronate (Agritox)	ND<10	10	1.0

Surrogate Recoveries (%)

%SS:	67

Comments: i

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc.	Date Sampled: 10/06/05
2937 Veneman Ave., Suite B240		Date Received: 10/07/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted: 10/12/05
	Client P.O.: #F1168	Date Analyzed: 10/12/05

Organophosphorous Pesticides by GC-NPD (Basic Target List)*

Extraction Method: SW3535A Analytical Method: SW8141B Work Order: 0510129

Lab ID	0510129-002B
Client ID	B-2
Matrix	Water

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Alachlor	ND<10	10	1.0	Atrazine	ND<5.0	10	0.5
Azinphos methyl (Guthion)	ND<10	10	1.0	Bolstar (Sulprofos)	ND<10	10	1.0
Chloropyrifos	ND<10	10	1.0	Coumaphos	ND<10	10	1.0
Demeton-O	ND<10	10	1.0	Diazinon	ND<2.5	10	0.25
Dichlorvos (DDVP)	ND<10	10	1.0	Dimethoate	ND<25	10	2.5
Disulfoton (Di-Syston)	ND<5.0	10	0.5	EPN	ND<10	10	1.0
EPTC	ND<10	10	1.0	Ethion	ND<10	10	1.0
Ethoprop	ND<10	10	1.0	Fensulfothion	ND<10	10	1.0
Fenthion	ND<25	10	2.5	Fonofos	ND<5.0	10	0.5
Malathion	ND<10	10	1.0	Merphos	ND<10	10	1.0
Mevinphos (Phosdrin)	ND<10	10	1.0	Molinate	ND<9.0	10	0.9
Ethyl parathion	13	10	1.0	Methyl parathion	ND<10	10	1.0
Phorate (Thimet)	ND<10	10	1.0	Prometon	ND<5.0	10	0.5
Ronnel	ND<10	10	1.0	Simazine	ND<10	10	1.0
Stirofos (Tetrachlorvinphos)	ND<10	10	1.0	Terbacil	ND<20	10	2.0
Terbufos (Terbuphos)	ND<5.0	10	0.5	Thiobencarb	ND<10	10	1.0
Tokuthion (Prothiofos)	ND<25	10	2.5	Trichloronate (Agritox)	ND<10	10	1.0

Surrogate Recoveries (%)

%SS:	68

Comments: i

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental 2937 Veneman Ave., Suite B240 Modesto, CA 95356	Client Project ID: #474.2; Haley Flying Svc.	Date Sampled: 10/06/05
		Date Received: 10/07/05
	Client Contact: Steve Lankford	Date Extracted: 10/12/05
	Client P.O.: #F1168	Date Analyzed: 10/12/05

Organophosphorous Pesticides by GC-NPD (Basic Target List)*

Extraction Method: SW3535A Analytical Method: SW8141B Work Order: 0510129

Lab ID	0510129-003B
Client ID	TRIP BK
Matrix	Water

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Alachlor	ND	1.0	1.0	Atrazine	ND	1.0	0.5
Azinphos methyl (Guthion)	ND	1.0	1.0	Bolstar (Sulprofos)	ND	1.0	1.0
Chloropyrifos	ND	1.0	1.0	Coumaphos	ND	1.0	1.0
Demeton-O	ND	1.0	1.0	Diazinon	ND	1.0	0.25
Dichlorvos (DDVP)	ND	1.0	1.0	Dimethoate	ND	1.0	2.5
Disulfoton (Di-Syston)	ND	1.0	0.5	EPN	ND	1.0	1.0
EPTC	ND	1.0	1.0	Ethion	ND	1.0	1.0
Ethoprop	ND	1.0	1.0	Fensulfothion	ND	1.0	1.0
Fenthion	ND	1.0	2.5	Fonofos	ND	1.0	0.5
Malathion	ND	1.0	1.0	Merphos	ND	1.0	1.0
Mevinphos (Phosdrin)	ND	1.0	1.0	Molinate	ND	1.0	0.9
Ethyl parathion	ND	1.0	1.0	Methyl parathion	ND	1.0	1.0
Phorate (Thimet)	ND	1.0	1.0	Prometon	ND	1.0	0.5
Ronnel	ND	1.0	1.0	Simazine	ND	1.0	1.0
Stirofos (Tetrachlorvinphos)	ND	1.0	1.0	Terbacil	ND	1.0	2.0
Terbufos (Terbuphos)	ND	1.0	0.5	Thiobencarb	ND	1.0	1.0
Tokuthion (Prothiofos)	ND	1.0	2.5	Trichloronate (Agritox)	ND	1.0	1.0

Surrogate Recoveries (%)

%SS:	63	

Comments:

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc.	Date Sampled: 10/06/05
2937 Veneman Ave., Suite B240		Date Received: 10/07/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted: 10/12/05
	Client P.O.: #F1168	Date Analyzed: 10/12/05

Organophosphorous Pesticides by GC-NPD (Basic Target List)*

Extraction Method: SW3535A Analytical Method: SW8141B Work Order: 0510129

Lab ID	0510129-004B
Client ID	EQ
Matrix	Water

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Alachlor	ND	1.0	1.0	Atrazine	ND	1.0	0.5
Azinphos methyl (Guthion)	ND	1.0	1.0	Bolstar (Sulprofos)	ND	1.0	1.0
Chloropyrifos	ND	1.0	1.0	Coumaphos	ND	1.0	1.0
Demeton-O	ND	1.0	1.0	Diazinon	ND	1.0	0.25
Dichlorvos (DDVP)	ND	1.0	1.0	Dimethoate	ND	1.0	2.5
Disulfoton (Di-Syston)	ND	1.0	0.5	EPN	ND	1.0	1.0
EPTC	ND	1.0	1.0	Ethion	ND	1.0	1.0
Ethoprop	ND	1.0	1.0	Fensulfothion	ND	1.0	1.0
Fenthion	ND	1.0	2.5	Fonofos	ND	1.0	0.5
Malathion	ND	1.0	1.0	Merphos	ND	1.0	1.0
Mevinphos (Phosdrin)	ND	1.0	1.0	Molinate	ND	1.0	0.9
Ethyl parathion	ND	1.0	1.0	Methyl parathion	ND	1.0	1.0
Phorate (Thimet)	ND	1.0	1.0	Prometon	ND	1.0	0.5
Ronnel	ND	1.0	1.0	Simazine	ND	1.0	1.0
Stirofos (Tetrachlorvinphos)	ND	1.0	1.0	Terbacil	ND	1.0	2.0
Terbufos (Terbuphos)	ND	1.0	0.5	Thiobencarb	ND	1.0	1.0
Tokuthion (Prothiofos)	ND	1.0	2.5	Trichloronate (Agritox)	ND	1.0	1.0

Surrogate Recoveries (%)

%SS:	104	

Comments:

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc.	Date Sampled: 10/06/05
2937 Veneman Ave., Suite B240		Date Received: 10/07/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted: 10/07/05
	Client P.O.: #F1168	Date Analyzed: 10/12/05

Chlorinated Herbicides by GC-ECD (Basic Target List)*

Extraction Method: SW3535A Analytical Method: SW8151A Work Order: 0510129

Lab ID	0510129-001C	0510129-002C	0510129-003C	0510129-004C	Reporting Limit for DF =1	
Client ID	B-1	B-2	TRIP BK	EQ		
Matrix	W	W	W	W		
DF	2	10	1	1	S	W
Compound	**Concentration**				µg/Kg	µg/L
Triclopyr	ND<0.40	ND<2.0	ND	ND	NA	0.2
Acifluorfen	ND<2.0	ND<10	ND	ND	NA	1.0
Bentazon	ND<4.0	ND<20	ND	ND	NA	2.0
Chloramben	ND<2.0	ND<10	ND	ND	NA	1.0
2,4-D (Dichlorophenoxyacetic acid)	ND<2.0	ND<10	ND	ND	NA	1.0
2,4-DB	ND<2.0	ND<10	ND	ND	NA	1.0
Dalapon	ND<2.0	ND<10	ND	ND	NA	1.0
DCPA (mono & diacid)	ND<0.20	2.0	ND	ND	NA	0.1
Dicamba	ND<2.0	ND<10	ND	ND	NA	1.0
3,5-Dichlorobenzoic Acid	ND<2.0	ND<10	ND	ND	NA	1.0
Dichloroprop	ND<2.0	ND<10	ND	ND	NA	1.0
Dinoseb (DNBP)	ND<4.0	ND<20	ND	ND	NA	2.0
MCPA	ND<40	ND<200	ND	ND	NA	20
MCPP	ND<40	ND<200	ND	ND	NA	20
4-Nitrophenol	ND<2.0	ND<10	ND	ND	NA	1.0
Pentachlorophenol (PCP)	ND<0.40	ND<2.0	ND	ND	NA	0.2
Picloram	ND<2.0	ND<10	ND	ND	NA	1.0
2,4,5-T (Trichlorophenoxy acetic acid)	ND<2.0	ND<10	ND	ND	NA	1.0
2,4,5-TP (Silvex)	ND<2.0	ND<10	ND	ND	NA	1.0
Surrogate Recoveries (%)						
%SS:	118	107	95	109		
Comments	j,i	i				

* water samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) a lighter than water immiscible sheen/product is present; i) liquid sample that contains >~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference/cluttered chromatogram; k) results reported on a dry weight basis.

DHS Certification No. 1644

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Website: www.mccampbell.com E-mail: main@mccampbell.com

Geophase Environmental	Client Project ID: #474.2; Haley Flying Svc.	Date Sampled: 10/06/05
2937 Veneman Ave., Suite B240		Date Received: 10/07/05
Modesto, CA 95356	Client Contact: Steve Lankford	Date Extracted: 10/12/05-10/13/05
	Client P.O.: #F1168	Date Analyzed: 10/12/05-10/13/05

Carbamates by HPLC*

Extraction Method: SW8318A Analytical Method: SW8318A Work Order: 0510129

Lab ID	0510129-001D	0510129-002D	0510129-003D	0510129-004D	Reporting Limit for DF =1	
Client ID	B-1	B-2	TRIP BK	EQ		
Matrix	W	W	W	W		
DF	1	1	1	1	S	W
Compound	**Concentration**				ug/kg	µg/L
3-OH-carbofuran	ND	ND	ND	ND	NA	2.0
Aldicarb	ND	ND	ND	ND	NA	2.0
Aldicarb Sulfone	ND	ND	ND	ND	NA	2.0
Aldicarb Sulfoxide	ND	ND	ND	ND	NA	2.0
Carbaryl	2.4	22	ND	ND	NA	2.0
Carbofuran	ND	ND	ND	ND	NA	2.0
Methiocarb	ND	ND	ND	ND	NA	2.0
Methomyl	ND	ND	ND	ND	NA	2.0
Oxamyl	ND	ND	ND	ND	NA	2.0
Propoxur	ND	ND	ND	ND	NA	2.0
Surrogate Recoveries (%)						
%SS:	119	116	112	88		
Comments	i	i				

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) sample diluted due to high organic content.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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QC SUMMARY REPORT FOR SW8081B

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0510129

EPA Method: SW8081B **Extraction: SW3510C** **BatchID: 18412** **Spiked Sample ID: 0510135-002A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Aldrin	N/A	0.50	N/A	N/A	N/A	111	111	0	N/A	70 - 130
g-BHC	N/A	0.50	N/A	N/A	N/A	97.7	97.7	0	N/A	70 - 130
p,p-DDT	N/A	1.25	N/A	N/A	N/A	113	113	0	N/A	70 - 130
Dieldrin	N/A	1.25	N/A	N/A	N/A	113	113	0	N/A	70 - 130
Endrin	N/A	1.25	N/A	N/A	N/A	110	110	0	N/A	70 - 130
Heptachlor	N/A	0.50	N/A	N/A	N/A	107	107	0	N/A	70 - 130
%SS:	N/A	2.5	N/A	N/A	N/A	109	110	1.26	N/A	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 18412 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0510129-001A	0/06/05 11:25 AM	10/07/05	10/10/05 4:05 PM	0510129-002A	0/06/05 10:15 AM	10/07/05	10/10/05 5:02 PM
0510129-003A	10/06/05	10/07/05	10/08/05 1:03 AM	0510129-004A	10/06/05	10/07/05	10/08/05 1:58 AM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
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QC SUMMARY REPORT FOR SW8141B

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0510129

EPA Method: SW8141B | **Extraction: SW3535A** | **BatchID: 18450** | **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Diazinon	N/A	2.5	N/A	N/A	N/A	80.3	86.6	7.53	N/A	60 - 140
Disulfoton (Di-Syston)	N/A	2.5	N/A	N/A	N/A	70.4	67.1	4.77	N/A	60 - 140
Fenthion	N/A	2.5	N/A	N/A	N/A	79.6	77.3	2.84	N/A	60 - 140
Methyl parathion	N/A	2.5	N/A	N/A	N/A	104	102	2.12	N/A	60 - 140
%SS:	N/A	0.50	N/A	N/A	N/A	84	94	12.0	N/A	60 - 140

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 18450 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0510129-001B	0/06/05 11:25 AM	10/07/05	0/13/05 11:08 AM	0510129-002B	0/06/05 10:15 AM	10/07/05	10/12/05 4:54 PM
0510129-003B	10/06/05	10/07/05	10/12/05 6:07 PM	0510129-004B	10/06/05	10/07/05	10/12/05 7:18 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

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QC SUMMARY REPORT FOR SW8151A

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0510129

EPA Method: SW8151A | **Extraction: SW3535A** | **BatchID: 18446** | **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
2,4-D (Dichlorophenoxyacetic acid	N/A	0.50	N/A	N/A	N/A	87.2	91	4.32	N/A	60 - 140
2,4-DB	N/A	0.50	N/A	N/A	N/A	97.3	95.7	1.66	N/A	60 - 140
Dalapon	N/A	0.50	N/A	N/A	N/A	75.9	71.3	6.31	N/A	60 - 140
Dicamba	N/A	0.50	N/A	N/A	N/A	90.3	79.5	12.7	N/A	60 - 140
2,4,5-TP (Silvex)	N/A	0.50	N/A	N/A	N/A	102	86	16.7	N/A	60 - 140
%SS:	N/A	0.50	N/A	N/A	N/A	108	97	10.0	N/A	60 - 140

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 18446 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0510129-001C	0/06/05 11:25 AM	10/07/05	10/12/05 8:31 PM	0510129-002C	0/06/05 10:15 AM	10/07/05	10/12/05 7:34 PM
0510129-003C	10/06/05	10/07/05	10/12/05 6:37 PM	0510129-004C	10/06/05	10/07/05	10/12/05 5:38 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

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QC SUMMARY REPORT FOR SW8318A

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0510129

EPA Method: SW8318A | **Extraction: SW8318A** | **BatchID: 18455** | **Spiked Sample ID: 0510129-004d**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Aldicarb	ND	50	115	118	2.32	116	116	0	80 - 120	80 - 120
Aldicarb Sulfoxide	ND	50	104	105	0.337	105	103	1.74	80 - 120	80 - 120
Carbaryl	ND	50	92.2	95	3.03	94.1	87.3	7.51	80 - 120	80 - 120
Carbofuran	ND	50	110	115	4.98	116	110	5.17	80 - 120	80 - 120
Methiocarb	ND	50	90.1	94.9	5.18	100	101	0.848	80 - 120	80 - 120
Methomyl	ND	50	119	116	2.18	117	115	1.16	80 - 120	80 - 120
Oxamyl	ND	50	103	104	1.08	104	105	1.35	80 - 120	80 - 120
Propoxur	ND	50	111	111	0	111	110	0.264	80 - 120	80 - 120
%SS:	88	100	111	114	2.28	117	119	1.50	80 - 120	80 - 120

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 18455 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0510129-001d	0/06/05 11:25 AM	10/07/05	0/12/05 10:27 PM	0510129-002d	0/06/05 10:15 AM	10/07/05	0/12/05 11:21 PM
0510129-003d	10/06/05	10/07/05	0/13/05 12:16 AM	0510129-004d	10/06/05	10/07/05	10/13/05 1:11 AM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

DHS Certification No. 1644

QA/QC Officer

0510129 6pm

ARGON ANALYTICAL SERVICES, INC.

CHAIN OF CUSTODY

PO No.: F1168

Project Information:

Project No: 474.2
Project Title: Haley Flying Svc
Location:

Sampler's Name:
(print)
Sampler's Signature:

Report To:

Consultant: GeoPhase Environmental
Address: 2937 Veneman Ave., #B240
Modesto, CA 95356
Contact: Steve Lankford
Phone: (209)569-0293
Fax: (209)569-0295

Bill To:

Client: Argon Labs
Address: 2905 Railroad Ave.
Ceres, CA 95307

Samples Submitted To:

Laboratory: McCampbell Analytical
Address: 110 2nd Avenue South, #D7
Pacheco, CA 94553
Contact:
Phone: 925-798-1620
Fax: 925-798-1622

Date Results Required:

Date Report Required:

TURN AROUND TIME

RUSH	24 Hour	48 Hour	5 Day	
			X	

ANALYSIS

Sample ID.	Date	Time	# Containers	Matrix	8081A	8141A	8151A	8318							Comments
B-1	10/06/05	11:25	4	Water	X	X	X	X							
B-2	10/06/05	10:15	4	Water	X	X	X	X							
Trip Bk	10/06/05	-	4	Water	X	X	X	X							
Eq Bk	10/06/05	-	4	Water	X	X	X	X							

ICE/T ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT
DECHLORINATED IN LAB
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB

PRESERVATION	VOAS	O&G	METALS	OTHER

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	10/7/05	09:00	Christie Reed	10/7/05	12:10
			[signature]	10/7/05	1210pm

Special Instructions:
* Report to GeoPhase Environmental as indicated above.
* Email results to: data@argonlabs.com
* Mail reports to Argon
* Invoice to Argon

McCampbell Analytical, Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0510129 **ClientID: GPEM** **EDF: NO**

Report to:
Steve Lankford
Geophase Environmental
2937 Veneman Ave., Suite B240
Modesto, CA 95356

TEL: (209) 581-9280
FAX: (209) 581-9282
ProjectNo: #474.2; Haley Flying Svc.
PO: #F1168

Bill to:
Accounts Payable
Argon Analytical Services, Inc.
2905 Railroad Avenue
Ceres, CA 95307

Requested TAT: 5 days

Date Received: 10/07/2005
Date Printed: 10/07/2005

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0510129-001	B-1	Water	10/6/05 11:25:00	☐	A	B	C	D											
0510129-002	B-2	Water	10/6/05 10:15:00	☐	A	B	C	D											
0510129-003	TRIP BK	Water	10/6/05	☐	A	B	C	D											
0510129-004	EQ	Water	10/6/05	☐	A	B	C	D											

Test Legend:

1	8081_W	2	8141B_W	3	8151A_W	4	8318A_W	5	
6		7		8		9		10	
11		12		13		14		15	

Prepared by: Juanita Venegas

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

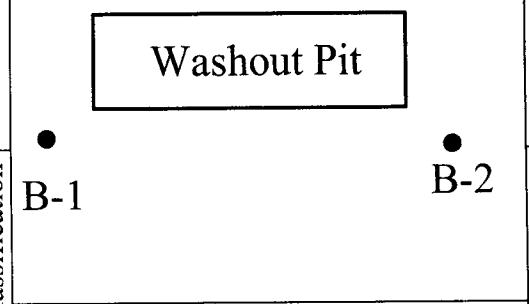
Appendix B

Soil Boring Logs

Project Name Haley PEA
Address 21,000 Paradise, Tracy

Geologist SL
Boring No. B-1
Date/Time Started-Finished 9/6/05 11:00 - 11:30
Boring Location Near SW Corner of Washout Pit

Location Map:



Key
TD=Total Depth
CSD=Casing Depth
AS=Annular Seal
FP=Filter Pack
Gr=Grout
AnDi=Annular Diam.
CSDi=Casing Diam.
SS=Slot Size
=Depth to Water

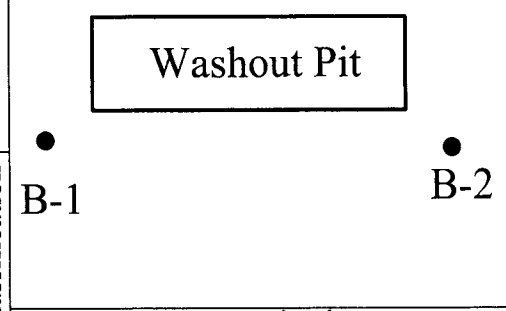
Depth-Below Grade (Ft)	Sampling Interval	Sample Identification	Time	Blow Count (Blows/0.5 ft)	Well Details	Columnar Section	USCS Classification	Description	Remarks
								3" PVC Pipe 0 - 2'	
5.0			11:09	Direct Push Drilling	Boring Grouted to Surface		ML	Silt. friable. Yellowish Brown 10YR5/4	Faint Pesticide Odor
10.0			11:14				CL	Silty Clay. Plastic Deformation Yellowish Brown 10YR5/4	No Odor
15.0			11:23				CL	Silty Clay. Plastic Deformation Yellowish Brown 10YR5/4	No Odor
20.0									
25.0									
30.0									

Notes:
GW at approx 11'. Grab GW sample collected at 11:25 using 4' screen.

Project Name Haley PEA
Address 21,000 Paradise, Tracy

Geologist SL
Boring No. B-2
Date/Time Started-Finished 9/6/05 09:40 - 10:15
Boring Location Near SE Corner of Washout Pit

Location Map:



Key
TD=Total Depth
CSD=Casing Depth
AS=Annular Seal
FP=Filter Pack
Gr=Grout
AnDi=Annular Diam.
CSDi=Casing Diam.
SS=Slot Size
=Depth to Water

Depth-Below Grade (Ft)	Sampling Interval	Sample Identification	Time	Blow Count (Blows/0.5 ft)	Well Details	Columnar Section	USCS Classification	Description	Remarks
								3" PVC Pipe 0 - 2'	
5.0			9:43	Direct Push Drilling	Boring Grouted to Surface		ML	Clayey Silt. Slightly Plastic. Yellowish Brown 10YR5/6	No Odor
10.0			9:48				CL	Silty Clay. Plastic Deformation Yellowish Brown 10YR5/6	No Odor
15.0			9:58				ML	Sandy Silt/ Friable Yellowish Brown 10YR5/6	No Odor
20.0									
25.0									
30.0									

Notes:
GW at approx 11'. Grab GW sample collected at 10:15 using Hydropunch

Appendix C

Site Photos

Photo 1 7:10 AM, 8/24/05

Upon arrival at the site, the Geo-Phase Environmental truck was unloaded in the work area.

Photo 2 7:40 AM, 8/24/05

The decon station was initially setup next to the truck. It consisted of a three-bucket wash as described in the Work Plan. The blue bins contain other sampling equipment. The hand auger is lying across the nearest blue bin. In the bed of the truck is the generator that was used to power a roto-hammer. This tool was needed at several points to break through pavement and packed road base.

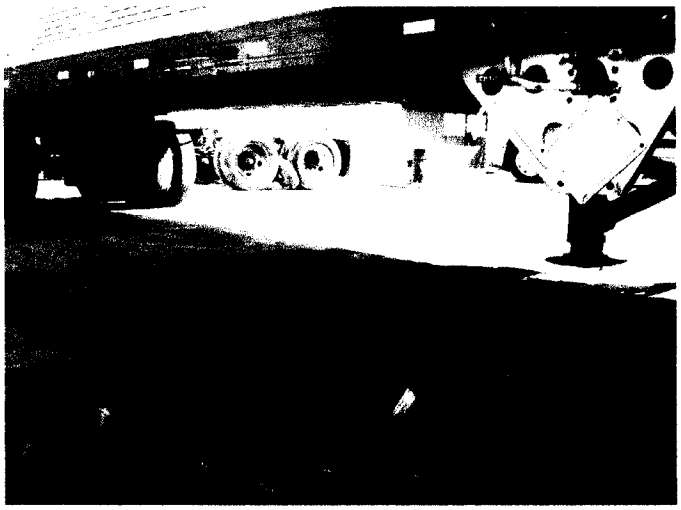


Photo 3 9:30 AM, 8/24/05

The intended sample point for S10 was directly beneath the semi-trailer. Due to large cobbles filling the sump, the sample point was moved about 5 feet. The hand auger bucket is the actual sample location

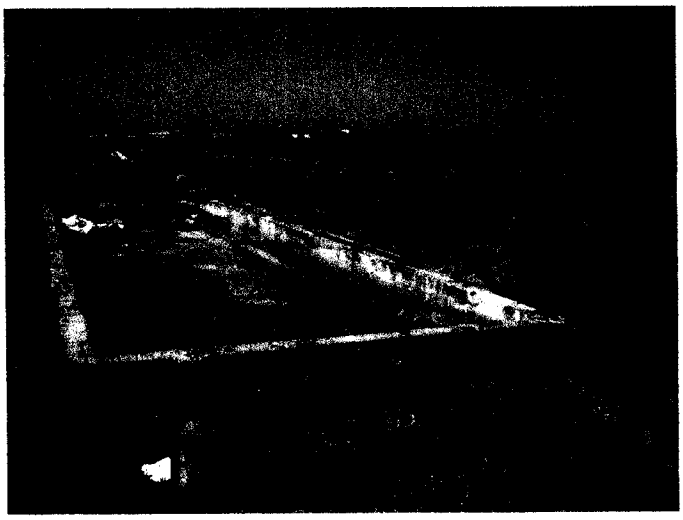


Photo 4 11:35 AM, 8/24/05

This is the concrete washout pit where rinse water from returning aircraft would be pumped and continuously sprayed until it evaporated. To the right is a berm that marks the north line of the parcel and the south bank of an irrigation ditch. The shovel in the foreground marks sample point S16.

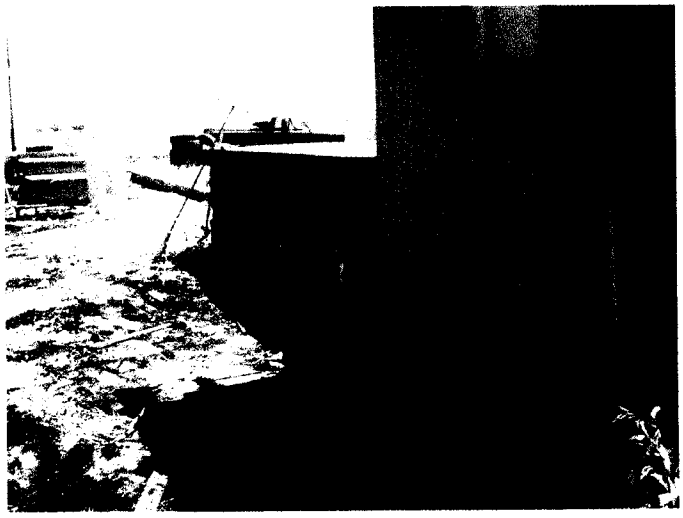


Photo 5 12:55 PM, 8/24/05

This view shows the rear of the aircraft loading dock. The slide hammer shows the location of sample point S17. This is the site of the single most contaminated sample collected during this PEA. The hand auger at the opposite end of the dock is the location of sample point S18.

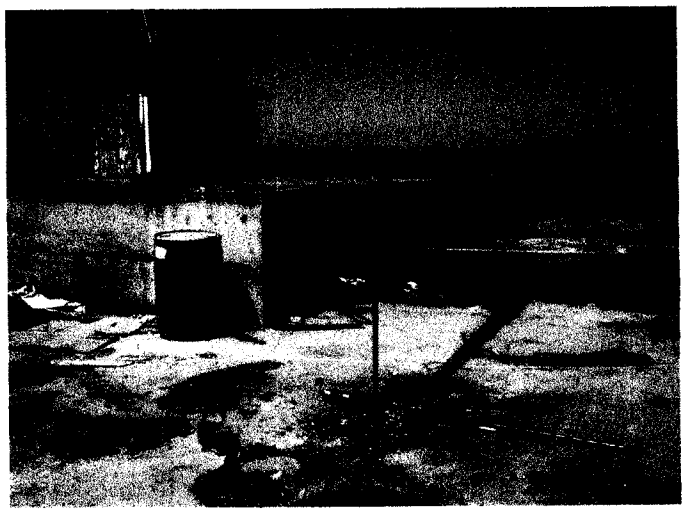


Photo 6 1:40 PM 8/24/05

The roto-hammer was used to cut a hole through the concrete loading pad where aircraft would park during loading and rinse-out operations. The slide hammer is the site of sample point S19. In the rear is the front side of the loading dock. The blue drum was used to store decon water.

Photo 7 8:05 AM 8/25/05

The slide hammer near the open truck door is at sample point S22, just off the south side of the concrete loading apron. The metal building on the background is the east hanger.

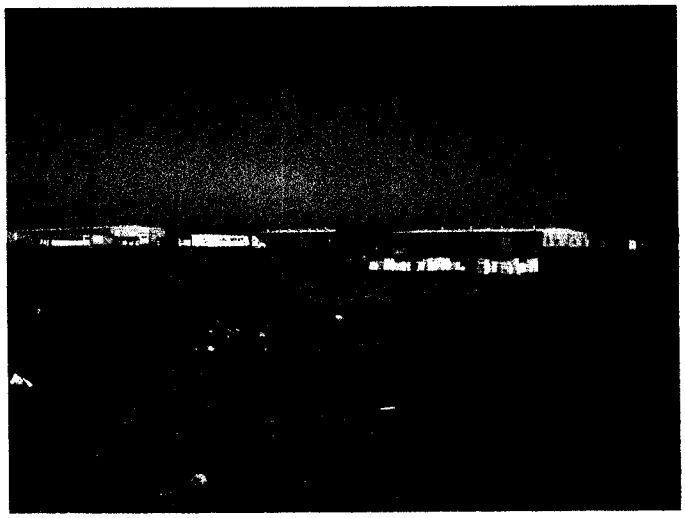


Photo 8 10:09 AM, 8/25/05

Sample point S1 is at the west end of the runway. In the distance, the Yellow Freight truck terminal is partially visible to the west of the Haley property.

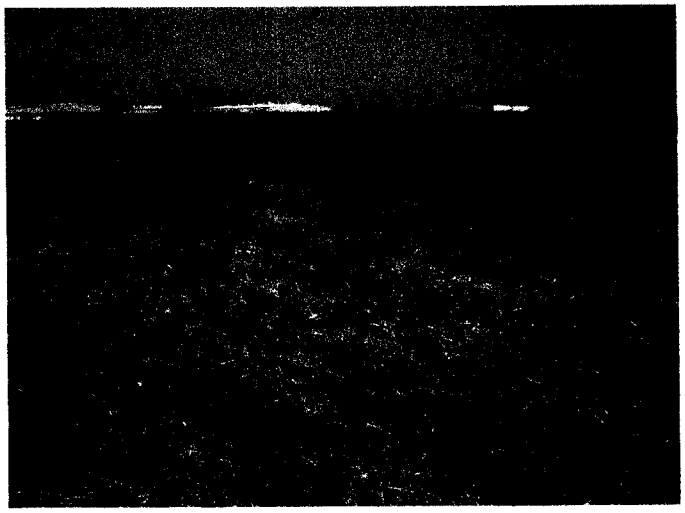


Photo 9 11:22 AM, 8/25/05

The slide hammer is ample point S3. The surface in this area is disked soil. The rise in the background is the south berm of the irrigation ditch.

Photo 10 6:54 AM, 8/26/05

The original samples from sample point S20 were lost. The next day, a replacement sample S20 was collected from a point 8 inches west of the original sample point. The roto-hammer was used to break through about 8 inches of packed road base.

Photo 11 7:28 AM, 8/26/05

The slide hammer is at sample point S6, near the east end of the former runway. The view is toward the WNW.

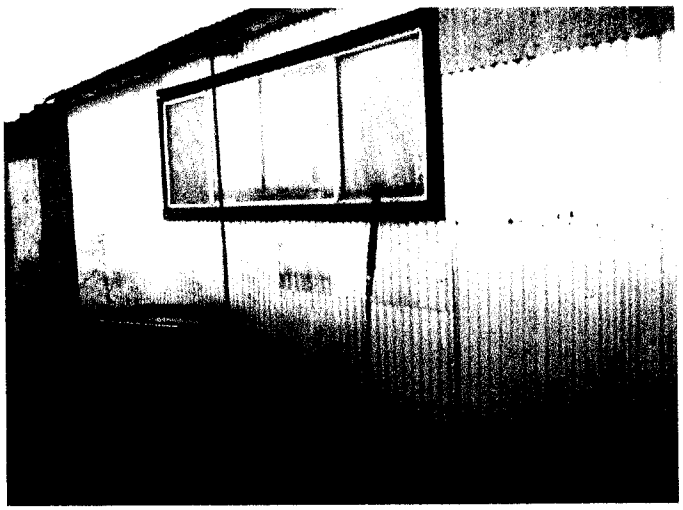


Photo 12 8:35 AM, 8/26/05

The slide hammer is at sample point S-23, at the west side of the west hangar. This sample was taken to test for waste oil. Two drums of waste oil are partially visible behind the weeds. This sample point was not mentioned in the Work Plan.

Photo 13 9:05 AM, 8/26/05

The hand auger is at sample point S24. The sample was collected to test for waste oil in an area of heavy oil staining at the surface. The roto-hammer on the ground was used to penetrate hard-packed road base. The structure in the background is a mobile building that was used as equipment storage space. It is no longer present on the property.

Photo 14 7:10 AM, 9/6/05

Geo-Probe soil borings were installed at either end of the washout pit in order to collect groundwater samples. The borings were designated as B-1 and B-2

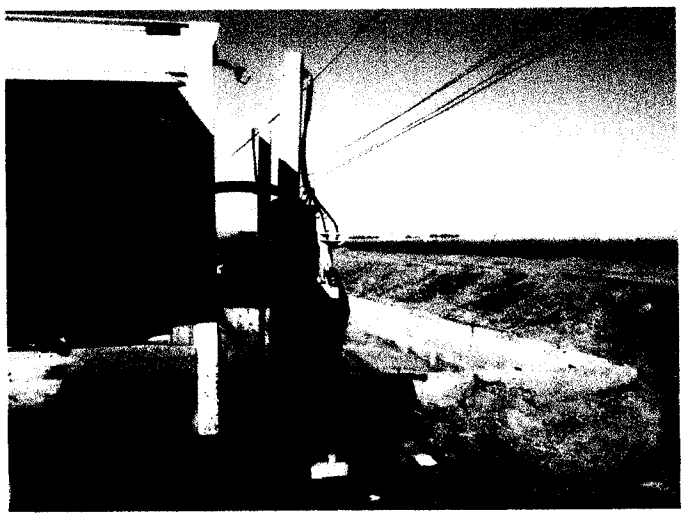


Photo 15 9/6/05

Soil boring B2 was drilled using Geo-Probe drilling equipment operated by V&W Drilling. The boring is located near the east end of the washout pit.

Photo 16 9/6/05

Another view of the drilling of B2.

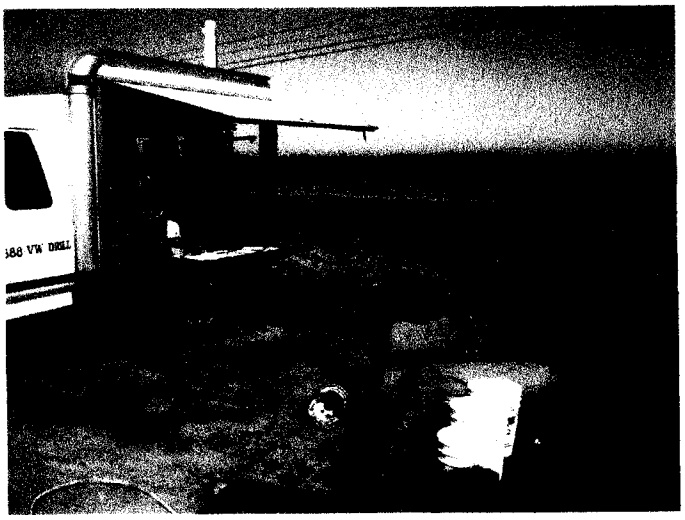


Photo 17 10:30 AM, 9/6/05

The equipment decon station was setup near the Geo-Probe rig. Reusable sample equipment consisted of a temporary well screen and the soil sample core barrel.

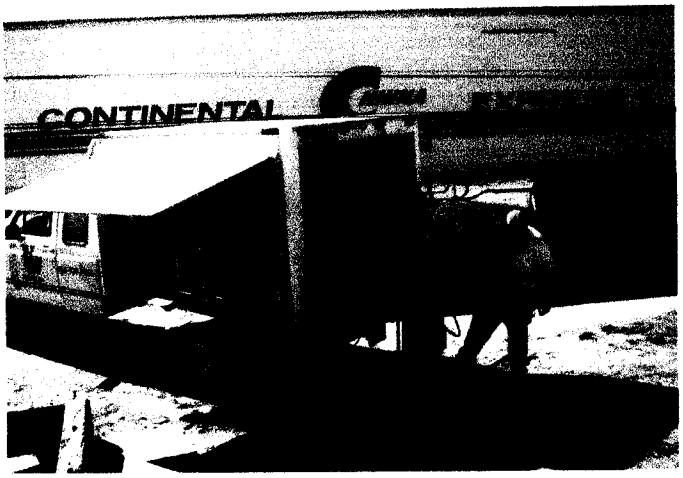


Photo 18 11:48 AM, 9/6/05

Boring B-1 was installed near the west end of the washout pit, which is partially visible at the lower left. The semi trailer behind the driller is owned by a tenant on the Haley site who operates a small trucking company.

Photo 19 11:03 AM, 9/6/05

Another view of boring B-1. This view is toward the southeast. The washout pit is visible in the left center of the frame.

Photo 20 11:04 AM, 9/6/05

The first two feet of borings B-1 and B-2 were drilled using a hand auger. A length of 3-inch diameter PVC pipe was then inserted in the hole. This was an attempt to reduce cross contamination of the drilling tools by what was known to be highly contaminated shallow soil. The Geo-Probe tools were then advanced through the PVC pipe. In this photo, the top of the PVC pipe is visible in B-1.

Appendix D

Exposure Point Estimates using ProUCL

Data File	C:\ProUCL\Haley UCL Data\Haley - run.xls	Variable:	a Chlordane

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	43	Shapiro-Wilk Test Statisitic	0.194304
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.943
Minimum	0.0005	Data not normal at 5% significance level	
Maximum	125		
Mean	3.552942	95% UCL (Assuming Normal Distribution)	
Median	0.025	Student's-t UCL	8.43634
Standard Deviation	19.03894		
Variance	362.4812	Gamma Distribution Test	
Coefficient of Variation	5.358641	A-D Test Statistic	3.928653
Skewness	6.477082	A-D 5% Critical Value	0.932571
		K-S Test Statistic	0.204288
Gamma Statistics		K-S 5% Critical Value	0.151054
k hat	0.154538	Data do not follow gamma distribution	
k star (bias corrected)	0.15926	at 5% significance level	
Theta hat	22.9907		
Theta star	22.30901	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.29029	Approximate Gamma UCL	7.647841
nu star	13.69639	Adjusted Gamma UCL	7.862831
Approx.Chi Square Value (.05)	6.362905		
Adjusted Level of Significance	0.044419	Lognormal Distribution Test	
Adjusted Chi Square Value	6.188927	Shapiro-Wilk Test Statisitic	0.872035
		Shapiro-Wilk 5% Critical Value	0.943
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-7.600902		
Maximum of log data	4.828314	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.684038	95% H-UCL	502.9898
Standard Deviation of log data	3.612525	95% Chebyshev (MVUE) UCL	33.61078
Variance of log data	13.05034	97.5% Chebyshev (MVUE) UCL	44.9645
		99% Chebyshev (MVUE) UCL	67.26667
		95% Non-parametric UCLs	
		CLT UCL	8.328628
		Adj-CLT UCL (Adjusted for skewness)	11.39295
		Mod-t UCL (Adjusted for skewness)	8.914312
		Jackknife UCL	8.43634
		Standard Bootstrap UCL	8.276223
		Bootstrap-t UCL	76.09007
RECOMMENDATION		Hall's Bootstrap UCL	48.5491 ←
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	9.254128
		BCA Bootstrap UCL	12.61367
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	16.20862
		97.5% Chebyshev (Mean, Sd) UCL	21.68474
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	32.44152
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\ProUCL\Haley UCL Data\Haley - run.xls	Variable:	g Chlordane

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	43	Shapiro-Wilk Test Statisitic	0.226076
Number of Unique Samples	20	Shapiro-Wilk 5% Critical Value	0.943
Minimum	0.0005	Data not normal at 5% significance level	
Maximum	125		
Mean	4.027709	95% UCL (Assuming Normal Distribution)	
Median	0.025	Student's-t UCL	8.94013
Standard Deviation	19.15209		
Variance	366.8026	Gamma Distribution Test	
Coefficient of Variation	4.755083	A-D Test Statistic	3.571641
Skewness	6.294156	A-D 5% Critical Value	0.93274
		K-S Test Statistic	0.205605
Gamma Statistics		K-S 5% Critical Value	0.151064
k hat	0.154266	Data do not follow gamma distribution	
k star (bias corrected)	0.159007	at 5% significance level	
Theta hat	26.1088		
Theta star	25.33031	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.26691	Approximate Gamma UCL	8.676221
nu star	13.67464	Adjusted Gamma UCL	8.920371
Approx.Chi Square Value (.05)	6.348096		
Adjusted Level of Significance	0.044419	Lognormal Distribution Test	
Adjusted Chi Square Value	6.17435	Shapiro-Wilk Test Statisitic	0.870648
		Shapiro-Wilk 5% Critical Value	0.943
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-7.600902		
Maximum of log data	4.828314	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.568623	95% H-UCL	1251.568
Standard Deviation of log data	3.75683	95% Chebyshev (MVUE) UCL	58.492
Variance of log data	14.11377	97.5% Chebyshev (MVUE) UCL	78.36967
		99% Chebyshev (MVUE) UCL	117.4155
		95% Non-parametric UCLs	
		CLT UCL	8.831778
		Adj-CLT UCL (Adjusted for skewness)	11.82725
		Mod-t UCL (Adjusted for skewness)	9.407364
		Jackknife UCL	8.94013
		Standard Bootstrap UCL	8.78336
		Bootstrap-t UCL	43.89518
RECOMMENDATION		Hall's Bootstrap UCL	29.8798 ←
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	9.614221
		BCA Bootstrap UCL	12.90887
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	16.7586
		97.5% Chebyshev (Mean, Sd) UCL	22.26726
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	33.08797
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\ProUCL\Haley UCL Data\Haley - run.xls	Variable:	DDD

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	43	Shapiro-Wilk Test Statisitic	0.179188
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.943
Minimum	0.0005	Data not normal at 5% significance level	
Maximum	3000		
Mean	78.46236	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	195.7136
Standard Deviation	457.1283		
Variance	208966.2	Gamma Distribution Test	
Coefficient of Variation	5.826083	A-D Test Statistic	4.635023
Skewness	6.514269	A-D 5% Critical Value	0.958609
		K-S Test Statistic	0.227756
Gamma Statistics		K-S 5% Critical Value	0.152567
k hat	0.112561	Data do not follow gamma distribution	
k star (bias corrected)	0.120212	at 5% significance level	
Theta hat	697.0653		
Theta star	652.7011	95% UCLs (Assuming Gamma Distribution)	
nu hat	9.680246	Approximate Gamma UCL	195.3016
nu star	10.33821	Adjusted Gamma UCL	201.9124
Approx.Chi Square Value (.05)	4.153373		
Adjusted Level of Significance	0.044419	Lognormal Distribution Test	
Adjusted Chi Square Value	4.017388	Shapiro-Wilk Test Statisitic	0.877902
		Shapiro-Wilk 5% Critical Value	0.943
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-7.600902		
Maximum of log data	8.006368	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.74309	95% H-UCL	386142.1
Standard Deviation of log data	4.54604	95% Chebyshev (MVUE) UCL	1695.802
Variance of log data	20.66648	97.5% Chebyshev (MVUE) UCL	2284.362
		99% Chebyshev (MVUE) UCL	3440.473
		95% Non-parametric UCLs	
		CLT UCL	193.1274
		Adj-CLT UCL (Adjusted for skewness)	267.1247
		Mod-t UCL (Adjusted for skewness)	207.2557
		Jackknife UCL	195.7136
		Standard Bootstrap UCL	191.4325
		Bootstrap-t UCL	3860.47
RECOMMENDATION		Hall's Bootstrap UCL	2213.469 ←
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	216.4285
		BCA Bootstrap UCL	290.816
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	382.3273
		97.5% Chebyshev (Mean, Sd) UCL	513.8099
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	772.0821
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\ProUCL\Haley UCL Data\Haley - run.xls	Variable:	DDE

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	43	Shapiro-Wilk Test Statisitic	0.202899
Number of Unique Samples	30	Shapiro-Wilk 5% Critical Value	0.943
Minimum	0.0005	Data not normal at 5% significance level	
Maximum	530		
Mean	15.36764	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	36.173
Standard Deviation	81.114		
Variance	6579.481	Gamma Distribution Test	
Coefficient of Variation	5.278233	A-D Test Statistic	4.128594
Skewness	6.377379	A-D 5% Critical Value	0.940856
		K-S Test Statistic	0.25839
Gamma Statistics		K-S 5% Critical Value	0.151536
k hat	0.141182	Data do not follow gamma distribution	
k star (bias corrected)	0.146836	at 5% significance level	
Theta hat	108.85		
Theta star	104.6587	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.14164	Approximate Gamma UCL	34.39362
nu star	12.62788	Adjusted Gamma UCL	35.41297
Approx.Chi Square Value (.05)	5.642349		
Adjusted Level of Significance	0.044419	Lognormal Distribution Test	
Adjusted Chi Square Value	5.479936	Shapiro-Wilk Test Statisitic	0.931841
		Shapiro-Wilk 5% Critical Value	0.943
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-7.600902		
Maximum of log data	6.272877	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.759348	95% H-UCL	2866.405
Standard Deviation of log data	3.760275	95% Chebyshev (MVUE) UCL	132.7858
Variance of log data	14.13966	97.5% Chebyshev (MVUE) UCL	177.9172
		99% Chebyshev (MVUE) UCL	266.5691
		95% Non-parametric UCLs	
		CLT UCL	35.7141
		Adj-CLT UCL (Adjusted for skewness)	48.56845
		Mod-t UCL (Adjusted for skewness)	38.17802
		Jackknife UCL	36.173
		Standard Bootstrap UCL	34.97248
		Bootstrap-t UCL	230.234
RECOMMENDATION		Hall's Bootstrap UCL	317.5997 ←
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	39.37087
		BCA Bootstrap UCL	55.31931
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	69.28622
		97.5% Chebyshev (Mean, Sd) UCL	92.61683
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	138.4453
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\ProUCL\Haley UCL Data\Haley - run.xls	Variable:	DDT

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	43	Shapiro-Wilk Test Statisitic	0.177238
Number of Unique Samples	29	Shapiro-Wilk 5% Critical Value	0.943
Minimum	0.0005	Data not normal at 5% significance level	
Maximum	19000		
Mean	491.7609	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	1234.334
Standard Deviation	2895.074		
Variance	8381453	Gamma Distribution Test	
Coefficient of Variation	5.887158	A-D Test Statistic	5.433448
Skewness	6.52014	A-D 5% Critical Value	1.010159
		K-S Test Statistic	0.281264
Gamma Statistics		K-S 5% Critical Value	0.155209
k hat	0.095771	Data do not follow gamma distribution	
k star (bias corrected)	0.104593	at 5% significance level	
Theta hat	5134.759		
Theta star	4701.655	95% UCLs (Assuming Gamma Distribution)	
nu hat	8.236303	Approximate Gamma UCL	1331.074
nu star	8.995011	Adjusted Gamma UCL	1380.607
Approx.Chi Square Value (.05)	3.323177		
Adjusted Level of Significance	0.044419	Lognormal Distribution Test	
Adjusted Chi Square Value	3.20395	Shapiro-Wilk Test Statisitic	0.887893
		Shapiro-Wilk 5% Critical Value	0.943
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-7.600902		
Maximum of log data	9.852194	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.327623	95% H-UCL	10178430
Standard Deviation of log data	4.947884	95% Chebyshev (MVUE) UCL	10221.77
Variance of log data	24.48156	97.5% Chebyshev (MVUE) UCL	13789.26
		99% Chebyshev (MVUE) UCL	20796.91
		95% Non-parametric UCLs	
		CLT UCL	1217.955
		Adj-CLT UCL (Adjusted for skewness)	1687.015
		Mod-t UCL (Adjusted for skewness)	1307.498
		Jackknife UCL	1234.334
		Standard Bootstrap UCL	1222.327
		Bootstrap-t UCL	14917.55
RECOMMENDATION		Hall's Bootstrap UCL	13820.18 ←
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1371.974
		BCA Bootstrap UCL	2226.262
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	2416.191
		97.5% Chebyshev (Mean, Sd) UCL	3248.894
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	4884.577
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\ProUCL\Haley UCL Data\Haley - run.xls	Variable:	Dieldrin

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	43	Shapiro-Wilk Test Statisitic	0.197893
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.943
Minimum	0.0005	Data not normal at 5% significance level	
Maximum	125		
Mean	3.612512	95% UCL (Assuming Normal Distribution)	
Median	0.025	Student's-t UCL	8.495031
Standard Deviation	19.03551		
Variance	362.3508	Gamma Distribution Test	
Coefficient of Variation	5.269329	A-D Test Statistic	3.708796
Skewness	6.470779	A-D 5% Critical Value	0.931036
		K-S Test Statistic	0.207646
Gamma Statistics		K-S 5% Critical Value	0.150965
k hat	0.157013	Data do not follow gamma distribution	
k star (bias corrected)	0.161562	at 5% significance level	
Theta hat	23.00773		
Theta star	22.35985	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.50312	Approximate Gamma UCL	7.724511
nu star	13.89437	Adjusted Gamma UCL	7.939649
Approx.Chi Square Value (.05)	6.497962		
Adjusted Level of Significance	0.044419	Lognormal Distribution Test	
Adjusted Chi Square Value	6.321889	Shapiro-Wilk Test Statisitic	0.885526
		Shapiro-Wilk 5% Critical Value	0.943
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-7.600902		
Maximum of log data	4.828314	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.578001	95% H-UCL	502.5926
Standard Deviation of log data	3.592721	95% Chebyshev (MVUE) UCL	35.21069
Variance of log data	12.90765	97.5% Chebyshev (MVUE) UCL	47.09423
		99% Chebyshev (MVUE) UCL	70.43715
		95% Non-parametric UCLs	
		CLT UCL	8.387338
		Adj-CLT UCL (Adjusted for skewness)	11.44813
		Mod-t UCL (Adjusted for skewness)	8.972452
		Jackknife UCL	8.495031
		Standard Bootstrap UCL	8.396063
		Bootstrap-t UCL	63.76208
RECOMMENDATION		Hall's Bootstrap UCL	40.83458 ←
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	9.32943
		BCA Bootstrap UCL	12.59484
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	16.26591
		97.5% Chebyshev (Mean, Sd) UCL	21.74104
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	32.49589
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\ProUCL\Haley UCL Data\Haley - run.xls	Variable:	Endolsulfan I

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	43	Shapiro-Wilk Test Statisitic	0.359325
Number of Unique Samples	27	Shapiro-Wilk 5% Critical Value	0.943
Minimum	0.0005	Data not normal at 5% significance level	
Maximum	1100		
Mean	59.42778	95% UCL (Assuming Normal Distribution)	
Median	0.054	Student's-t UCL	109.6842
Standard Deviation	195.9351		
Variance	38390.58	Gamma Distribution Test	
Coefficient of Variation	3.29703	A-D Test Statistic	3.028019
Skewness	4.350596	A-D 5% Critical Value	0.95094
		K-S Test Statistic	0.200429
Gamma Statistics		K-S 5% Critical Value	0.152122
k hat	0.124924	Data do not follow gamma distribution	
k star (bias corrected)	0.131713	at 5% significance level	
Theta hat	475.7101		
Theta star	451.1929	95% UCLs (Assuming Gamma Distribution)	
nu hat	10.74349	Approximate Gamma UCL	140.6394
nu star	11.32728	Adjusted Gamma UCL	145.1176
Approx.Chi Square Value (.05)	4.786389		
Adjusted Level of Significance	0.044419	Lognormal Distribution Test	
Adjusted Chi Square Value	4.638688	Shapiro-Wilk Test Statisitic	0.876028
		Shapiro-Wilk 5% Critical Value	0.943
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-7.600902		
Maximum of log data	7.003065	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.228634	95% H-UCL	6601240
Standard Deviation of log data	4.875553	95% Chebyshev (MVUE) UCL	8765.725
Variance of log data	23.77102	97.5% Chebyshev (MVUE) UCL	11822.52
		99% Chebyshev (MVUE) UCL	17826.99
		95% Non-parametric UCLs	
		CLT UCL	108.5757
		Adj-CLT UCL (Adjusted for skewness)	129.758
		Mod-t UCL (Adjusted for skewness)	112.9882
		Jackknife UCL	109.6842
		Standard Bootstrap UCL	107.7265
		Bootstrap-t UCL	205.8773
RECOMMENDATION		Hall's Bootstrap UCL	239.1955 ←
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	115.5447
		BCA Bootstrap UCL	139.2223
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	189.6709
		97.5% Chebyshev (Mean, Sd) UCL	246.0273
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	356.7283
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\ProUCL\Haley UCL Data\Haley - run.xls	Variable:	Endosulfan II

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	43	Shapiro-Wilk Test Statisitic	0.328204
Number of Unique Samples	27	Shapiro-Wilk 5% Critical Value	0.943
Minimum	0.0005	Data not normal at 5% significance level	
Maximum	750		
Mean	35.08353	95% UCL (Assuming Normal Distribution)	
Median	0.086	Student's-t UCL	67.1663
Standard Deviation	125.0813		
Variance	15645.33	Gamma Distribution Test	
Coefficient of Variation	3.565243	A-D Test Statistic	2.922047
Skewness	4.95153	A-D 5% Critical Value	0.947213
		K-S Test Statistic	0.189558
Gamma Statistics		K-S 5% Critical Value	0.151905
k hat	0.130934	Data do not follow gamma distribution	
k star (bias corrected)	0.137303	at 5% significance level	
Theta hat	267.9491		
Theta star	255.5199	95% UCLs (Assuming Gamma Distribution)	
nu hat	11.26029	Approximate Gamma UCL	81.23109
nu star	11.80802	Adjusted Gamma UCL	83.74729
Approx.Chi Square Value (.05)	5.099858		
Adjusted Level of Significance	0.044419	Lognormal Distribution Test	
Adjusted Chi Square Value	4.946632	Shapiro-Wilk Test Statisitic	0.872918
		Shapiro-Wilk 5% Critical Value	0.943
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-7.600902		
Maximum of log data	6.620073	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.426951	95% H-UCL	1430206
Standard Deviation of log data	4.689682	95% Chebyshev (MVUE) UCL	3786.597
Variance of log data	21.99312	97.5% Chebyshev (MVUE) UCL	5103.811
		99% Chebyshev (MVUE) UCL	7691.224
		95% Non-parametric UCLs	
		CLT UCL	66.45866
		Adj-CLT UCL (Adjusted for skewness)	81.84884
		Mod-t UCL (Adjusted for skewness)	69.56686
		Jackknife UCL	67.1663
		Standard Bootstrap UCL	65.38184
		Bootstrap-t UCL	124.863
RECOMMENDATION		Hall's Bootstrap UCL	148.8618 ←
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	69.76009
		BCA Bootstrap UCL	91.76779
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	118.2283
		97.5% Chebyshev (Mean, Sd) UCL	154.2051
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	224.8746
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\ProUCL\Haley UCL Data\Haley - run.xls	Variable:	Endosulfan Sulfate

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	43	Shapiro-Wilk Test Statisitic	0.21719
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.943
Minimum	0.0005	Data not normal at 5% significance level	
Maximum	125		
Mean	3.893605	95% UCL (Assuming Normal Distribution)	
Median	0.025	Student's-t UCL	8.795493
Standard Deviation	19.11103		
Variance	365.2313	Gamma Distribution Test	
Coefficient of Variation	4.908312	A-D Test Statistic	3.495827
Skewness	6.353464	A-D 5% Critical Value	0.931033
		K-S Test Statistic	0.205638
Gamma Statistics		K-S 5% Critical Value	0.150965
k hat	0.157018	Data do not follow gamma distribution	
k star (bias corrected)	0.161567	at 5% significance level	
Theta hat	24.79723		
Theta star	24.09903	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.50352	Approximate Gamma UCL	8.325457
nu star	13.89475	Adjusted Gamma UCL	8.557329
Approx.Chi Square Value (.05)	6.498222		
Adjusted Level of Significance	0.044419	Lognormal Distribution Test	
Adjusted Chi Square Value	6.322145	Shapiro-Wilk Test Statisitic	0.87779
		Shapiro-Wilk 5% Critical Value	0.943
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-7.600902		
Maximum of log data	4.828314	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.5029	95% H-UCL	955.2875
Standard Deviation of log data	3.696643	95% Chebyshev (MVUE) UCL	51.96885
Variance of log data	13.66517	97.5% Chebyshev (MVUE) UCL	69.58734
		99% Chebyshev (MVUE) UCL	104.1954
		95% Non-parametric UCLs	
		CLT UCL	8.687373
		Adj-CLT UCL (Adjusted for skewness)	11.70459
		Mod-t UCL (Adjusted for skewness)	9.266118
		Jackknife UCL	8.795493
		Standard Bootstrap UCL	8.537317
		Bootstrap-t UCL	44.2772
RECOMMENDATION		Hall's Bootstrap UCL	34.71534 ←
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	9.566023
		BCA Bootstrap UCL	15.43138
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	16.5972
		97.5% Chebyshev (Mean, Sd) UCL	22.09405
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	32.89156
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\ProUCL\Haley UCL Data\Haley - run.xls	Variable:	Endrin

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	43	Shapiro-Wilk Test Statisitic	0.287214
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.943
Minimum	0.0005	Data not normal at 5% significance level	
Maximum	125		
Mean	5.058523	95% UCL (Assuming Normal Distribution)	
Median	0.025	Student's-t UCL	10.24931
Standard Deviation	20.23737		
Variance	409.5509	Gamma Distribution Test	
Coefficient of Variation	4.000647	A-D Test Statistic	3.920552
Skewness	5.366863	A-D 5% Critical Value	0.936421
		K-S Test Statistic	0.228279
Gamma Statistics		K-S 5% Critical Value	0.151278
k hat	0.148332	Data do not follow gamma distribution	
k star (bias corrected)	0.153487	at 5% significance level	
Theta hat	34.10273		
Theta star	32.95732	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.75655	Approximate Gamma UCL	11.08012
nu star	13.19989	Adjusted Gamma UCL	11.39915
Approx.Chi Square Value (.05)	6.026282		
Adjusted Level of Significance	0.044419	Lognormal Distribution Test	
Adjusted Chi Square Value	5.857623	Shapiro-Wilk Test Statisitic	0.873242
		Shapiro-Wilk 5% Critical Value	0.943
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-7.600902		
Maximum of log data	4.828314	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.568833	95% H-UCL	1676.046
Standard Deviation of log data	3.808426	95% Chebyshev (MVUE) UCL	68.54863
Variance of log data	14.50411	97.5% Chebyshev (MVUE) UCL	91.88936
		99% Chebyshev (MVUE) UCL	137.7377
		95% Non-parametric UCLs	
		CLT UCL	10.13482
		Adj-CLT UCL (Adjusted for skewness)	12.83372
		Mod-t UCL (Adjusted for skewness)	10.67029
		Jackknife UCL	10.24931
		Standard Bootstrap UCL	10.00981
		Bootstrap-t UCL	22.48427
RECOMMENDATION		Hall's Bootstrap UCL	27.69176
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	10.70813
		BCA Bootstrap UCL	15.05333 ←
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	18.51082
		97.5% Chebyshev (Mean, Sd) UCL	24.33164
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	35.76552
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\ProUCL\Haley UCL Data\Haley - run.xls	Variable:	Toxaphene

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	43	Shapiro-Wilk Test Statisitic	0.187558
Number of Unique Samples	28	Shapiro-Wilk 5% Critical Value	0.943
Minimum	0.025	Data not normal at 5% significance level	
Maximum	24000		
Mean	658.9644	95% UCL (Assuming Normal Distribution)	
Median	1.25	Student's-t UCL	1596.171
Standard Deviation	3653.895		
Variance	13350948	Gamma Distribution Test	
Coefficient of Variation	5.544905	A-D Test Statistic	4.055807
Skewness	6.504467	A-D 5% Critical Value	0.943825
		K-S Test Statistic	0.21032
Gamma Statistics		K-S 5% Critical Value	0.151708
k hat	0.136394	Data do not follow gamma distribution	
k star (bias corrected)	0.142382	at 5% significance level	
Theta hat	4831.322		
Theta star	4628.137	95% UCLs (Assuming Gamma Distribution)	
nu hat	11.7299	Approximate Gamma UCL	1497.651
nu star	12.24487	Adjusted Gamma UCL	1542.944
Approx.Chi Square Value (.05)	5.387726		
Adjusted Level of Significance	0.044419	Lognormal Distribution Test	
Adjusted Chi Square Value	5.229569	Shapiro-Wilk Test Statisitic	0.898165
		Shapiro-Wilk 5% Critical Value	0.943
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.688879		
Maximum of log data	10.08581	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.778398	95% H-UCL	275733.1
Standard Deviation of log data	3.938715	95% Chebyshev (MVUE) UCL	7947.456
Variance of log data	15.51348	97.5% Chebyshev (MVUE) UCL	10665.76
		99% Chebyshev (MVUE) UCL	16005.33
		95% Non-parametric UCLs	
		CLT UCL	1575.499
		Adj-CLT UCL (Adjusted for skewness)	2166.081
		Mod-t UCL (Adjusted for skewness)	1688.29
		Jackknife UCL	1596.171
		Standard Bootstrap UCL	1563.167
		Bootstrap-t UCL	14835.94
RECOMMENDATION		Hall's Bootstrap UCL	9724.42 ←
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1762.646
		BCA Bootstrap UCL	2850.738
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	3087.803
		97.5% Chebyshev (Mean, Sd) UCL	4138.763
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	6203.171
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Appendix E

CalTOX Exposure Modeling

CalTOX™ 4.0 beta: Eight-Compartment Multimedia Exposure Model - Contaminated Soil

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Chemical ==>	Chlordane
Landscape ==>	Calif. Residential Site (CA Res.)
Exposure Factors Set=>	(Residential) Exposure Factors

Toxicity Data ==>

	potencies 1/(mg/kg-d)	ADIs (mg/kg-d)
Inhalation	1.2 E+00	5.7143E-06
Ingestion	1.2 E+00	0.00006
Dermal	1.2 E+00	0.00006
Total dose		0

	Risk	Hazard quotie
Target Risk/Hazard =	1.0 E-06	1.00

	current value	should be >
Root-soil thickness ===>	1.4	OK
Alter root soil thickness to?	n/a	
Distance off-site for air exposure=	0.0 E+00	meters

Time after initial concentrations when exposure begins = 3.7 E+02 days

Measured Concentrations (at time = 0)

Root-zone soil	78	ppm (mg/kg)
Vadose-zone soil	0	ppm (mg/kg)
Ground water	0	ppm (mg/L)
Methane flux m/d		0

Continuous inputs

Source term to air (mol/d)	0.0 E+00	Sa
Source term to ground-surface soil (mol/d)	0.0 E+00	Sg
Source term to root-zone soil (mol/d)	0.0 E+00	Ss
Source term to surface water(mol/d)	0.0 E+00	Sw

Aquifer characteristics

	Distance to first well (m)	0.0 E+00	d_well
0.001341446	Darcy veleocity (m/d)	1.0 E-01	v_darc
	Water dispersion coeff. (m2/d)	5.0 E-02	D_T

Summary of Results:

See Warnings Please

Un-mitigated risk and/or hazard ratio

Risk	2.2 E-3		
Hazard ratio	3.8 E+2		

Target Soil Concentrations (in ppm)

Based on cancer risk:

Root soil	3.5 E-2		
Vadose soil	0.0 E+0	not avlbl.	
		Root Soil	3.5 E-2
		Vadose soil	n/a

Based on hazard:

Root soil	2.1 E-1	
Vadose soil	0.0 E+0	not avlbl.

Concentration limits without NAPL

Root soil	3.1 E+02	mg/kg solid
Vadose soil	7.7 E+01	mg/kg solid
Ground water	5.5 E-01	mg/L water

Time avrg. Conc. in on-site environmental media

Air	1.1 E-03	mg/m3
Total Leaf	3.3 E-01	mg/kg(total)
Grnd-surface soil	3.0 E+01	mg/kg(total)
Root-zone soil	4.9 E+01	mg/kg(total)
Vadose-zone soil	2.3 E-03	mg/kg(total)
Ground water	5.5 E-05	mg/L(water)
Surface water	7.3 E-02	mg/L
Sediment	3.2 E+01	mg/kg

Chemical Properties

Compound	Chlordane		Value used	Mean value	Coeff. Var.	Adjustment	Notes
			0.00297	0.003		1	-2.2 E+05
	Molecular weight (g/mol)	MW	4.10 E+02	4.10E+02	0.01	1	
	Octanol-water partition coefficient	Kow	1.21 E+06	1.21E+06	0.73	1	
	Melting point (K)	Tm	2.98 E+02	2.98E+02	0.03	1	
	Vapor Pressure in (Pa)	VP	1.64 E-02	1.64E-02	1.58	1	
	Solubility in mol/m3	S	1.34 E-03	1.34E-03	1.36	1	Kaw
	Henry's law constant (Pa-m^3/mol)	H -	1.22 E+01	-9.90E+01	0.46	1	0.0050824
	Diffusion coefficient in pure air (m2/d)	Dair	1.02 E-01	1.02E-01	0.08	1	1.18 E-06
	Diffusion coefficient; pure water (m2/d)	Dwater	4.55 E-05	4.55E-05	0.25	1	5.27 E-10
	Organic carbon partition coefficient Koc	**Koc -**	5.18 E+04	5.18E+04	0.14	1	m^2/s
	Ocatanol/air partition coefficient	**Koa -**	2.38 E+08	-9.90E+01	0.10	1	
	Partition coefficient in ground/root soil layer	**Kd_s -**	6.45 E+02	-9.90E+01	0.10	1	
	Partition coefficient in vadose-zone soil layer	**Kd_v -**	1.58 E+02	-9.90E+01	0.10	1	
	Partition coefficient in aquifer layer	**Kd_q -**	1.58 E+02	-9.90E+01	0.10	1	A parameter with a "-" symbol after it, indicates a parameter that can be calculated by a default algoritm when **the value of mean for this parameter is <0**. Otherwise the liste value is used.
	Partition coeffic. in surface wtr sediments	**Kd_d -**	1.04 E+03	-9.90E+01	0.10	1	
	NOT USED	Kps -	2.35 E-03	-9.90E+01	4.00	1	
	Leaves/phlm wtr prtn cff.(wet kg/m3 per wet kg/m3)	**Kl_phl -**	2.45 E+02	-9.90E+01	0.10	1	
	Stem/xylem-fluid prtn cff (m^3[xylem]/m^3[stem])	**Ks_x -**	4.44 E+03	-9.90E+01	0.10	1	
	Transpiration stream cncntrtn fctr (m^3[wtr]/m^3[ts])	**TSCF -**	2.67 E-02	-9.90E+01	0.10	1	
	Biotrnsfr fctr, plant/air (m3[a]/kg[pFM])	**Kpa -**	5.95 E+02	-9.90E+01	14.00	1	
	Biotransfer factor; cattle-diet/milk (d/kg[milk])	**Bk -**	9.62 E-03	-9.90E+01	11.00	1	
	Biotransfer factor; cattle-diet/meat (d/L)	**Bt -**	3.04 E-02	-9.90E+01	13.00	1	
	Biotransfer fctr; hen-diet/eggs (d/kg[egg contents])	**Be -**	1.92 E-01	-9.90E+01	14.00	1	
	Biotrnsfr fctr; brst mlk/mthr intake (d/kg)	**Bbmk -**	2.42 E-01	-9.90E+01	10.00	1	
	Bioconcentration factor; fish/water	**BCF -**	5.81 E+04	-9.90E+01	0.60	1	
	Particle scavenging ratio of rain drops	**Psr_rain -**	5.00 E+04	5.00E+04	2.40	1	
	Skin permeability coefficient; cm/h	**Kp_w -**	1.25 E-01	-9.90E+01	2.40	1	
	Skin-water/soil partition coefficient (L/kg)	**Km -**	1.00 E+00	-9.90E+01	1.30	1	
	Fraction dermal uptake from soil	**dfct_sl-**	2.01 E-01	2.01E-01	1.00	1	

Chemical Properties (continued)

Reaction half-life in air (d)	Thalf_a	1.19 E+00	1.19E+00	1.00	1	
Reaction half-life in surface soil (d)	Thalf_g	5.70 E+03	5.70E+03	1.10	1	
Reaction half-life in root-zone soil (d)	Thalf_s	5.70 E+03	5.70E+03	1.20	1	
Reaction half-life in vadose-zone soil (d)	Thalf_v	1.39 E+03	1.39E+03	1.00	1	
Reaction half-life in ground water (d)	Thalf_q	1.67 E+03	1.67E+03	1.30	1	
Reaction half-life in surface water (d)	Thalf_w	8.35 E+02	8.35E+02	1.20	1	
Reaction half-life in sediments (d)	Thalf_d	6.94 E+02	6.94E+02	1.40	1	
Reaction half-life in the leaf surface (d)	Thalf_ls	5.70 E+03	-9.90E+01	1.00	1	

Landscape properties

site name	Calif. Residential Site (CA Res.)		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Contaminated area in m2	Area	4.68 E+04	4.68E+04	0.10	1	(m/y)
	Annual average precipitation (m/d)	rain	1.12 E-03	1.12E-03	0.56	1	4.07 E-01
	Not currently used	rain_days	0.00 E+00	0.00E+00	0.00	1	
	Flux; surface water into landscape (m/d)	inflow	0.00 E+00	0.00E+00	0.10	1	0.00 E+00
	Land surface runoff (m/d)	runoff	5.47 E-04	6.10E-04	1.00	1	2.00 E-01
	Atmospheric dust load (kg/m3)	rhob_a	6.15 E-08	6.15E-08	0.20	1	
	Dry deposition velocity, air particles (m/d)	v_d	5.00 E+02	5.00E+02	0.30	1	
	Aerosol organic fraction	foc_ap	2.00 E-01	2.00E-01	1.00	1	
	Volume fraction of water in leaf	beta_leaf	5.00 E-01	5.00E-01	0.05	1	
	Volume fraction of air in leaf	alpha_leaf	1.80 E-01	1.80E-01	0.20	1	
	Volume fraction of lipid in leaf	lipid_leaf	2.00 E-03	2.00E-03	0.20	1	
	Volume fraction of water in stem	beta_stem	4.00 E-01	4.00E-01	0.20	1	
	Volume fraction of water in root	beta_root	6.00 E-01	6.00E-01	0.20	1	
	Primary produciton dry vegetation(kg/m2/y)	veg_prod	9.00 E-01	9.00E-01	0.20	1	
	One-sided Leaf Area Index	**LAI -**	3.63 E+00	-9.90E+01	0.40	1	
	Wet interception fraction	IF_w	1.00 E-01	1.00E-01	0.10	1	
	Avg thickness of leaf surface(cuticle)(m)	d_cuticle	2.00 E-06	2.00E-06	0.20	1	
	Stem wet density (kg/m3)	rho_stm	8.30 E+02	8.30E+02	0.20	1	
	Leaf wet density (kg/m3)	rho_leaf	8.20 E+02	8.20E+02	0.30	1	
	Root wet density (kg/m3)	rho_root	8.00 E+02	8.00E+02	0.05	1	
	Veg attenuation fctr, dry interception(m2/kg)	atf_leaf	2.90 E+00	2.90E+00	0.01	1	

Landscape properties (continued)

site name	Calif. Residential Site (CA Res.)		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Stomata area frctn(area stomata/area leaf)	na_st	7.00 E-03	7.00E-03	0.20	1	
	Effective pore depth	del_st	2.50 E-05	2.50E-05	0.20	1	
	Boundary layer thickness over leafs	del_a	2.00 E-03	2.00E-03	1.00	1	
	Leaf surface erosion half-life (d)	Thalf_le	1.40 E+01	1.40E+01	1.00	1	
	Ground-water recharge (m/d)	recharge	5.58 E-05	5.58E-05	1.00	1	2.04 E-02
	Evaporation of water from surface wtr (m/d)	evaporate	6.85 E-05	6.85E-05	1.00	1	
	Thickness of the ground soil layer (m)	d_g	5.00 E-03	5.00E-03	1.00	1	
	Soil particle density (kg/m3)	rhos_s	2.60 E+03	2.60E+03	0.05	1	
	Water content in surface soil (vol fraction)	beta_g	1.92 E-01	1.92E-01	0.33	1	
	Air content in the surface soil (vol frctn)	alpha_g	2.66 E-01	2.66E-01	0.29	1	cm/y
	Erosion of surface soil (kg/m2-d)	erosion_g	2.03 E-04	2.03E-04	1.00	1	0.004636
	Bioturbation (m^2/d)	D_bio	1.20 E-04	1.20E-04	1.00	1	
	Thickness of the root-zone soil (m)	d_s	1.40 E+00	1.40E+00	0.47	1	
	Water content of root-zone soil (vol. frctn.)	beta_s	2.06 E-01	2.06E-01	0.34	1	
	Air content of root-zone soil (vol. frctn.)	alpha_s	2.53 E-01	2.53E-01	0.31	1	
	Thickness of the vadose-zone soil (m)	d_v	2.00 E+00	2.00E+00	0.37	1	
	Water content; vadose-zone soil (vol. frctn.)	beta_v	2.02 E-01	2.02E-01	0.32	1	
	Air content of vadose-zone soil (vol. frctn.)	alpha_v	2.36 E-01	2.36E-01	0.30	1	
	Thickness of the aquifer layer (m)	d_q	3.00 E+01	3.00E+01	0.30	1	
	Solid material density in aquifer (kg/m3)	rhos_q	2.60 E+03	2.60E+03	0.05	1	
	Porosity of the aquifer zone	beta_q	3.00 E-01	3.00E-01	0.20	1	
	Fraction of land area in surface water	f_arw	1.00 E-04	1.00E-04	0.20	1	
	Average depth of surface waters (m)	d_w	5.00 E+00	5.00E+00	1.00	1	
	Suspended sedmnt in surface wtr (kg/m3)	rhob_w	8.00 E-01	8.00E-01	1.00	1	
	Suspended sdmnt deposition (kg/m2/d)	deposit	1.05 E+01	1.05E+01	0.30	1	(m/s)
	Thickness of the sediment layer (m)	d_d	5.00 E-02	5.00E-02	1.00	1	
	Solid material density in sediment (kg/m3)	rhos_d	2.60 E+03	2.60E+03	0.05	1	
	Porosity of the sediment zone	beta_d	2.00 E-01	2.00E-01	0.20	1	m/y
	Sediment burial rate (m/d)	bury_d	1.00 E-06	1.00E-06	5.00	1	3.65 E-04
	Ambient environmental temperature (K)	Temp	2.89 E+02	2.89E+02	0.06	1	(m/s)
	Surface water current in m/d	current_w	0.00 E+00	0.00E+00	1.00	1	0.00 E+00

Landscape properties (continued)

site name	Calif. Residential Site (CA Res.)		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Organic carbon fraction in upper soil zone	foc_s	1.24 E-02	8.47E-03	1.98	1	
	Organic carbon fraction in vadose zone	foc_v	3.06 E-03	3.06E-03	0.96	1	
	Organic carbon fraction in aquifer zone	foc_q	3.06 E-03	3.06E-03	0.96	1	
	Organic carbon fraction in sediments	foc_d	2.00 E-02	2.00E-02	1.00	1	
	Bndry lyr thickness in air above soil (m)	del_ag	5.00 E-03	5.00E-03	0.20	1	(m/s)
	Yearly average wind speed (m/d)	v_w	2.80 E+05	2.80E+05	0.17	1	3.24 E+00

Human Exposure Factors

scenario	(Residential) Exposure Factors		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Body weight (kg)	BW	6.20 E+01	6.20E+01	0.20	1	
	Surface area (m2/kg)	SAb	2.60 E-02	2.60E-02	0.07	1	
	Active breathing rate (m3/kg-h)	BRa	1.90 E-02	1.90E-02	0.30	1	
	Resting breathing rate (m3/kg-h)	BRr	6.40 E-03	6.40E-03	0.20	1	
	Fluid Intake (L/kg-d)	Ifl	2.20 E-02	2.20E-02	0.20	1	
	Fruit and vegetable intake (kg/kg-d)	Ifv	4.90 E-03	4.90E-03	0.20	1	
	Grain intake (kg/kg-d)	Ig	3.70 E-03	3.70E-03	0.20	1	
	Milk intake (kg/kg-d)	Imk	6.50 E-03	6.50E-03	0.20	1	
	Meat intake (kg/kg-d)	Imt	3.00 E-03	3.00E-03	0.20	1	
	Egg intake (kg/kg-d)	Iegg	4.60 E-04	4.60E-04	0.30	1	
	Fish intake (kg/kg-d)	Ifsh	2.90 E-04	2.90E-04	0.40	1	
	Soil ingestion (kg/d)	Isl	3.50 E-07	3.50E-07	3.00	1	
	Breast milk ingestion by infants (kg/kg-d)	Ibm	1.10 E-01	1.10E-01	0.20	1	
	Inhalation by cattle (m3/d)	Inc	1.22 E+02	1.22E+02	0.30	1	
	Inhalation by hens (m3/d)	Inh	2.20 E+00	2.20E+00	0.30	1	
	Ingestion of pasture, dairy cattle (kg[FM]/d)	Ivdc	8.50 E+01	8.50E+01	0.20	1	
	Ingestion of pasture, beef cattle (kg[FM]/d)	Ivbc	6.00 E+01	6.00E+01	0.40	1	
	Ingestion of pasture by hens (kg[FM]/d)	Ivh	1.20 E-01	1.20E-01	0.04	1	
	Ingestion of water by dairy cattle (L/d)	Iwdc	3.50 E+01	3.50E+01	0.20	1	
	Ingestion of water by beef cattle (L/d)	Iwbc	3.50 E+01	3.50E+01	0.20	1	
	Ingestion of water by hens (L/d)	Iwh	8.40 E-02	8.40E-02	0.10	1	
	Ingestion of soil by cattle (kg/d)	Isc	4.00 E-01	4.00E-01	0.70	1	
	Ingestion of soil by hens (kg/d)	Ish	1.30 E-05	1.30E-05	1.00	1	

Human Exposure Factors (continued)

scenario	(Residential) Exposure Factors		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Fraction of water needs from ground water	fw_gw	8.00 E-01	8.00E-01	0.10	1	
	Fraction of water needs from surface water	fw_sw	2.00 E-01	2.00E-01	0.10	1	
	Water irrigation rate applied to agr.soil (l/m2-d)	R_irr	2.59 E+00	2.59E+00	1.00	1	
	Frctn frts & vgtbls that are exposed produce	fabv_grd_v	4.70 E-01	4.70E-01	0.10	1	
	Fraction of fruits and vegetables local	flocal_v	2.40 E-01	2.40E-01	0.70	1	
	Fraction of grains local	flocal_g	1.20 E-01	1.20E-01	0.70	1	
	Fraction of milk local	flocal_mk	4.00 E-01	4.00E-01	0.70	1	
	Fraction of meat local	flocal_mt	4.40 E-01	4.40E-01	0.50	1	
	Fraction of eggs local	flocal_egg	4.00 E-01	4.00E-01	0.70	1	
	Fraction of fish local	flocal_fsh	7.00 E-01	7.00E-01	0.30	1	
	Plant-air prttn fctr, particles, m3/kg[FM]	Kpa_part	3.30 E+03	3.30E+03	1.80	1	
	Rainsplash (mg/kg[plnt FM])/(mg/kg[dry soil])	rainsplash	3.40 E-03	3.40E-03	1.00	1	
	Water use in the shower (L/min)	Wshower	8.00 E+00	8.00E+00	0.40	1	
	Water use in the House (L/h)	Whouse	4.00 E+01	4.00E+01	0.40	1	
	Room ventilation rate, bathroom (m3/min)	VRbath	1.00 E+00	1.00E+00	0.40	1	
	Room ventilation rate, house (m3/h)	VRhouse	7.50 E+02	7.50E+02	0.30	1	
	Exposure time, in shower or bath (h/day)	ETsb	2.70 E-01	2.70E-01	0.60	1	
	Exposure time, active indoors (h/day)	ETai	8.00 E+00	8.00E+00	0.14	1	
	Exposure time, outdoors at home (h/day)	ETao	3.00 E-01	3.00E-01	0.14	1	
	Exposure time, indoors resting (h/day)	ETri	8.00 E+00	8.00E+00	0.04	1	
	Indoor dust load (kg/m^3)	dust_in	3.00 E-08	3.00E-08	0.40	1	
	Exposure frequency to soil on skin, (d/y)	EFsl	1.37 E+02	1.37E+02	0.60	1	
	Soil adherence to skin (mg/cm^2)	Slsk	5.00 E-01	5.00E-01	0.40	1	
	Ratio of indoor gas conc. to soil gas conc.	alpha_inair	1.00 E-04	1.00E-04	2.00	1	
	Exposure time swimming (h/d)	ETsw	5.00 E-01	5.00E-01	0.50	1	
	Exposure frequency, swimming (d/y)	EFsw	1.50 E+01	1.50E+01	4.00	1	
	Water ingestion while swimming (L/kg-h)	Isww	7.00 E-04	7.00E-04	1.00	1	
	Exposure duration (years)	ED	1.40 E+01	1.40E+01	1.15	1	
	Averaging time (days)	AT	2.56 E+04	2.56E+04	0.10	1	

Constants		
Gas Constant (Pa-m^3/mol-K)	8.31E+00	Rgas

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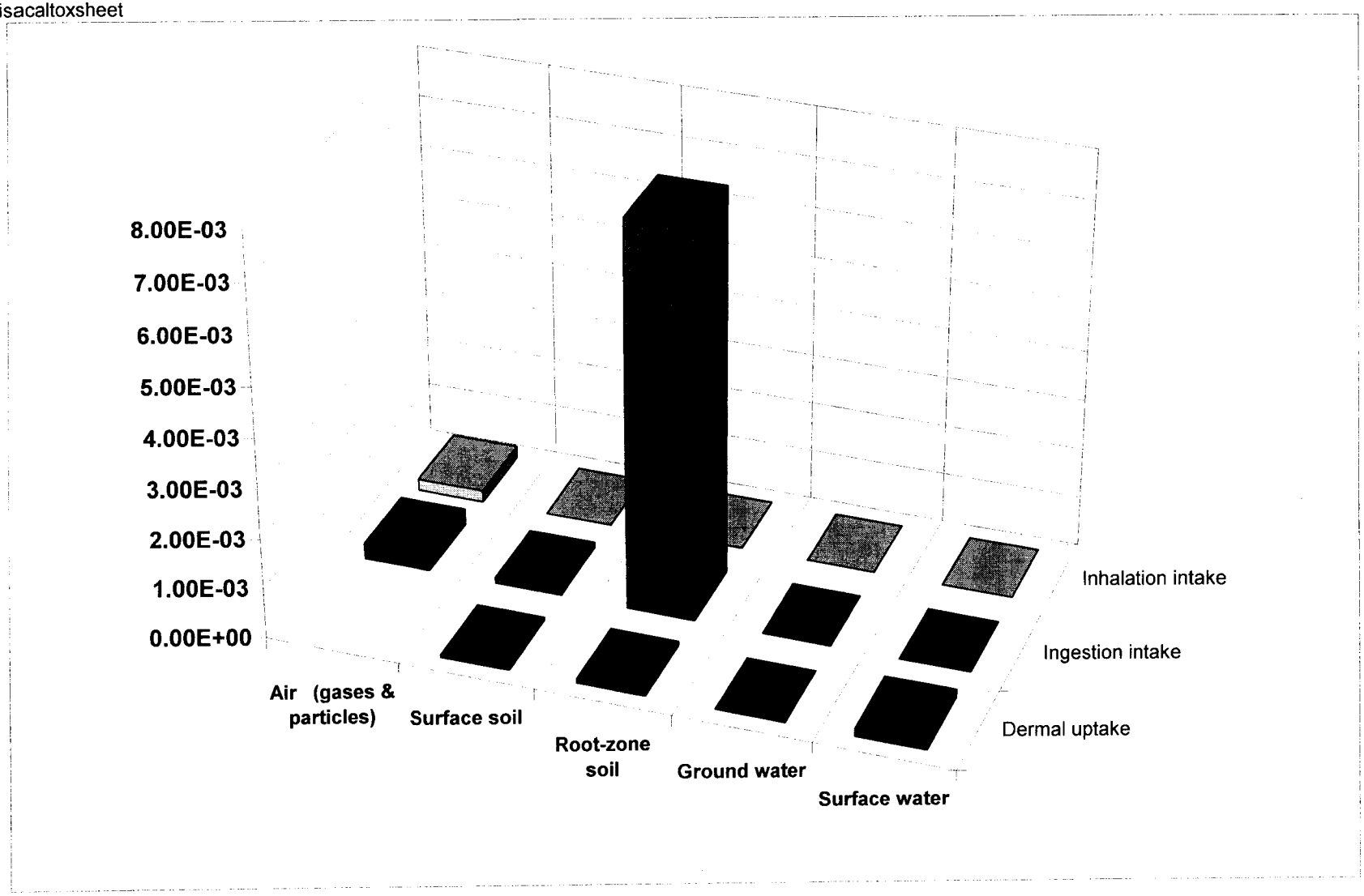


Exposure Pathway-Include-and-Exclude Toggles

All inhalation exposures indoors active	1	Contaminant transfer, air to plants surfaces	1
All inhalation exposures indoors resting	1	Cntmnnt. transfer, grnd. soil to plant surfaces	1
Inhalation exposure in shower/bath	1	Contamnnt. transfer, root soil to plant tissues	1
Inhalation exposures outdoors active	1	On-site grazing of animals	0
Inhalation of air particles indoors	1		
Transfer of soil dust to indoor air	1	Ingestion of home-grown exposed produce	1
Transfer of soil vapors to indoor air	1	Ingestion of home-grown unexposed produce	1
On-site inhalation by animals	1	Ingestion of home-grown meat	0
		Ingestion of home-grown milk	0
Use of ground water as tap water	0	Ingestion of home-grown eggs	0
Use of surface water as tap water	0	Ingestion of locally caught fish	0
Ingestion of tap water	1	Direct soil ingestion	1
Use of ground water for irrigation	0	Soil contact exposure at home or at work	1
Use of surface water for irrigation	0	Dermal exposure during shower/bath	1
		Dermal & ingstn exposures while swimming	1
Use of ground water for feeding animals	0		
Use of surface water for feeding animals	0	Breast-milk ingestion by infants	1

MEDIA AND CORRESPONDING POTENTIAL DOSES IN mg/kg-d (averaged over the exposure duration)

PATHWAYS	Air (gases & particles)	Surface soil	Root-zone soil	Ground water	Surface water	Totals	%
INHALATION	2.32E-04	2.08E-07	8.98E-06	0.00E+00	0.00E+00	**2.41E-04**	2.76
INGESTION:							
Water				0.00E+00	1.05E-06	1.05E-06	0.01
Exposed produce	3.24E-04	1.15E-04	6.21E-06	0.00E+00	0.00E+00	4.46E-04	5.11
Unexposed produce			7.75E-03	0.00E+00	0.00E+00	7.75E-03	88.75
Meat	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Milk	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Eggs	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Fish					0.00E+00	0.00E+00	0.00
Soil		9.62E-08	1.58E-07			2.54E-07	0.00
Total ingestion	3.24 E-04	1.16 E-04	7.76 E-03	0.00 E+00	1.05 E-06	**8.20 E-03**	93.88
DERMAL UPTAKE		5.02E-05	8.27E-05	0.00E+00	1.61E-04	**2.94E-04**	3.36
Dose SUM	**5.56E-04**	**1.66E-04**	**7.85E-03**	**0.00E+00**	**1.62E-04**	**8.73E-03**	100.0

	Air (gases & particles)	Surface soil	Root-zone soil	Ground water	Surface water	total
Breast milk concentration	8.81 E-03	2.63 E-03	1.24 E-01	0.00 E+00	2.56 E-03	1.38 E-01
Infant dose	9.69 E-04	2.89 E-04	1.37 E-02	0.00 E+00	2.82 E-04	**dose_bm 1.52 E-02**

Ingestion dose used =>	8.70 E-03
Total dose used =>	9.23 E-03

ENVIRONMENTAL Media CONCENTRATIONS	**Air (gases)** mg/m^3 (air)	**Air (dust)** mg/m^3 (air)	**Ground soil** mg/kg(soil solids)	**Root soil** mg/kg(soil solids)	**Ground water** mg/L (pure)	**Surface water** mg/L (pure)
	1.11 E-03	3.98 E-06	3.41E+01	5.61 E+01	5.52 E-05	4.00 E-02

EXPOSURE MEDIA CONCENTRATIONS (averaged over the exposure duration)

EXPOSURE	Air (gases)	Air (dust)	Ground soil	Root soil	Ground water	Surface water
Indoor air (mg/m^3)	1.11 E-03	3.98 E-06	1.02 E-06	4.42 E-05	0.00 E+00	0.00 E+00
Bathroom air (mg/m^3)					0.00 E+00	0.00 E+00
Outdoor air (mg/m^3)	1.11 E-03	3.98 E-06				
Tap water (mg/L)					0.00 E+00	0.00 E+00
Exposed produce (mg/kg)	3.24 E-01	1.17 E-03	1.16 E-01	6.23 E-03	0.00 E+00	0.00 E+00
Unexposed produce (mg/kg)				1.24 E+01	0.00 E+00	0.00 E+00
Meat (mg/kg)	5.96 E-01	2.15 E-03	2.11 E-01	1.14 E-02	0.00 E+00	0.00 E+00
Milk (mg/kg)	2.66 E-01	9.60 E-04	9.47 E-02	5.09 E-03	0.00 E+00	0.00 E+00
Eggs (mg/kg)	7.93 E-03	2.86 E-05	2.67 E-03	1.43 E-04	0.00 E+00	0.00 E+00
Fish and seafood (mg/kg)						2.33 E+03
Household soil (mg/kg)			1.70 E+01	2.80 E+01		
Swimming water (mg/L)						7.32 E-02

PATHWAY CONTACT FACTORS (CR/BW*FI)

EXPOSURE Media	Units	Inhalation	Ingestion	Dermal
Indoor air (active)		1.52 E-01		
Indoor air (resting)		5.12 E-02		
Indoor air (shower/bath)		5.13 E-03		
Outdoor air (active)		5.70 E-03		
Tap water			2.20 E-02	1.06 E-02
Exposed produce			9.97 E-04	
Unexposed produce			6.23 E-04	
Meat			0.00 E+00	
Milk			0.00 E+00	
Eggs			0.00 E+00	
Fish and seafood			0.00 E+00	
Household soil			5.65 E-09	2.95 E-06
Swimming wtr			1.44 E-05	4.02 E-03

Dose ratios	inh-dose/Ns	ing-dose/Ns	drml-dose/Ns	inh-dose/Nq	ing-dose/Nq	drml-dose/Nq
	1.9 E-08	6.5 E-07	2.3 E-08	0.0 E+00	0.0 E+00	0.0 E+00

Time (y)	Total inhalation dose	Total ingestion dose	Total dermal dose	Total dose	Total dose from root soil	Total dose from ground water
1	3.6 E-04	1.2 E-02	4.4 E-04	1.3 E-02	1.3 E-02	0.0 E+00
2.4	3.3 E-04	1.1 E-02	4.0 E-04	1.2 E-02	1.2 E-02	0.0 E+00
3.8	3.0 E-04	1.0 E-02	3.7 E-04	1.1 E-02	1.1 E-02	0.0 E+00
5.2	2.8 E-04	9.5 E-03	3.4 E-04	1.0 E-02	1.0 E-02	0.0 E+00
6.6	2.5 E-04	8.7 E-03	3.1 E-04	9.2 E-03	9.2 E-03	0.0 E+00
8	2.3 E-04	7.9 E-03	2.8 E-04	8.5 E-03	8.5 E-03	0.0 E+00
9.4	2.1 E-04	7.3 E-03	2.6 E-04	7.7 E-03	7.7 E-03	0.0 E+00
10.8	2.0 E-04	6.7 E-03	2.4 E-04	7.1 E-03	7.1 E-03	0.0 E+00
12.2	1.8 E-04	6.1 E-03	2.2 E-04	6.5 E-03	6.5 E-03	0.0 E+00
13.6	1.6 E-04	5.6 E-03	2.0 E-04	6.0 E-03	6.0 E-03	0.0 E+00
15	1.5 E-04	5.1 E-03	1.8 E-04	5.5 E-03	5.5 E-03	0.0 E+00
Cumulative doses				44.61795448		
over ED by route, mg/kg	1.2 E+00	4.2 E+01	1.5 E+00	4.5 E+01	4.5 E+01	0.0 E+00
fraction	0.0276	0.9388	0.0336	1.0000	1.000	0.000
Average doses						
over ED by route, mg/kg-d	2.4 E-04	8.2 E-03	2.9 E-04	8.7 E-03	8.7 E-03	0.0 E+00
Maximum doses						
over ED by route, mg/kg-d	3.6 E-04	1.2 E-02	4.4 E-04	2.4 E-02	1.3 E-02	0.0 E+00
fraction	0.0153	0.5205	0.0187	0.5544	1.000	0.000

Max breast-milk dose	2.3 E-02	mg/kg-d	Max_ing	2.3 E-02

Off-site 1-h max X/Q (mol/m3-s)	6.2 E-03
Off-site Long-term X/Q	5.0 E-04
On-site Long-term X/Q	3.8 E-04
Off-site air dilution factor	1.0 E+00

Off-site pseudo Sa = 6.2 E-01 mol/day

bbb2 = 2.1 E-03 bbb4 = 1.6 E+01

bbb3 = 7.7 E-02 bbb5 = 1.4 E-03

			fugacity off-site	**fugacity on-site**	
Off-site air concentration (gases)	1.1 E-03	**mg/m3**	6.5 E-06	6.5 E-06	air
Off-site concentration (particles)	4.0 E-06	**mg/m3**			
Off-site surface-water concentrtn.	1.7 E-04	**mg/L**	5.0 E-06	1.2 E-03	water
Off-site surface soil concentration	1.4 E-01	**mg/kg**	6.4 E-06	1.6 E-03	ground soil
Off-site root-soil concentration	7.1 E-02	**mg/kg**	3.3 E-06	2.6 E-03	root soil

Off-site ground-water dilution	**0**

w	erf(w)
0.0 E+00	0.0 E+00
Dispsn redctn	3.5 E-01
decay reductn.	1.0 E+00

Darcy velociy of water	v_darc	1.0 E-01	m/d
Contaminant velocity	Vc	3.5 E-04	m/d
Trnsvrs. disprsn. coeff. (water)	D_T	5.0 E-02	m2/d
Trnsvrs. disprsn. coeff. (chem)	D_Tc	1.7 E-04	m2/d
Dispersion depth	dzz	10.4	m
Thickness of aquifer	d_q	30	m
Transverse dispersivity (chem)	alpha_t	5.0 E-01	m
Width of the contaminated area	Y	216	m
Distrance to off-site location	X	0	m
Mass tranfer rate, aquifer - out	T_qo	1.6 E-06	1/d

Calculated Properties

fugacity capacity of pure air	4.16E-04	Zair		
fugacity capacity of pure water	8.19E-02	Zwater		
height of the air compartment (m)	1.62E+01	d_a		
evapotranspiration of water from soil (m/d)	5.13E-04	evapotrans	1.87 E-01	m/y
transpiration of water from plants (m/d)	5.13E-04	transpire	1.87 E-01	m/y
Total surface water runoff (m/d)	4.78E-04	outflow	1.75 E-01	m/y
bndry lyr thickness in air above wtr (m)	5.50E-04	del_aw		
bndry lyr thickness in wtr below air (m)	1.90E-04	del_wa		
diffusion length in surface soil (m)	1.37E-02	del_g		
diffusion length in upper soil (m)	6.69E-01	del_s		
Thickness of the root-zone soil layer	1.40E+00	d_s		
wtr-side bndry lyr thickness with sed (m)	2.00E-02	del_wd		
sed-side bndry lyr thickness with wtr (m)	4.21E-04	del_dw		
Initial concentration in soil (mol/m3)	3.07E-01	Cs0		
Initial conc. in the vadose zone (mol/m3)	0.00E+00	Cv0		
Sediment resuspension rate (kg/m2-d)	1.23E+01	resuspend		
soil particle density; surface layer(kg/m3)	2.60E+03	rhos_g		
soil particle density; vadose layer(kg/m3)	2.60E+03	rhos_v		
Initial iventory in groundwater zone	0.00E+00	Nq0		
diffusion lag time in skin (h)	6.11E+01	tlag		
Skin/water partition coefficient	1.84E+04	Km		
Reaction rate constant in air (1/d)	5.85E-01	Ra		
Reaction rate constant, ground soil (1/d)	1.22E-04	Rg		
Reaction rate constant, root-zone soil (1/d)	1.22E-04	Rs		
Reaction rate constant, vadose-zone soil (1/d)	4.99E-04	Rv		
Reaction rate constant, ground water (1/d)	4.15E-04	Rq		
Reaction rate constant, surface water (1/d)	8.30E-04	Rw		
Reaction rate constant, sediment (1/d)	9.27E-08	Rd		
Reaction rate constant in leaf surface (1/d)	1.22E-04	Rls		
Continuous source term to air (mol/d)	0.00E+00	Sa		
Root lipid in root-zone soil(m3(organic)/m3(soil))	3.98E-03	RootLipid		

Leaf wet mass per area of soil (kg/m2)	1.15E+00	bm_leaf		
Wood and stem wet mass per area of soil(kg/m2)	2.69E+01	bm_stem		
Root wet mass per area of root-zone soil(kg/m2)	1.11E+01	bm_root		
Interception fraction for dry deposition on leaf	7.29E-01	IF_d		
Volume of the stem (m3)	1.52E+03	Vstm		
stomatal conductance (m/d)	1.43E+01	mtc_s		
cuticular conductance (m/d)	2.06E+00	mtc_c		
air side conductance over leaf (m/d)	5.10E+01	mtc_a		
cuticle water permeance (m/d)	1.04E-02	mtc_l		
conductance air/cuticle (m/d)	1.98E+00	mtc_ct		
conductance air/stomata (m/d)	1.12E+01	mtc_st		
root-soil / stem transfer factor	1.08E-08	x_rs		
stem / leaf transfer factor	3.57E-06	x_sl		
leaf / stem transfer factor	7.60E-05	p_ls		
stem / root-soil transfer factor	1.78E-07	p_sr		

Warnings

0 Ground soil depth greater than 2 cm
0 Root-zone soil too shallow for accuracy of diffusion model (must be at least 1.4*del_s)
0 Starting time cannot be 0 and should be greater than 365 day
0 Recharge velocity is negative
0 Recharge velocity is too large accuracy of model
0 Concentration in root-zone soil-water <0 or exceeds solubility when there are non-zero sources
0 Concentration in vadose-zone soil-water <0 or exceeds solubility when there are non-zero sources
0 Concentration in groundwater exceeds solubility or < 0
0 Concentration in surface water exceeds solubility
0 Concentration in sediment-zone water exceeds solubility
0 Exposure time indoors and outdoors at home or at work exceeds 24 h
1 Risk from breast milk exposure is large compared to other ingestion pathways
1 Hazard from breast milk exposure is large compared to other ingestion pathways
0 Fraction of water from groundwater plus fraction from surface >1
2 total

Fugacity (Pa)

Air	fa	6.48E-06
Cuticle	fc	3.00E-06
Leaf	fl	5.60E-06
Ground	fg	1.57E-03
Root	fs	2.59E-03
Vadose	fv	4.91E-07
Water	fw	1.19E-03
Sediment	fd	1.02E-03
Groundwater	fq	1.64E-06

Compartment Volumes (m^3)

Va	7.6 E+05	Air compartment
Vc	6.88E-01	Cuticle compartment
Vl	6.52E+01	Leaf compartment
Vg	2.3 E+02	Ground-soil compartment
Vs	6.6 E+04	Root-zone compartment
Vv	9.4 E+04	Vadose compartment volume
Vw	2.3 E+01	Water compartment
Vd	2.3 E-01	Sediment compartment
Vq	1.4 E+06	aquifer compartment

rhob_c 0.01141113 Volume fraction of atmospheric particles on cuticle (m3/m3)

phi 3.59E-03

Fugacity Capacities (mol/m^3 per Pa)

Zap	6.34E+04	fugacity capacity of air particles in mol/m3[s]-Pa
Zgp	1.37E+02	fugacity capacity of ground soil compartment particles in mol/m3[s]-Pa
Zsp	1.37E+02	fugacity capacity of root zone compartment particles in mol/m3[s]-Pa
Zvp	3.37E+01	fugacity capacity of vadose zone compartment particles in mol/m3[s]-Pa
Zwp	2.21E+02	fugacity capacity of suspended sediment in surface water in mol/m3[s]-Pa
Zdp	2.21E+02	fugacity capacity of bottom sediment particles in mol/m3[s]-Pa
Zqp	3.37E+01	fugacity capacity of aquifer solids in mol/m3-Pa
Zleaftotal	2.04E+02	fugacity capacity of the total leaf compartment in mol/Pa/m3
Za	4.18E-04	fugacity capacity of air compartment in mol/m3-Pa
Zc	1.76E+04	fugacity capacity of leaf surface compartment in mol/Pa/m3
Zl	2.01E+01	fugacity capacity of internal leaf compartment in mol/Pa/m3
Zg	7.44E+01	fugacity capacity of ground soil compartment in mol/m3-Pa
Zs	7.42E+01	fugacity capacity of root-soil compartment in mol/m3-Pa
Zv	1.90E+01	fugacity capacity of vadose-zone compartment in mol/m3-Pa
Zw	1.50E-01	fugacity capacity of water compartment in mol/m3-Pa
Zd	1.77E+02	fugacity capacity of sediment compartment in mol/m3-Pa
Zq	2.36E+01	fugacity capacity of aquifer compartment in mol/m3-Pa

Diffusion coefficients in m2/d				Boundary-layer thickness (del)	Fugacity mass-transfer coefficients mol/Pa-m2-d Y		Overall intercompartment mass transfer rate constants (1/day) T			
Compartment Phase		Compartment			one-sided	both-sides	Diffusion	Advection	Total	Compartment Interface
Dair	1.02E-01	Da	1.02E-01	5.50E-04	7.69E-02	1.57E-02	2.31E-04	1.36E-05	2.44E-04	air-water, T_aw
Dwater	4.55E-05	Dw	2.49E-05	1.90E-04	1.97E-02		2.09 E-02		2.09E-02	water-air, T_wa
Dair_g	5.88E-03	Dg	1.20E-04	5.00E-03	8.49E-03	8.38E-03	1.23E+00	5.32E-02	1.29E+00	air-ground, T_ag
Dwater_g	8.88E-07			1.37E-02	6.54E-01		2.25E-02	4.36E-06	2.25E-02	ground-air, T_ga
Dair_s	4.96E-03	Ds	1.20E-04	1.37E-02	6.54E-01	1.31E-02	3.51E-02	1.23E-05	3.51E-02	ground-soil, T_gs
Dwater_s	1.12E-06			6.69E-01	1.33E-02		1.26E-04	0.00E+00	1.26E-04	soil-ground, T_sg
Dair_v	4.30E-03	Dv	1.20E-04	6.69E-01	1.33E-02	2.71E-03		4.40E-08	4.40E-08	soil-vadose, T_sv
Dwater_v	1.15E-06			6.69E-01	3.41E-03					vadose-soil, T_vs
Dwater_d	5.32E-06	Dd	2.47E-09	2.00E-02	3.41E-04	2.56E-04	3.43E-04	1.19E+00	1.19E+00	water-sediment, T_wd
				4.21E-04	1.04E-03		2.91E-05	1.18E-01	1.18E-01	sediment-water, T_dw
							8.80E-01	8.32E-02	9.63E-01	air-cuticle, T_ac
							2.31E-02	2.48E-03	2.55E-02	cuticle-air, T_ca
							2.48E+00		2.48E+00	air - leaf T_al
							6.09E-01		6.09E-01	leaf-air, T_la
							2.40E-02		2.40E-02	cuticle-leaf, T_cl
							2.22E-01		2.22E-01	leaf-cuticle, T_lc
								4.98E-02	4.98E-02	cuticle-ground T_cg
								2.74E-03	2.74E-03	leaf-ground T_lg
								1.78E-07	1.78E-07	leaf-soil, T_ls
								1.08E-08	1.08E-08	soil-leaf, T_sl
									0.00E+00	ground-cuticle, T_gc
								1.20E-07	1.20E-07	vadose-aquifer, T_vq
								2.50E-05	2.50E-05	sediment-out, T_do
								2.98E+02	2.98E+02	air-out, T_ao
								1.49E-04	1.49E-04	ground-water, T_gw
								9.57E-01	9.57E-01	water-out, T_wo

aaa1	2.50E-04	C0_1	2.01E+04
aaa2	1.52E-04	C0_2	0.00E+00
aaa3	7.50E-05	S_1	0.00E+00
aaa4	3.06E-11	S_2	0.00E+00
aaa5	2.18E-03	AA	3.24E-04
bbb1	0.00E+00	BB	0.00E+00
bbb2	0.00E+00	CC	4.40E-08
bbb3	0.00E+00	DDD	5.00E-04
ccc1	7.80E-01	Gam1	-3.24E-04
ccc2	2.71E+00	Gam2	-5.00E-04
ccc3	3.03E+02	Gm1mGm2	1.76E-04
ccc4	6.66E-01	Gam1p	5.00E-04
ccc5	1.77E+00	Gam2p	3.24E-04
ccc6	1.14E-01	Gm1mGm2p	1.76E-04

aaa6	2.01E+04
aaa7	-2.69E+00
aaa8	2.69E+00
bbb4	0.00E+00
bbb5	0
Lam1	0.000171

Source terms (g/d)

air	0.0 E+00	ground	0.0 E+00	water	0.0 E+00

Compartment Name		Loss-rate constant (1/day) L	Total Inventory (moles) N	Concen-tration (mol/m3) C	Mass distri-bution %	Gains g/d	Losses g/d	Residence Time (days)
air	a	3.03E+02	2.06E-03	2.71E-09	0.00%	2.56E+02	2.56E+02	3.30E-03
leaf	l	8.34E-01	7.34E-03	1.13E-04	0.00%	2.51E+00	2.51E+00	1.20E+00
cuticle	c	9.94E-02	3.63E-02	5.29E-02	0.00%	1.48E+00	1.48 E+00	1.01E+01
ground-soil	g	5.79E-02	2.74E+01	1.17E-01	0.22%	6.51E+02	6.51E+02	1.73E+01
root-soil	s	2.47E-04	1.26E+04	1.92E-01	99.35%	3.95E+02	1.28E+03	4.04E+03
vadose-zone	v	5.00E-04	8.73E-01	9.32E-06	0.01%	2.27E-01	1.79E-01	2.00E+03
surface water	w	2.17E+00	4.18E-03	1.79E-04	0.00%	3.72E+00	3.72E+00	4.61E-01
sediment	d	1.18E-01	4.21E-02	1.80E-01	0.00%	2.04E+00	2.04E+00	8.46E+00
aquifer	q	4.17E-04	5.46E+01	3.89E-05	0.43%	4.31E-05	9.32E+00	2.40E+03

Mass Flows (g/d)

air-ground	1.09E+00	Tag*Na*MW
air-water	2.06E-04	Taw*Na*MW
air-out	2.51E+02	Tao*Na*MW
air-leaves	2.09E+00	Tal*Na*MW
air-leaf surfaces	8.13E-01	Tac*Na*MW
air-transform	4.93E-01	Ra*Na*MW
leaves-air	1.83E+00	Tla*Nl*MW
leaves-leaf surfaces	6.68E-01	Tlc*Nl*MW
leaves-ground	8.24E-03	Tlg*Nl*MW
leaves-soil	5.35E-07	Tls*Nl*MW
leaf-surface - air	3.80E-01	Tca*Nc*MW
leaf-surfaces - leaves	3.57E-01	Tcl*Nc*MW
leaf-surfaces - ground	7.41E-01	Tcg*Nc*MW
leaf surfaces-trnsfrm	1.81E-03	Rls*Nc*MW
ground-air	2.53E+02	Tga*Ng*MW
ground-leaf surface	0.00E+00	T_gc*Ng*MW
ground-soil	3.95E+02	Tgs*Ng*MW

ground-water	1.68E+00	Tgw*Ng*MW
ground-trnsfrm	1.37E+00	Rg*Ng*MW
soil-ground	6.50E+02	Tsg*Ns*MW
soil-leaves	5.57E-02	Tsl*Ns*MW
soil-vadose	2.27E-01	Tsv*Ns*MW
soil-trnsfrm	6.28E+02	Rs*Ns*MW
vadose-aquifer	4.31E-05	Tvq*Nv*MW
vadose-trnsfrm	1.79E-01	Rv*Nv*MW
aquifer-removal	9.32E+00	Lq*Nq*MW
water-air	3.59E-02	Twa*Nw*MW
water-sediment	2.04E+00	Twd*Nw*MW
water-out	1.64E+00	Two*Nw*MW
water-trnsfrm	1.42E-03	Rw*Nw*MW
sediment-water	2.04E+00	Tdw*Nd*MW
sedmnt-trnsfrm	1.60E-06	Rd*Nd*MW
sediment-out	4.31E-04	Tdo*Nd*MW

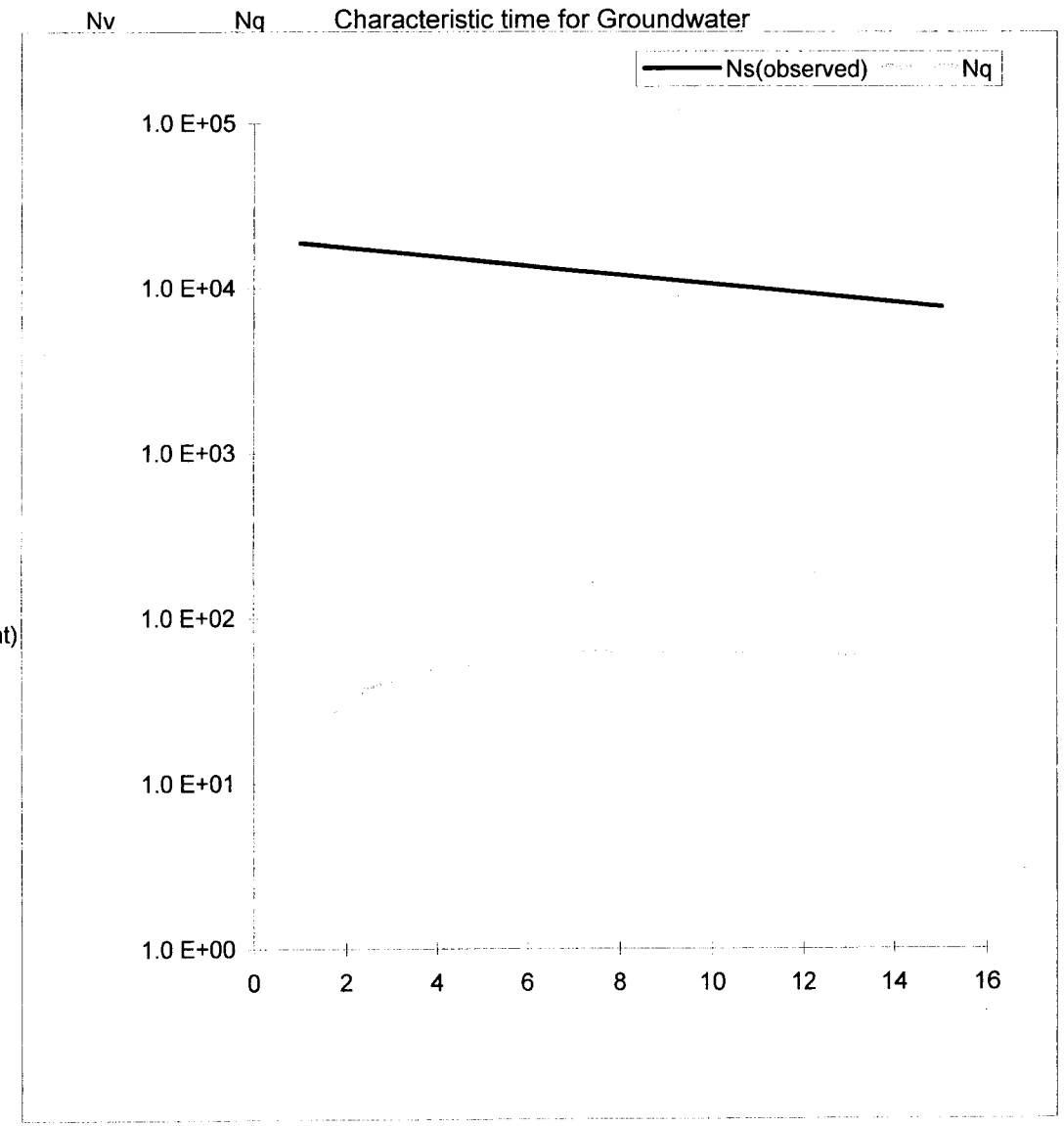
Time-dependent Compartment Inventories

Time (y)	Time (d)	Ns(observed)	Nq
1	365	1.9 E+04	1.8 E+01
2.4	876	1.7 E+04	3.6 E+01
3.8	1387	1.6 E+04	4.9 E+01
5.2	1898	1.5 E+04	5.7 E+01
6.6	2409	1.3 E+04	6.1 E+01
8	2920	1.2 E+04	6.3 E+01
9.4	3431	1.1 E+04	6.3 E+01
10.8	3942	1.0 E+04	6.2 E+01
12.2	4453	9.4 E+03	6.0 E+01
13.6	4964	8.6 E+03	5.8 E+01
15	5475	7.9 E+03	5.5 E+01

		Ns(0)[total]
		2.0 E+04
	const_sat	Ns(sat)
	-13.65446717	8.0E+04
t*	Ns(@Ns>=Nsat)	Ns(total)	Nv(@Ns=sat)
0	1.51 E+04	1.9E+04	1.2E+00
0	1.19 E+04	1.7E+04	1.8E+00
0	1.03 E+04	1.6E+04	2.0E+00
0	8.89 E+03	1.5E+04	2.2E+00
0	7.56 E+03	1.3E+04	2.3E+00
0	6.35 E+03	1.2E+04	2.3E+00
0	5.23 E+03	1.1E+04	2.4E+00
0	4.21 E+03	1.0E+04	2.4E+00
0	3.28 E+03	9.4E+03	2.4E+00
0	2.42 E+03	8.6E+03	2.3E+00
0	1.63 E+03	7.9E+03	2.3E+00

Plot

Nv Nq



CalTOX™ 4.0 beta: Eight-Compartment Multimedia Exposure Model - Contaminated Soil

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Chemical ==>	DDD
Landscape ==>	Calif. Residential Site (CA Res.)
Exposure Factors Set=>	(Residential) Exposure Factors

Toxicity Data ==>	potencies 1/(mg/kg-d)	ADIs (mg/kg-d)
Inhalation	2.4 E-01	0
Ingestion	2.4 E-01	0
Dermal	2.4 E-01	0
Total dose		0

	Risk	Hazard quotie
Target Risk/Hazard =	1.0 E-06	1.00

	current value	should be >
Root-soil thickness ===>	**2213**	**OK**
Alter root soil thickness to?	n/a	
Distance off-site for air exposure=	0.0 E+00	meters
Time after initial concentrations when exposure begins =	3.7 E+02	days

Measured Concentrations (at time = 0)

Root-zone soil	78	ppm (mg/kg)
Vadose-zone soil	0	ppm (mg/kg)
Ground water	0	ppm (mg/L)

Continuous inputs

Methane flux m/d		0
Source term to air (mol/d)	0.0 E+00	Sa
Source term to ground-surface soil (mol/d)	0.0 E+00	Sg
Source term to root-zone soil (mol/d)	0.0 E+00	Ss
Source term to surface water(mol/d)	0.0 E+00	Sw

Aquifer characteristics

	Distance to first well (m)	0.0 E+00	d_well
0.001341446	Darcy veleocity (m/d)	1.0 E-01	v_darc
	Water dispersion coeff. (m2/d)	5.0 E-02	D_T

Summary of Results:

See Warnings Please

Un-mitigated risk and/or hazard ratio

Risk	4.9 E-5		
Hazard ratio	0.0 E+0		

Target Soil Concentrations (in ppm)

Based on cancer risk:

Root soil	1.6 E+0		
Vadose soil	0.0 E+0	not avlbl.	
		Root Soil	1.6 E+0
		Vadose soil	n/a

Based on hazard:

Root soil	0.0 E+0	not avlbl.
Vadose soil	0.0 E+0	not avlbl.

Concentration limits without NAPL

Root soil	6.5 E+02	mg/kg solid
Vadose soil	1.6 E+02	mg/kg solid
Ground water	9.3 E-02	mg/L water

Time avrg. Conc. in on-site environmental media

Air	6.4 E-06	mg/m3
Total Leaf	2.8 E-02	mg/kg(total)
Grnd-surface soil	4.4 E+01	mg/kg(total)
Root-zone soil	4.4 E+01	mg/kg(total)
Vadose-zone soil	3.0 E-04	mg/kg(total)
Ground water	3.8 E-06	mg/L(water)
Surface water	2.8 E-02	mg/L
Sediment	2.5 E+01	mg/kg

Chemical Properties

Compound	DDD		Value used	Mean value	Coeff. Var.	Adjustment	Notes
			0.00297	0.003		1	-4.8 E+03
	Molecular weight (g/mol)	MW	3.20 E+02	3.20E+02	0.01	1	
	Octanol-water partition coefficient	Kow	1.35 E+06	1.35E+06	0.21	1	
	Melting point (K)	Tm	3.82 E+02	3.82E+02	0.03	1	
	Vapor Pressure in (Pa)	VP	1.30 E-04	1.30E-04	0.52	1	
	Solubility in mol/m3	S	2.89 E-04	2.89E-04	0.54	1	Kaw
	Henry's law constant (Pa-m^3/mol)	H -	4.49 E-01	-9.90E+01	0.46	1	0.0001868
	Diffusion coefficient in pure air (m2/d)	Dair	1.35 E-01	1.35E-01	0.08	1	1.56 E-06
	Diffusion coefficient; pure water (m2/d)	Dwater	5.79 E-05	5.79E-05	0.25	1	6.71 E-10
	Organic carbon partition coefficient Koc	**Koc -**	6.48 E+05	-9.90E+01	1.00	1	m^2/s
	Ocatanol/air partition coefficient	**Koa -**	7.22 E+09	-9.90E+01	0.10	1	
	Partition coefficient in ground/root soil layer	**Kd_s -**	8.06 E+03	-9.90E+01	0.10	1	
	Partition coefficient in vadose-zone soil layer	**Kd_v -**	1.98 E+03	-9.90E+01	0.10	1	
	Partition coefficient in aquifer layer	**Kd_q -**	1.98 E+03	-9.90E+01	0.10	1	A parameter with a "-" symbol after it, indicates a parameter that can be calculated by a default algoritm when **the value of mean for this parameter is <0.** Otherwise the liste value is used.
	Partition coeffic. in surface wtr sediments	**Kd_d -**	1.30 E+04	-9.90E+01	0.10	1	
	NOT USED	Kps -	2.20 E-03	-9.90E+01	4.00	1	
	Leaves/phlm wtr prtn cff.(wet kg/m3 per wet kg/m3)	**Kl_phl -**	2.73 E+02	-9.90E+01	0.10	1	
	Stem/xylem-fluid prtn cff (m^3[xylem]/m^3[stem])	**Ks_x -**	4.92 E+03	-9.90E+01	0.10	1	
	Transpiration stream cncntrtn fctr (m^3[wtr]/m^3[ts])	**TSCF -**	2.41 E-02	-9.90E+01	0.10	1	
	Biotrnsfr fctr, plant/air (m3[a]/kg[pFM])	**Kpa -**	1.63 E+04	-9.90E+01	14.00	1	
	Biotransfer factor; cattle-diet/milk (d/kg[milk])	**Bk -**	1.07 E-02	-9.90E+01	11.00	1	
	Biotransfer factor; cattle-diet/meat (d/L)	**Bt -**	3.39 E-02	-9.90E+01	13.00	1	
	Biotransfer fctr; hen-diet/eggs (d/kg[egg contents])	**Be -**	2.14 E-01	-9.90E+01	14.00	1	
	Biotrnsfr fctr; brst mlk/mthr intake (d/kg)	**Bbmk -**	2.70 E-01	-9.90E+01	10.00	1	
	Bioconcentration factor; fish/water	**BCF -**	6.48 E+04	-9.90E+01	0.60	1	
	Particle scavenging ratio of rain drops	**Psr_rain -**	5.00 E+04	5.00E+04	2.40	1	
	Skin permeability coefficient; cm/h	**Kp_w -**	4.77 E-01	-9.90E+01	2.40	1	
	Skin-water/soil partition coefficient (L/kg)	**Km -**	1.00 E+00	-9.90E+01	1.30	1	
	Fraction dermal uptake from soil	**dfct_sl-**	2.01 E-01	2.01E-01	1.00	1	

Chemical Properties (continued)

Reaction half-life in air (d)	Thalf_a	4.06 E+00	4.06E+00	1.00	1	
Reaction half-life in surface soil (d)	Thalf_g	3.21 E+03	3.21E+03	1.10	1	
Reaction half-life in root-zone soil (d)	Thalf_s	3.21 E+03	3.21E+03	1.20	1	
Reaction half-life in vadose-zone soil (d)	Thalf_v	5.73 E+03	5.73E+03	1.00	1	
Reaction half-life in ground water (d)	Thalf_q	5.73 E+03	5.73E+03	1.30	1	
Reaction half-life in surface water (d)	Thalf_w	3.21 E+03	3.21E+03	1.20	1	
Reaction half-life in sediments (d)	Thalf_d	2.88 E+03	2.88E+03	1.40	1	
Reaction half-life in the leaf surface (d)	Thalf_ls	3.21 E+03	-9.90E+01	1.00	1	

Landscape properties

site name	Calif. Residential Site (CA Res.)		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Contaminated area in m2	Area	4.68 E+04	4.68E+04	0.10	1	(m/y)
	Annual average precipitation (m/d)	rain	1.12 E-03	1.12E-03	0.56	1	4.07 E-01
	Not currently used	rain_days	0.00 E+00	0.00E+00	0.00	1	
	Flux; surface water into landscape (m/d)	inflow	0.00 E+00	0.00E+00	0.10	1	0.00 E+00
	Land surface runoff (m/d)	runoff	5.47 E-04	6.10E-04	1.00	1	2.00 E-01
	Atmospheric dust load (kg/m3)	rhob_a	6.15 E-08	6.15E-08	0.20	1	
	Dry deposition velocity, air particles (m/d)	v_d	5.00 E+02	5.00E+02	0.30	1	
	Aerosol organic fraction	foc_ap	2.00 E-01	2.00E-01	1.00	1	
	Volume fraction of water in leaf	beta_leaf	5.00 E-01	5.00E-01	0.05	1	
	Volume fraction of air in leaf	alpha_leaf	1.80 E-01	1.80E-01	0.20	1	
	Volume fraction of lipid in leaf	lipid_leaf	2.00 E-03	2.00E-03	0.20	1	
	Volume fraction of water in stem	beta_stem	4.00 E-01	4.00E-01	0.20	1	
	Volume fraction of water in root	beta_root	6.00 E-01	6.00E-01	0.20	1	
	Primary produciton dry vegetation(kg/m2/y)	veg_prod	9.00 E-01	9.00E-01	0.20	1	
	One-sided Leaf Area Index	**LAI -**	3.63 E+00	-9.90E+01	0.40	1	
	Wet interception fraction	IF_w	1.00 E-01	1.00E-01	0.10	1	
	Avg thickness of leaf surface(cuticle)(m)	d_cuticle	2.00 E-06	2.00E-06	0.20	1	
	Stem wet density (kg/m3)	rho_stm	8.30 E+02	8.30E+02	0.20	1	
	Leaf wet density (kg/m3)	rho_leaf	8.20 E+02	8.20E+02	0.30	1	
	Root wet density (kg/m3)	rho_root	8.00 E+02	8.00E+02	0.05	1	
	Veg attenuation fctr, dry interception(m2/kg)	atf_leaf	2.90 E+00	2.90E+00	0.01	1	

Landscape properties (continued)

site name	Calif. Residential Site (CA Res.)	Value used	Mean value	Coeff. Var.	Adjustment	Notes
Stomata area frctn(area stomata/area leaf)	na_st	7.00 E-03	7.00E-03	0.20	1	
Effective pore depth	del_st	2.50 E-05	2.50E-05	0.20	1	
Boundary layer thickness over leafs	del_a	2.00 E-03	2.00E-03	1.00	1	
Leaf surface erosion half-life (d)	Thalf_le	1.40 E+01	1.40E+01	1.00	1	
Ground-water recharge (m/d)	recharge	5.58 E-05	5.58E-05	1.00	1	2.04 E-02
Evaporation of water from surface wtr (m/d)	evaporate	6.85 E-05	6.85E-05	1.00	1	
Thickness of the ground soil layer (m)	d_g	5.00 E-03	5.00E-03	1.00	1	
Soil particle density (kg/m3)	rhos_s	2.60 E+03	2.60E+03	0.05	1	
Water content in surface soil (vol fraction)	beta_g	1.92 E-01	1.92E-01	0.33	1	
Air content in the surface soil (vol frctn)	alpha_g	2.66 E-01	2.66E-01	0.29	1	cm/y
Erosion of surface soil (kg/m2-d)	erosion_g	2.03 E-04	2.03E-04	1.00	1	0.004636
Bioturbation (m^2/d)	D_bio	1.20 E-04	1.20E-04	1.00	1	
Thickness of the root-zone soil (m)	d_s	1.40 E+00	1.40E+00	0.47	1	
Water content of root-zone soil (vol. frctn.)	beta_s	2.06 E-01	2.06E-01	0.34	1	
Air content of root-zone soil (vol. frctn.)	alpha_s	2.53 E-01	2.53E-01	0.31	1	
Thickness of the vadose-zone soil (m)	d_v	2.00 E+00	2.00E+00	0.37	1	
Water content; vadose-zone soil (vol. frctn.)	beta_v	2.02 E-01	2.02E-01	0.32	1	
Air content of vadose-zone soil (vol. frctn.)	alpha_v	2.36 E-01	2.36E-01	0.30	1	
Thickness of the aquifer layer (m)	d_q	3.00 E+01	3.00E+01	0.30	1	
Solid material density in aquifer (kg/m3)	rhos_q	2.60 E+03	2.60E+03	0.05	1	
Porosity of the aquifer zone	beta_q	3.00 E-01	3.00E-01	0.20	1	
Fraction of land area in surface water	f_arw	1.00 E-04	1.00E-04	0.20	1	
Average depth of surface waters (m)	d_w	5.00 E+00	5.00E+00	1.00	1	
Suspended sedmnt in surface wtr (kg/m3)	rhob_w	8.00 E-01	8.00E-01	1.00	1	
Suspended sdmnt deposition (kg/m2/d)	deposit	1.05 E+01	1.05E+01	0.30	1	(m/s)
Thickness of the sediment layer (m)	d_d	5.00 E-02	5.00E-02	1.00	1	
Solid material density in sediment (kg/m3)	rhos_d	2.60 E+03	2.60E+03	0.05	1	
Porosity of the sediment zone	beta_d	2.00 E-01	2.00E-01	0.20	1	m/y
Sediment burial rate (m/d)	bury_d	1.00 E-06	1.00E-06	5.00	1	3.65 E-04
Ambient environmental temperature (K)	Temp	2.89 E+02	2.89E+02	0.06	1	(m/s)
Surface water current in m/d	current_w	0.00 E+00	0.00E+00	1.00	1	0.00 E+00

Landscape properties (continued)

site name	Calif. Residential Site (CA Res.)		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Organic carbon fraction in upper soil zone	foc_s	1.24 E-02	8.47E-03	1.98	1	
	Organic carbon fraction in vadose zone	foc_v	3.06 E-03	3.06E-03	0.96	1	
	Organic carbon fraction in aquifer zone	foc_q	3.06 E-03	3.06E-03	0.96	1	
	Organic carbon fraction in sediments	foc_d	2.00 E-02	2.00E-02	1.00	1	
	Bndry lyr thickness in air above soil (m)	del_ag	5.00 E-03	5.00E-03	0.20	1	(m/s)
	Yearly average wind speed (m/d)	v_w	2.80 E+05	2.80E+05	0.17	1	3.24 E+00

Human Exposure Factors

scenario	(Residential) Exposure Factors		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Body weight (kg)	BW	6.20 E+01	6.20E+01	0.20	1	
	Surface area (m2/kg)	SAb	2.60 E-02	2.60E-02	0.07	1	
	Active breathing rate (m3/kg-h)	BRa	1.90 E-02	1.90E-02	0.30	1	
	Resting breathing rate (m3/kg-h)	BRr	6.40 E-03	6.40E-03	0.20	1	
	Fluid Intake (L/kg-d)	Ifl	2.20 E-02	2.20E-02	0.20	1	
	Fruit and vegetable intake (kg/kg-d)	Ifv	4.90 E-03	4.90E-03	0.20	1	
	Grain intake (kg/kg-d)	Ig	3.70 E-03	3.70E-03	0.20	1	
	Milk intake (kg/kg-d)	Imk	6.50 E-03	6.50E-03	0.20	1	
	Meat intake (kg/kg-d)	Imt	3.00 E-03	3.00E-03	0.20	1	
	Egg intake (kg/kg-d)	Iegg	4.60 E-04	4.60E-04	0.30	1	
	Fish intake (kg/kg-d)	Ifsh	2.90 E-04	2.90E-04	0.40	1	
	Soil ingestion (kg/d)	Isl	3.50 E-07	3.50E-07	3.00	1	
	Breast milk ingestion by infants (kg/kg-d)	Ibm	1.10 E-01	1.10E-01	0.20	1	
	Inhalation by cattle (m3/d)	Inc	1.22 E+02	1.22E+02	0.30	1	
	Inhalation by hens (m3/d)	Inh	2.20 E+00	2.20E+00	0.30	1	
	Ingestion of pasture, dairy cattle (kg[FM]/d)	Ivdc	8.50 E+01	8.50E+01	0.20	1	
	Ingestion of pasture, beef cattle (kg[FM]/d)	Ivbc	6.00 E+01	6.00E+01	0.40	1	
	Ingestion of pasture by hens (kg[FM]/d)	Ivh	1.20 E-01	1.20E-01	0.04	1	
	Ingestion of water by dairy cattle (L/d)	Iwdc	3.50 E+01	3.50E+01	0.20	1	
	Ingestion of water by beef cattle (L/d)	Iwbc	3.50 E+01	3.50E+01	0.20	1	
	Ingestion of water by hens (L/d)	Iwh	8.40 E-02	8.40E-02	0.10	1	
	Ingestion of soil by cattle (kg/d)	Isc	4.00 E-01	4.00E-01	0.70	1	
	Ingestion of soil by hens (kg/d)	Ish	1.30 E-05	1.30E-05	1.00	1	

Human Exposure Factors (continued)

scenario	(Residential) Exposure Factors		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Fraction of water needs from ground water	fw_gw	8.00 E-01	8.00E-01	0.10	1	
	Fraction of water needs from surface water	fw_sw	2.00 E-01	2.00E-01	0.10	1	
	Water irrigation rate applied to agr.soil (l/m2-d)	R_irr	2.59 E+00	2.59E+00	1.00	1	
	Frctn frts & vgtbls that are exposed produce	fabv_grd_v	4.70 E-01	4.70E-01	0.10	1	
	Fraction of fruits and vegetables local	flocal_v	2.40 E-01	2.40E-01	0.70	1	
	Fraction of grains local	flocal_g	1.20 E-01	1.20E-01	0.70	1	
	Fraction of milk local	flocal_mk	4.00 E-01	4.00E-01	0.70	1	
	Fraction of meat local	flocal_mt	4.40 E-01	4.40E-01	0.50	1	
	Fraction of eggs local	flocal_egg	4.00 E-01	4.00E-01	0.70	1	
	Fraction of fish local	flocal_fsh	7.00 E-01	7.00E-01	0.30	1	
	Plant-air prttn fctr, particles, m3/kg[FM]	Kpa_part	3.30 E+03	3.30E+03	1.80	1	
	Rainsplash (mg/kg[plnt FM])/(mg/kg[dry soil])	rainsplash	3.40 E-03	3.40E-03	1.00	1	
	Water use in the shower (L/min)	Wshower	8.00 E+00	8.00E+00	0.40	1	
	Water use in the House (L/h)	Whouse	4.00 E+01	4.00E+01	0.40	1	
	Room ventilation rate, bathroom (m3/min)	VRbath	1.00 E+00	1.00E+00	0.40	1	
	Room ventilation rate, house (m3/h)	VRhouse	7.50 E+02	7.50E+02	0.30	1	
	Exposure time, in shower or bath (h/day)	ETsb	2.70 E-01	2.70E-01	0.60	1	
	Exposure time, active indoors (h/day)	ETai	8.00 E+00	8.00E+00	0.14	1	
	Exposure time, outdoors at home (h/day)	ETao	3.00 E-01	3.00E-01	0.14	1	
	Exposure time, indoors resting (h/day)	ETri	8.00 E+00	8.00E+00	0.04	1	
	Indoor dust load (kg/m^3)	dust_in	3.00 E-08	3.00E-08	0.40	1	
	Exposure frequency to soil on skin, (d/y)	EFsl	1.37 E+02	1.37E+02	0.60	1	
	Soil adherence to skin (mg/cm^2)	Slsk	5.00 E-01	5.00E-01	0.40	1	
	Ratio of indoor gas conc. to soil gas conc.	alpha_inair	1.00 E-04	1.00E-04	2.00	1	
	Exposure time swimming (h/d)	ETsw	5.00 E-01	5.00E-01	0.50	1	
	Exposure frequency, swimming (d/y)	EFsw	1.50 E+01	1.50E+01	4.00	1	
	Water ingestion while swimming (L/kg-h)	Isww	7.00 E-04	7.00E-04	1.00	1	
	Exposure duration (years)	ED	1.40 E+01	1.40E+01	1.15	1	
	Averaging time (days)	AT	2.56 E+04	2.56E+04	0.10	1	

Constants		
Gas Constant (Pa-m^3/mol-K)	8.31E+00	Rgas

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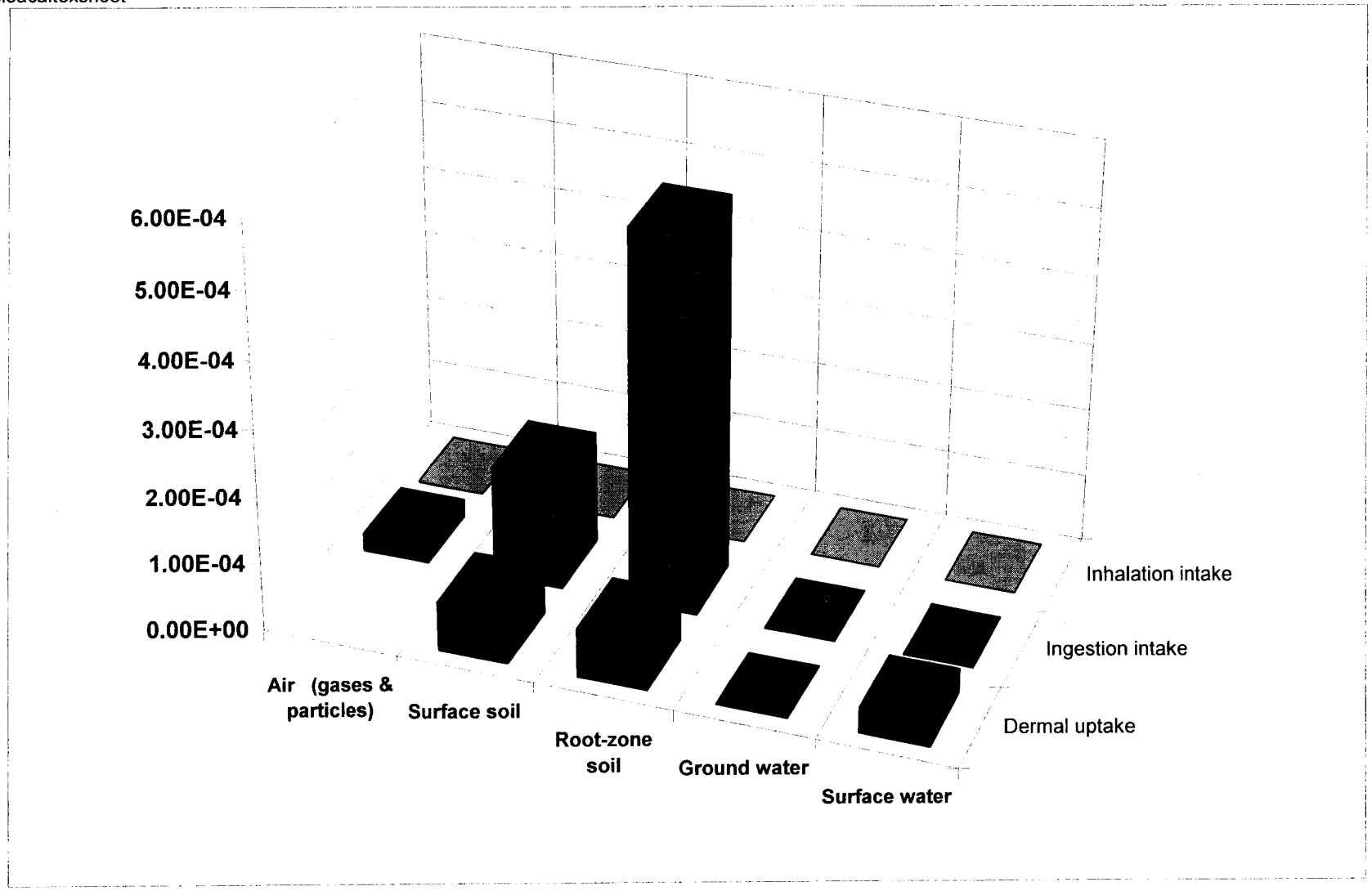

Exposure Pathway-Include-and-Exclude Toggles

All inhalation exposures indoors active	1	Contaminant transfer, air to plants surfaces	1
All inhalation exposures indoors resting	1	Cntmnnt. transfer, grnd. soil to plant surfaces	1
Inhalation exposure in shower/bath	1	Contamnnt. transfer, root soil to plant tissues	1
Inhalation exposures outdoors active	1	On-site grazing of animals	0
Inhalation of air particles indoors	1		
Transfer of soil dust to indoor air	1	Ingestion of home-grown exposed produce	1
Transfer of soil vapors to indoor air	1	Ingestion of home-grown unexposed produce	1
On-site inhalation by animals	1	Ingestion of home-grown meat	0
		Ingestion of home-grown milk	0
Use of ground water as tap water	0	Ingestion of home-grown eggs	0
Use of surface water as tap water	0	Ingestion of locally caught fish	0
Ingestion of tap water	1	Direct soil ingestion	1
Use of ground water for irrigation	0	Soil contact exposure at home or at work	1
Use of surface water for irrigation	0	Dermal exposure during shower/bath	1
		Dermal & ingstn exposures while swimming	1
Use of ground water for feeding animals	0		
Use of surface water for feeding animals	0	Breast-milk ingestion by infants	1

MEDIA AND CORRESPONDING POTENTIAL DOSES IN mg/kg-d (averaged over the exposure duration)

PATHWAYS	Air (gases & particles)	Surface soil	Root-zone soil	Ground water	Surface water	Totals	%
INHALATION	1.33E-06	3.02E-07	2.35E-08	0.00E+00	0.00E+00	**1.66E-06**	0.18
INGESTION:							
Water				0.00E+00	4.03E-07	4.03E-07	0.04
Exposed produce	2.69E-05	1.68E-04	1.10E-06	0.00E+00	0.00E+00	1.96E-04	20.93
Unexposed produce			5.53E-04	0.00E+00	0.00E+00	5.53E-04	59.09
Meat	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Milk	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Eggs	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Fish					0.00E+00	0.00E+00	0.00
Soil		1.40E-07	1.41E-07			2.81E-07	0.03
Total ingestion	2.69 E-05	1.68 E-04	5.54 E-04	0.00 E+00	4.03 E-07	**7.49 E-04**	80.10
DERMAL UPTAKE		7.30E-05	7.37E-05	0.00E+00	3.77E-05	**1.84E-04**	19.72
Dose SUM	**2.82E-05**	**2.41E-04**	**6.28E-04**	**0.00E+00**	**3.81E-05**	**9.35E-04**	100.0

	Air (gases & particles)	Surface soil	Root-zone soil	Ground water	Surface water	total
Breast milk concentration	4.98 E-04	4.26 E-03	1.11 E-02	0.00 E+00	6.73 E-04	1.65 E-02
Infant dose	5.48 E-05	4.68 E-04	1.22 E-03	0.00 E+00	7.41 E-05	**dose_bm 1.82 E-03**

Ingestion dose used =>	8.25 E-04
Total dose used =>	1.01 E-03

ENVIRONMENTAL Media CONCENTRATIONS	Air (gases) mg/m^3 (air)	Air (dust) mg/m^3 (air)	Ground soil mg/kg(soil solids)	Root soil mg/kg(soil solids)	Ground water mg/L (pure)	Surface water mg/L (pure)
	5.74 E-06	6.28 E-07	4.95E+01	5.00 E+01	3.80 E-06	2.47 E-03

EXPOSURE MEDIA CONCENTRATIONS (averaged over the exposure duration)

EXPOSURE	Air (gases)	Air (dust)	Ground soil	Root soil	Ground water	Surface water
Indoor air (mg/m^3)	5.74 E-06	6.28 E-07	1.49 E-06	1.16 E-07	0.00 E+00	0.00 E+00
Bathroom air (mg/m^3)					0.00 E+00	0.00 E+00
Outdoor air (mg/m^3)	5.74 E-06	6.28 E-07				
Tap water (mg/L)					0.00 E+00	0.00 E+00
Exposed produce (mg/kg)	2.43 E-02	2.66 E-03	1.68 E-01	1.11 E-03	0.00 E+00	0.00 E+00
Unexposed produce (mg/kg)				8.87 E-01	0.00 E+00	0.00 E+00
Meat (mg/kg)	4.95 E-02	5.41 E-03	3.42 E-01	2.25 E-03	0.00 E+00	0.00 E+00
Milk (mg/kg)	2.22 E-02	2.42 E-03	1.53 E-01	1.01 E-03	0.00 E+00	0.00 E+00
Eggs (mg/kg)	6.27 E-04	6.85 E-05	4.32 E-03	2.84 E-05	0.00 E+00	0.00 E+00
Fish and seafood (mg/kg)						1.60 E+02
Household soil (mg/kg)			2.48 E+01	2.50 E+01		
Swimming water (mg/L)						2.80 E-02

PATHWAY CONTACT FACTORS (CR/BW*FI)

EXPOSURE Media	Units	Inhalation	Ingestion	Dermal
Indoor air (active)		1.52 E-01		
Indoor air (resting)		5.12 E-02		
Indoor air (shower/bath)		5.13 E-03		
Outdoor air (active)		5.70 E-03		
Tap water			2.20 E-02	4.02 E-02
Exposed produce			9.97 E-04	
Unexposed produce			6.23 E-04	
Meat			0.00 E+00	
Milk			0.00 E+00	
Eggs			0.00 E+00	
Fish and seafood			0.00 E+00	
Household soil			5.65 E-09	2.95 E-06
Swimming wtr			1.44 E-05	1.53 E-02

Dose ratios	inh-dose/Ns	ing-dose/Ns	drml-dose/Ns	inh-dose/Nq	ing-dose/Nq	drml-dose/Nq
	1.2 E-10	5.2 E-08	1.3 E-08	0.0 E+00	0.0 E+00	0.0 E+00

Time (y)	Total inhalation dose	Total ingestion dose	Total dermal dose	Total dose	Total dose from root soil	Total dose from ground water
1	2.7 E-06	1.2 E-03	3.0 E-04	1.5 E-03	1.5 E-03	0.0 E+00
2.4	2.5 E-06	1.1 E-03	2.7 E-04	1.4 E-03	1.4 E-03	0.0 E+00
3.8	2.2 E-06	9.9 E-04	2.4 E-04	1.2 E-03	1.2 E-03	0.0 E+00
5.2	2.0 E-06	8.9 E-04	2.2 E-04	1.1 E-03	1.1 E-03	0.0 E+00
6.6	1.8 E-06	7.9 E-04	2.0 E-04	9.9 E-04	9.9 E-04	0.0 E+00
8	1.6 E-06	7.1 E-04	1.8 E-04	8.9 E-04	8.9 E-04	0.0 E+00
9.4	1.4 E-06	6.4 E-04	1.6 E-04	7.9 E-04	7.9 E-04	0.0 E+00
10.8	1.3 E-06	5.7 E-04	1.4 E-04	7.1 E-04	7.1 E-04	0.0 E+00
12.2	1.1 E-06	5.1 E-04	1.3 E-04	6.4 E-04	6.4 E-04	0.0 E+00
13.6	1.0 E-06	4.6 E-04	1.1 E-04	5.7 E-04	5.7 E-04	0.0 E+00
15	9.0 E-07	4.1 E-04	1.0 E-04	5.1 E-04	5.1 E-04	0.0 E+00
Cumulative doses				4.778406983		
over ED by route, mg/kg	8.5 E-03	3.8 E+00	9.4 E-01	4.8 E+00	4.8 E+00	0.0 E+00
fraction	0.0018	0.8010	0.1972	1.0000	1.000	0.000
Average doses						
over ED by route, mg/kg-d	1.7 E-06	7.5 E-04	1.8 E-04	9.4 E-04	9.4 E-04	0.0 E+00
Maximum doses						
over ED by route, mg/kg-d	2.7 E-06	1.2 E-03	3.0 E-04	3.3 E-03	1.5 E-03	0.0 E+00
fraction	0.0008	0.3742	0.0921	0.4672	1.000	0.000

Max breast-milk dose	3.0 E-03	mg/kg-d	Max_ing	3.0 E-03

Off-site 1-h max X/Q (mol/m3-s)	6.2 E-03
Off-site Long-term X/Q	5.0 E-04
On-site Long-term X/Q	3.8 E-04
Off-site air dilution factor	1.0 E+00

Off-site pseudo Sa = 4.8 E-03 mol/day

bbb2 = 1.5 E-05 bbb4 = 1.1 E+00

bbb3 = 6.9 E-03 bbb5 = 3.2 E-05

			fugacity off-site	**fugacity on-site**	
Off-site air concentration (gases)	5.7 E-06	**mg/m3**	4.3 E-08	4.3 E-08	air
Off-site concentration (particles)	6.3 E-07	**mg/m3**			
Off-site surface-water concentrtn.	5.5 E-07	**mg/L**	7.7 E-10	3.5 E-06	water
Off-site surface soil concentration	1.0 E-02	**mg/kg**	1.8 E-09	8.6 E-06	ground soil
Off-site root-soil concentration	3.9 E-03	**mg/kg**	6.7 E-10	8.7 E-06	root soil

Off-site ground-water dilution	**0**

w	erf(w)
0.0 E+00	0.0 E+00
Dispsn redctn	1.8 E-01
decay reductn.	1.0 E+00

Darcy velociy of water	v_darc	1.0 E-01	m/d
Contaminant velocity	Vc	1.0 E-04	m/d
Trnsvrs. disprsn. coeff. (water)	D_T	5.0 E-02	m2/d
Trnsvrs. disprsn. coeff. (chem)	D_Tc	1.4 E-05	m2/d
Dispersion depth	dzz	5.5	m
Thickness of aquifer	d_q	30	m
Transverse dispersivity (chem)	alpha_t	1.4 E-01	m
Width of the contaminated area	Y	216	m
Distrance to off-site location	X	0	m
Mass tranfer rate, aquifer - out	T_qo	4.6 E-07	1/d

Calculated Properties

fugacity capacity of pure air	4.16E-04	Zair		
fugacity capacity of pure water	2.23E+00	Zwater		
height of the air compartment (m)	1.62E+01	d_a		
evapotranspiration of water from soil (m/d)	5.13E-04	evapotrans	1.87 E-01	m/y
transpiration of water from plants (m/d)	5.13E-04	transpire	1.87 E-01	m/y
Total surface water runoff (m/d)	4.78E-04	outflow	1.75 E-01	m/y
bndry lyr thickness in air above wtr (m)	6.42E-04	del_aw		
bndry lyr thickness in wtr below air (m)	2.41E-04	del_wa		
diffusion length in surface soil (m)	1.37E-02	del_g		
diffusion length in upper soil (m)	6.68E-01	del_s		
Thickness of the root-zone soil layer	1.40E+00	d_s		
wtr-side bndry lyr thickness with sed (m)	2.00E-02	del_wd		
sed-side bndry lyr thickness with wtr (m)	8.84E-05	del_dw		
Initial concentration in soil (mol/m3)	3.93E-01	Cs0		
Initial conc. in the vadose zone (mol/m3)	0.00E+00	Cv0		
Sediment resuspension rate (kg/m2-d)	1.23E+01	resuspend		
soil particle density; surface layer(kg/m3)	2.60E+03	rhos_g		
soil particle density; vadose layer(kg/m3)	2.60E+03	rhos_v		
Initial iventory in groundwater zone	0.00E+00	Nq0		
diffusion lag time in skin (h)	1.75E+01	tlag		
Skin/water partition coefficient	2.00E+04	Km		
Reaction rate constant in air (1/d)	1.71E-01	Ra		
Reaction rate constant, ground soil (1/d)	2.16E-04	Rg		
Reaction rate constant, root-zone soil (1/d)	2.16E-04	Rs		
Reaction rate constant, vadose-zone soil (1/d)	1.21E-04	Rv		
Reaction rate constant, ground water (1/d)	1.21E-04	Rq		
Reaction rate constant, surface water (1/d)	2.16E-04	Rw		
Reaction rate constant, sediment (1/d)	1.78E-09	Rd		
Reaction rate constant in leaf surface (1/d)	2.16E-04	Rls		
Continuous source term to air (mol/d)	0.00E+00	Sa		
Root lipid in root-zone soil(m3(organic)/m3(soil))	3.98E-03	RootLipid		

Leaf wet mass per area of soil (kg/m2)	1.15E+00	bm_leaf		
Wood and stem wet mass per area of soil(kg/m2)	2.69E+01	bm_stem		
Root wet mass per area of root-zone soil(kg/m2)	1.11E+01	bm_root		
Interception fraction for dry deposition on leaf	7.29E-01	IF_d		
Volume of the stem (m3)	1.52E+03	Vstm		
stomatal conductance (m/d)	1.89E+01	mtc_s		
cuticular conductance (m/d)	6.04E+01	mtc_c		
air side conductance over leaf (m/d)	6.74E+01	mtc_a		
cuticle water permeance (m/d)	1.13E-02	mtc_l		
conductance air/cuticle (m/d)	3.18E+01	mtc_ct		
conductance air/stomata (m/d)	1.47E+01	mtc_st		
root-soil / stem transfer factor	7.80E-10	x_rs		
stem / leaf transfer factor	3.22E-06	x_sl		
leaf / stem transfer factor	6.82E-05	p_ls		
stem / root-soil transfer factor	1.61E-07	p_sr		

Warnings

0 Ground soil depth greater than 2 cm
0 Root-zone soil too shallow for accuracy of diffusion model (must be at least 1.4*del_s)
0 Starting time cannot be 0 and should be greater than 365 day
0 Recharge velocity is negative
0 Recharge velocity is too large accuracy of model
0 Concentration in root-zone soil-water <0 or exceeds solubility when there are non-zero sources
0 Concentration in vadose-zone soil-water <0 or exceeds solubility when there are non-zero sources
0 Concentration in groundwater exceeds solubility or < 0
0 Concentration in surface water exceeds solubility
0 Concentration in sediment-zone water exceeds solubility
0 Exposure time indoors and outdoors at home or at work exceeds 24 h
1 Risk from breast milk exposure is large compared to other ingestion pathways
1 Hazard from breast milk exposure is large compared to other ingestion pathways
0 Fraction of water from groundwater plus fraction from surface >1
2 total

Landscape properties (continued)

site name	Calif. Residential Site (CA Res.)		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Stomata area frctn(area stomata/area leaf)	na_st	7.00 E-03	7.00E-03	0.20	1	
	Effective pore depth	del_st	2.50 E-05	2.50E-05	0.20	1	
	Boundary layer thickness over leafs	del_a	2.00 E-03	2.00E-03	1.00	1	
	Leaf surface erosion half-life (d)	Thalf_le	1.40 E+01	1.40E+01	1.00	1	
	Ground-water recharge (m/d)	recharge	5.58 E-05	5.58E-05	1.00	1	2.04 E-02
	Evaporation of water from surface wtr (m/d)	evaporate	6.85 E-05	6.85E-05	1.00	1	
	Thickness of the ground soil layer (m)	d_g	5.00 E-03	5.00E-03	1.00	1	
	Soil particle density (kg/m3)	rhos_s	2.60 E+03	2.60E+03	0.05	1	
	Water content in surface soil (vol fraction)	beta_g	1.92 E-01	1.92E-01	0.33	1	
	Air content in the surface soil (vol frctn)	alpha_g	2.66 E-01	2.66E-01	0.29	1	cm/y
	Erosion of surface soil (kg/m2-d)	erosion_g	2.03 E-04	2.03E-04	1.00	1	0.004636
	Bioturbation (m^2/d)	D_bio	1.20 E-04	1.20E-04	1.00	1	
	Thickness of the root-zone soil (m)	d_s	1.40 E+00	1.40E+00	0.47	1	
	Water content of root-zone soil (vol. frctn.)	beta_s	2.06 E-01	2.06E-01	0.34	1	
	Air content of root-zone soil (vol. frctn.)	alpha_s	2.53 E-01	2.53E-01	0.31	1	
	Thickness of the vadose-zone soil (m)	d_v	2.00 E+00	2.00E+00	0.37	1	
	Water content; vadose-zone soil (vol. frctn.)	beta_v	2.02 E-01	2.02E-01	0.32	1	
	Air content of vadose-zone soil (vol. frctn.)	alpha_v	2.36 E-01	2.36E-01	0.30	1	
	Thickness of the aquifer layer (m)	d_q	3.00 E+01	3.00E+01	0.30	1	
	Solid material density in aquifer (kg/m3)	rhos_q	2.60 E+03	2.60E+03	0.05	1	
	Porosity of the aquifer zone	beta_q	3.00 E-01	3.00E-01	0.20	1	
	Fraction of land area in surface water	f_arw	1.00 E-04	1.00E-04	0.20	1	
	Average depth of surface waters (m)	d_w	5.00 E+00	5.00E+00	1.00	1	
	Suspended sedmnt in surface wtr (kg/m3)	rhob_w	8.00 E-01	8.00E-01	1.00	1	
	Suspended sdmnt deposition (kg/m2/d)	deposit	1.05 E+01	1.05E+01	0.30	1	(m/s)
	Thickness of the sediment layer (m)	d_d	5.00 E-02	5.00E-02	1.00	1	
	Solid material density in sediment (kg/m3)	rhos_d	2.60 E+03	2.60E+03	0.05	1	
	Porosity of the sediment zone	beta_d	2.00 E-01	2.00E-01	0.20	1	m/y
	Sediment burial rate (m/d)	bury_d	1.00 E-06	1.00E-06	5.00	1	3.65 E-04
	Ambient environmental temperature (K)	Temp	2.89 E+02	2.89E+02	0.06	1	(m/s)
	Surface water current in m/d	current_w	0.00 E+00	0.00E+00	1.00	1	0.00 E+00

Landscape properties (continued)

site name	Calif. Residential Site (CA Res.)		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Organic carbon fraction in upper soil zone	foc_s	1.24 E-02	8.47E-03	1.98	1	
	Organic carbon fraction in vadose zone	foc_v	3.06 E-03	3.06E-03	0.96	1	
	Organic carbon fraction in aquifer zone	foc_q	3.06 E-03	3.06E-03	0.96	1	
	Organic carbon fraction in sediments	foc_d	2.00 E-02	2.00E-02	1.00	1	
	Bndry lyr thickness in air above soil (m)	del_ag	5.00 E-03	5.00E-03	0.20	1	(m/s)
	Yearly average wind speed (m/d)	v_w	2.80 E+05	2.80E+05	0.17	1	3.24 E+00

Human Exposure Factors

scenario	(Residential) Exposure Factors		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Body weight (kg)	BW	6.20 E+01	6.20E+01	0.20	1	
	Surface area (m2/kg)	SAb	2.60 E-02	2.60E-02	0.07	1	
	Active breathing rate (m3/kg-h)	BRa	1.90 E-02	1.90E-02	0.30	1	
	Resting breathing rate (m3/kg-h)	BRr	6.40 E-03	6.40E-03	0.20	1	
	Fluid Intake (L/kg-d)	Ifl	2.20 E-02	2.20E-02	0.20	1	
	Fruit and vegetable intake (kg/kg-d)	Ifv	4.90 E-03	4.90E-03	0.20	1	
	Grain intake (kg/kg-d)	Ig	3.70 E-03	3.70E-03	0.20	1	
	Milk intake (kg/kg-d)	Imk	6.50 E-03	6.50E-03	0.20	1	
	Meat intake (kg/kg-d)	Imt	3.00 E-03	3.00E-03	0.20	1	
	Egg intake (kg/kg-d)	Iegg	4.60 E-04	4.60E-04	0.30	1	
	Fish intake (kg/kg-d)	Ifsh	2.90 E-04	2.90E-04	0.40	1	
	Soil ingestion (kg/d)	Isl	3.50 E-07	3.50E-07	3.00	1	
	Breast milk ingestion by infants (kg/kg-d)	Ibm	1.10 E-01	1.10E-01	0.20	1	
	Inhalation by cattle (m3/d)	Inc	1.22 E+02	1.22E+02	0.30	1	
	Inhalation by hens (m3/d)	Inh	2.20 E+00	2.20E+00	0.30	1	
	Ingestion of pasture, dairy cattle (kg[FM]/d)	Ivdc	8.50 E+01	8.50E+01	0.20	1	
	Ingestion of pasture, beef cattle (kg[FM]/d)	Ivbc	6.00 E+01	6.00E+01	0.40	1	
	Ingestion of pasture by hens (kg[FM]/d)	Ivh	1.20 E-01	1.20E-01	0.04	1	
	Ingestion of water by dairy cattle (L/d)	Iwdc	3.50 E+01	3.50E+01	0.20	1	
	Ingestion of water by beef cattle (L/d)	Iwbc	3.50 E+01	3.50E+01	0.20	1	
	Ingestion of water by hens (L/d)	Iwh	8.40 E-02	8.40E-02	0.10	1	
	Ingestion of soil by cattle (kg/d)	Isc	4.00 E-01	4.00E-01	0.70	1	
	Ingestion of soil by hens (kg/d)	Ish	1.30 E-05	1.30E-05	1.00	1	

Human Exposure Factors (continued)

scenario	(Residential) Exposure Factors		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Fraction of water needs from ground water	fw_gw	8.00 E-01	8.00E-01	0.10	1	
	Fraction of water needs from surface water	fw_sw	2.00 E-01	2.00E-01	0.10	1	
	Water irrigation rate applied to agr.soil (l/m2-d)	R_irr	2.59 E+00	2.59E+00	1.00	1	
	Frctn frts & vgtbls that are exposed produce	fabv_grd_v	4.70 E-01	4.70E-01	0.10	1	
	Fraction of fruits and vegetables local	flocal_v	2.40 E-01	2.40E-01	0.70	1	
	Fraction of grains local	flocal_g	1.20 E-01	1.20E-01	0.70	1	
	Fraction of milk local	flocal_mk	4.00 E-01	4.00E-01	0.70	1	
	Fraction of meat local	flocal_mt	4.40 E-01	4.40E-01	0.50	1	
	Fraction of eggs local	flocal_egg	4.00 E-01	4.00E-01	0.70	1	
	Fraction of fish local	flocal_fsh	7.00 E-01	7.00E-01	0.30	1	
	Plant-air prttn fctr, particles, m3/kg[FM]	Kpa_part	3.30 E+03	3.30E+03	1.80	1	
	Rainsplash (mg/kg[plnt FM])/(mg/kg[dry soil])	rainsplash	3.40 E-03	3.40E-03	1.00	1	
	Water use in the shower (L/min)	Wshower	8.00 E+00	8.00E+00	0.40	1	
	Water use in the House (L/h)	Whouse	4.00 E+01	4.00E+01	0.40	1	
	Room ventilation rate, bathroom (m3/min)	VRbath	1.00 E+00	1.00E+00	0.40	1	
	Room ventilation rate, house (m3/h)	VRhouse	7.50 E+02	7.50E+02	0.30	1	
	Exposure time, in shower or bath (h/day)	ETsb	2.70 E-01	2.70E-01	0.60	1	
	Exposure time, active indoors (h/day)	ETai	8.00 E+00	8.00E+00	0.14	1	
	Exposure time, outdoors at home (h/day)	ETao	3.00 E-01	3.00E-01	0.14	1	
	Exposure time, indoors resting (h/day)	ETri	8.00 E+00	8.00E+00	0.04	1	
	Indoor dust load (kg/m^3)	dust_in	3.00 E-08	3.00E-08	0.40	1	
	Exposure frequency to soil on skin, (d/y)	EFsl	1.37 E+02	1.37E+02	0.60	1	
	Soil adherence to skin (mg/cm^2)	Slsk	5.00 E-01	5.00E-01	0.40	1	
	Ratio of indoor gas conc. to soil gas conc.	alpha_inair	1.00 E-04	1.00E-04	2.00	1	
	Exposure time swimming (h/d)	ETsw	5.00 E-01	5.00E-01	0.50	1	
	Exposure frequency, swimming (d/y)	EFsw	1.50 E+01	1.50E+01	4.00	1	
	Water ingestion while swimming (L/kg-h)	Isww	7.00 E-04	7.00E-04	1.00	1	
	Exposure duration (years)	ED	1.40 E+01	1.40E+01	1.15	1	
	Averaging time (days)	AT	2.56 E+04	2.56E+04	0.10	1	

Constants		
Gas Constant (Pa-m^3/mol-K)	8.31E+00	Rgas

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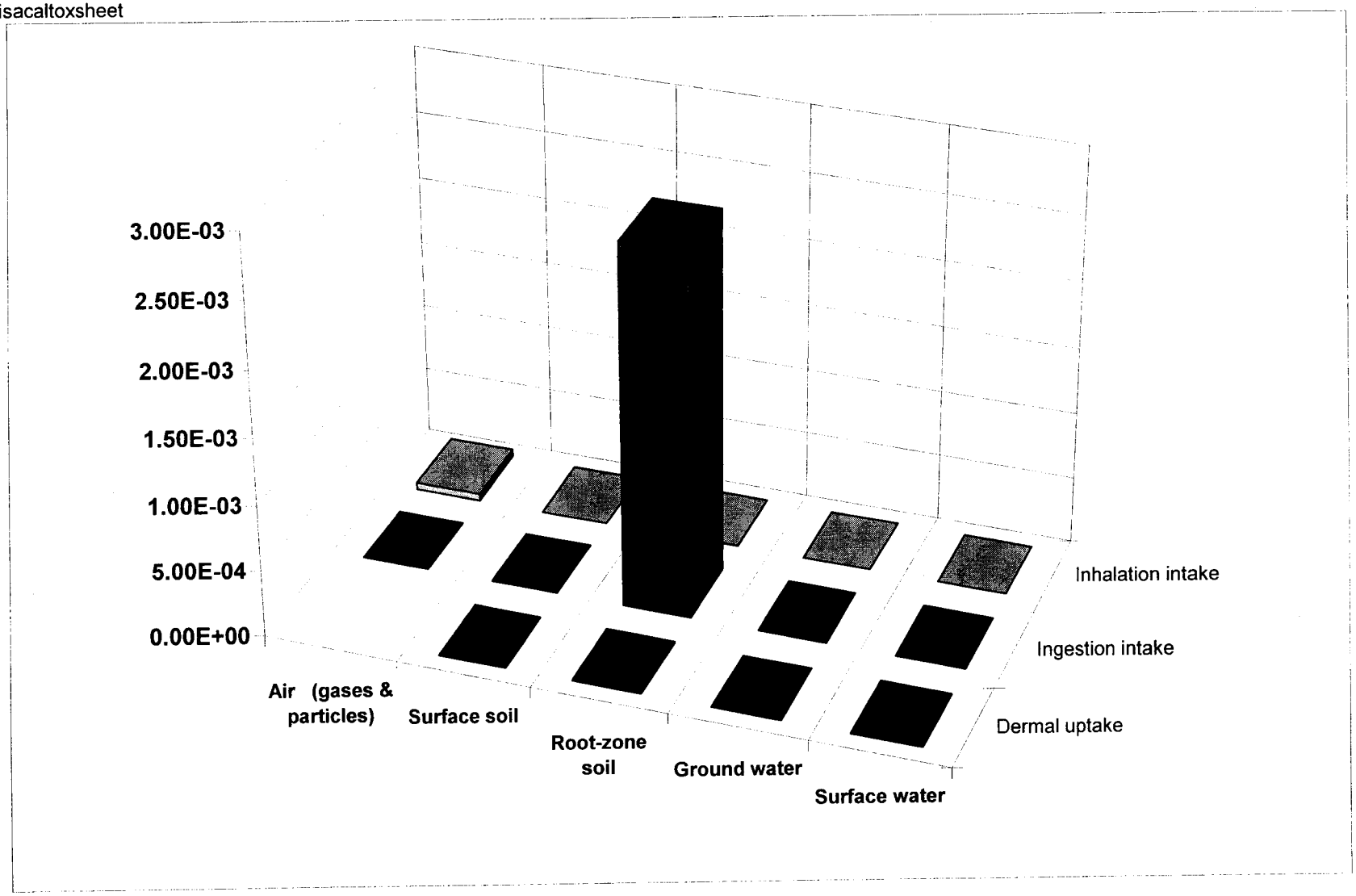


Exposure Pathway-Include-and-Exclude Toggles

All inhalation exposures indoors active	1	Contaminant transfer, air to plants surfaces	1
All inhalation exposures indoors resting	1	Cntmnnt. transfer, grnd. soil to plant surfaces	1
Inhalation exposure in shower/bath	1	Contamnnt. transfer, root soil to plant tissues	1
Inhalation exposures outdoors active	1	On-site grazing of animals	0
Inhalation of air particles indoors	1		
Transfer of soil dust to indoor air	1	Ingestion of home-grown exposed produce	1
Transfer of soil vapors to indoor air	1	Ingestion of home-grown unexposed produce	1
On-site inhalation by animals	1	Ingestion of home-grown meat	0
		Ingestion of home-grown milk	0
Use of ground water as tap water	0	Ingestion of home-grown eggs	0
Use of surface water as tap water	0	Ingestion of locally caught fish	0
Ingestion of tap water	1	Direct soil ingestion	1
Use of ground water for irrigation	0	Soil contact exposure at home or at work	1
Use of surface water for irrigation	0	Dermal exposure during shower/bath	1
		Dermal & ingstn exposures while swimming	1
Use of ground water for feeding animals	0		
Use of surface water for feeding animals	0	Breast-milk ingestion by infants	1

MEDIA AND CORRESPONDING POTENTIAL DOSES IN mg/kg-d (averaged over the exposure duration)

PATHWAYS	Air (gases & particles)	Surface soil	Root-zone soil	Ground water	Surface water	Totals	%
INHALATION	5.29E-05	1.10E-08	4.57E-06	0.00E+00	0.00E+00	**5.75E-05**	2.04
INGESTION:							
Water				0.00E+00	1.11E-06	1.11E-06	0.04
Exposed produce	1.83E-06	6.10E-06	1.66E-05	0.00E+00	0.00E+00	2.45E-05	0.87
Unexposed produce			2.72E-03	0.00E+00	0.00E+00	2.72E-03	96.42
Meat	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Milk	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Eggs	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Fish					0.00E+00	0.00E+00	0.00
Soil		5.08E-09	1.89E-08			2.40E-08	0.00
Total ingestion	1.83 E-06	6.10 E-06	2.73 E-03	0.00 E+00	1.11 E-06	**2.74 E-03**	97.33
DERMAL UPTAKE		2.65E-06	9.88E-06	0.00E+00	5.26E-06	**1.78E-05**	0.63
Dose SUM	**5.47E-05**	**8.76E-06**	**2.75E-03**	**0.00E+00**	**6.37E-06**	**2.82E-03**	100.0

	Air (gases & particles)	Surface soil	Root-zone soil	Ground water	Surface water	total
Breast milk concentration	2.74 E-06	4.39 E-07	1.38 E-04	0.00 E+00	3.19 E-07	1.41 E-04
Infant dose	3.01 E-07	4.83 E-08	1.51 E-05	0.00 E+00	3.51 E-08	**dose_bm** **1.55 E-05**

Ingestion dose used =>	2.74 E-03
Total dose used =>	2.82 E-03

ENVIRONMENTAL Media CONCENTRATIONS	**Air (gases)** mg/m^3 (air)	**Air (dust)** mg/m^3 (air)	**Ground soil** mg/kg(soil solids)	**Root soil** mg/kg(soil solids)	**Ground water** mg/L (pure)	**Surface water** mg/L (pure)
	2.53 E-04	1.91 E-08	1.80E+00	6.70 E+00	4.81 E-06	7.49 E-02

EXPOSURE MEDIA CONCENTRATIONS (averaged over the exposure duration)

EXPOSURE	Air (gases)	Air (dust)	Ground soil	Root soil	Ground water	Surface water
Indoor air (mg/m^3)	2.53 E-04	1.91 E-08	5.40 E-08	2.25 E-05	0.00 E+00	0.00 E+00
Bathroom air (mg/m^3)					0.00 E+00	0.00 E+00
Outdoor air (mg/m^3)	2.53 E-04	1.91 E-08				
Tap water (mg/L)					0.00 E+00	0.00 E+00
Exposed produce (mg/kg)	1.83 E-03	1.38 E-07	6.12 E-03	1.66 E-02	0.00 E+00	0.00 E+00
Unexposed produce (mg/kg)				4.36 E+00	0.00 E+00	0.00 E+00
Meat (mg/kg)	1.35 E-05	1.02 E-09	3.53 E-05	9.59 E-05	0.00 E+00	0.00 E+00
Milk (mg/kg)	5.68 E-06	4.28 E-10	1.58 E-05	4.30 E-05	0.00 E+00	0.00 E+00
Eggs (mg/kg)	4.71 E-07	3.56 E-11	4.45 E-07	1.21 E-06	0.00 E+00	0.00 E+00
Fish and seafood (mg/kg)						4.50 E+01
Household soil (mg/kg)			8.99 E-01	3.35 E+00		
Swimming water (mg/L)						7.71 E-02

PATHWAY CONTACT FACTORS (CR/BW*FI)

EXPOSURE Media	Units	Inhalation	Ingestion	Dermal
Indoor air (active)		1.52 E-01		
Indoor air (resting)		5.12 E-02		
Indoor air (shower/bath)		5.13 E-03		
Outdoor air (active)		5.70 E-03		
Tap water			2.20 E-02	1.84 E-04
Exposed produce			9.97 E-04	
Unexposed produce			6.23 E-04	
Meat			0.00 E+00	
Milk			0.00 E+00	
Eggs			0.00 E+00	
Fish and seafood			0.00 E+00	
Household soil			5.65 E-09	2.95 E-06
Swimming wtr			1.44 E-05	7.02 E-05

Dose ratios	inh-dose/Ns	ing-dose/Ns	drml-dose/Ns	inh-dose/Nq	ing-dose/Nq	drml-dose/Nq
	3.8 E-08	1.8 E-06	1.2 E-08	0.0 E+00	0.0 E+00	0.0 E+00

Time (y)	Total inhalation dose	Total ingestion dose	Total dermal dose	Total dose	Total dose from root soil	Total dose from ground water
1	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
2.4	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
3.8	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
5.2	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
6.6	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
8	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
9.4	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
10.8	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
12.2	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
13.6	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
15	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
Cumulative doses				14.40228309		
over ED by route, mg/kg	2.9 E-01	1.4 E+01	9.1 E-02	1.4 E+01	1.4 E+01	0.0 E+00
fraction	0.0204	0.9733	0.0063	1.0000	1.000	0.000
Average doses						
over ED by route, mg/kg-d	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
Maximum doses						
over ED by route, mg/kg-d	5.7 E-05	2.7 E-03	1.8 E-05	2.8 E-03	2.8 E-03	0.0 E+00
fraction	0.0204	0.9733	0.0063	1.0000	1.000	0.000

Max breast-milk dose	1.6 E-05	mg/kg-d	Max_ing	2.7 E-03

Off-site 1-h max X/Q (mol/m3-s)	6.2 E-03
Off-site Long-term X/Q	5.0 E-04
On-site Long-term X/Q	3.8 E-04
Off-site air dilution factor	1.0 E+00

Off-site pseudo Sa = 1.4 E-01 mol/day

bbb2 = 4.7 E-04 bbb4 = 5.2 E-02

bbb3 = 4.6 E-03 bbb5 = 2.6 E-06

			fugacity off-site	**fugacity on-site**	
Off-site air concentration (gases)	2.5 E-04	**mg/m3**	1.5 E-06	1.5 E-06	air
Off-site concentration (particles)	1.9 E-08	**mg/m3**			
Off-site surface-water concentrtn.	2.4 E-04	**mg/L**	1.1 E-06	3.4 E-04	water
Off-site surface soil concentration	5.7 E-03	**mg/kg**	1.1 E-06	3.6 E-04	ground soil
Off-site root-soil concentration	2.3 E-04	**mg/kg**	4.5 E-08	1.3 E-03	root soil

Off-site ground-water dilution	**0**

w	erf(w)
0.0 E+00	0.0 E+00
Dispsn redctn	3.5 E-01
decay reductn.	1.0 E+00

Darcy velociy of water	v_darc	1.0 E-01	m/d
Contaminant velocity	Vc	9.5 E-03	m/d
Trnsvrs. disprsn. coeff. (water)	D_T	5.0 E-02	m2/d
Trnsvrs. disprsn. coeff. (chem)	D_Tc	4.8 E-03	m2/d
Dispersion depth	dzz	10.4	m
Thickness of aquifer	d_q	30	m
Transverse dispersivity (chem)	alpha_t	5.0 E-01	m
Width of the contaminated area	Y	216	m
Distrance to off-site location	X	0	m
Mass tranfer rate, aquifer - out	T_qo	4.4 E-05	1/d

Calculated Properties

fugacity capacity of pure air	4.16E-04	Zair		
fugacity capacity of pure water	5.42E-01	Zwater		
height of the air compartment (m)	1.62E+01	d_a		
evapotranspiration of water from soil (m/d)	5.13E-04	evapotrans	1.87 E-01	m/y
transpiration of water from plants (m/d)	5.13E-04	transpire	1.87 E-01	m/y
Total surface water runoff (m/d)	4.78E-04	outflow	1.75 E-01	m/y
bndry lyr thickness in air above wtr (m)	5.34E-04	del_aw		
bndry lyr thickness in wtr below air (m)	1.95E-04	del_wa		
diffusion length in surface soil (m)	1.37E-02	del_g		
diffusion length in upper soil (m)	6.69E-01	del_s		
Thickness of the root-zone soil layer	1.40E+00	d_s		
wtr-side bndry lyr thickness with sed (m)	2.00E-02	del_wd		
sed-side bndry lyr thickness with wtr (m)	4.19E-03	del_dw		
Initial concentration in soil (mol/m3)	1.68E+00	Cs0		
Initial conc. in the vadose zone (mol/m3)	0.00E+00	Cv0		
Sediment resuspension rate (kg/m2-d)	1.23E+01	resuspend		
soil particle density; surface layer(kg/m3)	2.60E+03	rhos_g		
soil particle density; vadose layer(kg/m3)	2.60E+03	rhos_v		
Initial iventory in groundwater zone	0.00E+00	Nq0		
diffusion lag time in skin (h)	3.51E+01	tlag		
Skin/water partition coefficient	1.84E+02	Km		
Reaction rate constant in air (1/d)	1.22E+00	Ra		
Reaction rate constant, ground soil (1/d)	3.04E-03	Rg		
Reaction rate constant, root-zone soil (1/d)	3.04E-03	Rs		
Reaction rate constant, vadose-zone soil (1/d)	2.47E-02	Rv		
Reaction rate constant, ground water (1/d)	1.51E-01	Rq		
Reaction rate constant, surface water (1/d)	1.51E-01	Rw		
Reaction rate constant, sediment (1/d)	6.24E-05	Rd		
Reaction rate constant in leaf surface (1/d)	3.04E-03	Rls		
Continuous source term to air (mol/d)	0.00E+00	Sa		
Root lipid in root-zone soil(m3(organic)/m3(soil))	3.98E-03	RootLipid		

Leaf wet mass per area of soil (kg/m2)	1.15E+00	bm_leaf		
Wood and stem wet mass per area of soil(kg/m2)	2.69E+01	bm_stem		
Root wet mass per area of root-zone soil(kg/m2)	1.11E+01	bm_root		
Interception fraction for dry deposition on leaf	7.29E-01	IF_d		
Volume of the stem (m3)	1.52E+03	Vstm		
stomatal conductance (m/d)	1.39E+01	mtc_s		
cuticular conductance (m/d)	2.36E-01	mtc_c		
air side conductance over leaf (m/d)	4.97E+01	mtc_a		
cuticle water permeance (m/d)	1.81E-04	mtc_l		
conductance air/cuticle (m/d)	2.35E-01	mtc_ct		
conductance air/stomata (m/d)	1.09E+01	mtc_st		
root-soil / stem transfer factor	7.22E-06	x_rs		
stem / leaf transfer factor	8.17E-04	x_sl		
leaf / stem transfer factor	1.46E-02	p_ls		
stem / root-soil transfer factor	4.08E-05	p_sr		

Warnings

0 Ground soil depth greater than 2 cm
0 Root-zone soil too shallow for accuracy of diffusion model (must be at least 1.4*del_s)
0 Starting time cannot be 0 and should be greater than 365 day
0 Recharge velocity is negative
0 Recharge velocity is too large accuracy of model
0 Concentration in root-zone soil-water <0 or exceeds solubility when there are non-zero sources
0 Concentration in vadose-zone soil-water <0 or exceeds solubility when there are non-zero sources
0 Concentration in groundwater exceeds solubility or < 0
0 Concentration in surface water exceeds solubility
0 Concentration in sediment-zone water exceeds solubility
0 Exposure time indoors and outdoors at home or at work exceeds 24 h
0 Risk from breast milk exposure is large compared to other ingestion pathways
0 Hazard from breast milk exposure is large compared to other ingestion pathways
0 Fraction of water from groundwater plus fraction from surface >1
0 total

Fugacity (Pa)

Air	fa	1.49E-06
Cuticle	fc	6.97E-06
Leaf	fl	1.52E-05
Ground	fg	3.56E-04
Root	fs	1.33E-03
Vadose	fv	1.78E-07
Water	fw	3.40E-04
Sediment	fd	2.90E-04
Groundwater	fq	2.18E-08

Compartment Volumes (m^3)

Va	7.6 E+05	Air compartment
Vc	6.88E-01	Cuticle compartment
Vl	6.52E+01	Leaf compartment
Vg	2.3 E+02	Ground-soil compartment
Vs	6.6 E+04	Root-zone compartment
Vv	9.4 E+04	Vadose compartment volume
Vw	2.3 E+01	Water compartment
Vd	2.3 E-01	Sediment compartment
Vq	1.4 E+06	aquifer compartment

rhob_c 0.01141113 Volume fraction of atmospheric particles on cuticle (m3/m3)

phi 7.54E-05

Fugacity Capacities (mol/m^3 per Pa)

Zap	1.33E+03	fugacity capacity of air particles in mol/m3[s]-Pa
Zgp	3.22E+01	fugacity capacity of ground soil compartment particles in mol/m3[s]-Pa
Zsp	3.22E+01	fugacity capacity of root zone compartment particles in mol/m3[s]-Pa
Zvp	7.92E+00	fugacity capacity of vadose zone compartment particles in mol/m3[s]-Pa
Zwp	5.18E+01	fugacity capacity of suspended sediment in surface water in mol/m3[s]-Pa
Zdp	5.18E+01	fugacity capacity of bottom sediment particles in mol/m3[s]-Pa
Zqp	7.92E+00	fugacity capacity of aquifer solids in mol/m3-Pa
Zleaftotal	4.54E+00	fugacity capacity of the total leaf compartment in mol/Pa/m3
Za	4.16E-04	fugacity capacity of air compartment in mol/m3-Pa
Zc	3.69E+02	fugacity capacity of leaf surface compartment in mol/Pa/m3
Zl	6.91E-01	fugacity capacity of internal leaf compartment in mol/Pa/m3
Zg	1.76E+01	fugacity capacity of ground soil compartment in mol/m3-Pa
Zs	1.75E+01	fugacity capacity of root-soil compartment in mol/m3-Pa
Zv	4.56E+00	fugacity capacity of vadose-zone compartment in mol/m3-Pa
Zw	5.58E-01	fugacity capacity of water compartment in mol/m3-Pa
Zd	4.16E+01	fugacity capacity of sediment compartment in mol/m3-Pa
Zq	5.71E+00	fugacity capacity of aquifer compartment in mol/m3-Pa

Diffusion coefficients in m2/d

Compartment	Phase	Compartment		Boundary-layer thickness (del)	Fugacity mass-transfer coefficients mol/Pa-m2-d Y one-sided	both-sides	Overall intercompartment mass transfer rate constants (1/day) T Diffusion	Advection	Total	Compartment Interface
Dair	9.94E-02	Da	9.94E-02	5.34E-04	7.74E-02	4.86E-02	7.18E-04	9.21E-06	7.27E-04	air-water, T_aw
Dwater	4.68E-05	Dw	4.54E-05	1.95E-04	1.30E-01		1.74 E-02		1.74E-02	water-air, T_wa
Dair_g	5.73E-03	Dg	1.20E-04	5.00E-03	8.27E-03	7.85E-03	1.16E+00	8.14E-02	1.24E+00	air-ground, T_ag
Dwater_g	9.13E-07			1.37E-02	1.55E-01		8.94E-02	4.34E-06	8.94E-02	ground-air, T_ga
Dair_s	4.84E-03	Ds	1.20E-04	1.37E-02	1.55E-01	3.09E-03	3.51E-02	3.44E-04	3.55E-02	ground-soil, T_gs
Dwater_s	1.15E-06			6.69E-01	3.15E-03		1.26E-04	0.00E+00	1.26E-04	soil-ground, T_sg
Dair_v	4.19E-03	Dv	1.21E-04	6.69E-01	3.15E-03	6.52E-04		1.23E-06	1.23E-06	soil-vadose, T_sv
Dwater_v	1.18E-06			6.70E-01	8.22E-04					vadose-soil, T_vs
Dwater_d	5.47E-06	Dd	7.14E-08	2.00E-02	1.31E-03	4.59E-04	1.65E-04	7.50E-02	7.51E-02	water-sediment, T_wd
				4.19E-03	7.08E-04		2.21E-04	1.18E-01	1.18E-01	sediment-water, T_dw
							1.05E-01	1.07E-02	1.16E-01	air-cuticle, T_ac
							1.31E-01	2.48E-03	1.34E-01	cuticle-air, T_ca
							2.43E+00		2.43E+00	air - leaf T_al
							1.73E+01		1.73E+01	leaf-air, T_la
							1.32E-01		1.32E-01	cuticle-leaf, T_cl
							7.43E-01		7.43E-01	leaf-cuticle, T_lc
								4.98E-02	4.98E-02	cuticle-ground T_cg
								2.74E-03	2.74E-03	leaf-ground T_lg
								4.07E-05	4.07E-05	leaf-soil, T_ls
								7.15E-06	7.15E-06	soil-leaf, T_sl
									0.00E+00	ground-cuticle, T_gc
								3.32E-06	3.32E-06	vadose-aquifer, T_vq
								2.49E-05	2.49E-05	sediment-out, T_do
								2.98E+02	2.98E+02	air-out, T_ao
								3.40E-03	3.40E-03	ground-water, T_gw
								9.57E-01	9.57E-01	water-out, T_wo

aaa1	6.46E-04	C0_1	1.10E+05
aaa2	3.02E-03	C0_2	0.00E+00
aaa3	2.98E-04	S_1	0.00E+00
aaa4	2.37E-08	S_2	0.00E+00
aaa5	9.61E-04	AA	3.21E-03
bbb1	0.00E+00	BB	0.00E+00
bbb2	0.00E+00	CC	1.23E-06
bbb3	0.00E+00	DDD	2.47E-02
ccc1	1.77E+01	Gam1	-3.21E-03
ccc2	2.48E+00	Gam2	-2.47E-02
ccc3	3.02E+02	Gm1mGm2	2.15E-02
ccc4	1.76E+01	Gam1p	2.47E-02
ccc5	1.26E+00	Gam2p	3.21E-03
ccc6	1.19E-01	Gm1mGm2p	2.15E-02

aaa6	1.10E+05
aaa7	-6.29E+00
aaa8	6.29E+00
bbb4	0.00E+00
bbb5	0
Lam1	0.003143

Source terms (g/d)

air	0.0 E+00	ground	0.0 E+00	water	0.0 E+00

Compartment Name		Loss-rate constant (1/day) L	Total Inventory (moles) N	Concen-tration (mol/m3) C	Mass distri-bution %	Gains g/d	Losses g/d	Residence Time (days)
air	a	3.03E+02	4.73E-04	6.22E-10	0.00%	5.83E+01	5.83E+01	3.31E-03
leaf	l	1.80E+01	6.83E-04	1.05E-05	0.00%	5.01E+00	5.01E+00	5.55E-02
cuticle	c	3.18E-01	1.77E-03	2.57E-03	0.00%	2.29E-01	2.29 E-01	3.14E+00
ground-soil	g	1.31E-01	1.47E+00	6.27E-03	0.10%	7.83E+01	7.84E+01	7.62E+00
root-soil	s	3.18E-03	1.53E+03	2.33E-02	99.89%	2.12E+01	1.97E+03	3.15E+02
vadose-zone	v	2.47E-02	7.63E-02	8.14E-07	0.00%	7.65E-01	7.65E-01	4.05E+01
surface water	w	1.20E+00	4.44E-03	1.90E-04	0.00%	2.17E+00	2.17E+00	8.33E-01
sediment	d	1.18E-01	2.82E-03	1.20E-02	0.00%	1.36E-01	1.36E-01	8.46E+00
aquifer	q	1.51E-01	1.75E-01	1.24E-07	0.01%	1.03E-04	1.07E+01	6.64E+00

Mass Flows (g/d)

air-ground	2.39E-01	Tag*Na*MW
air-water	1.40E-04	Taw*Na*MW
air-out	5.73E+01	Tao*Na*MW
air-leaves	4.68E-01	Tal*Na*MW
air-leaf surfaces	2.23E-02	Tac*Na*MW
air-transform	2.35E-01	Ra*Na*MW
leaves-air	4.80E+00	Tla*Nl*MW
leaves-leaf surfaces	2.07E-01	Tlc*Nl*MW
leaves-ground	7.62E-04	Tlg*Nl*MW
leaves-soil	1.13E-05	Tls*Nl*MW
leaf-surface - air	9.62E-02	Tca*Nc*MW
leaf-surfaces - leaves	9.48E-02	Tcl*Nc*MW
leaf-surfaces - ground	3.58E-02	Tcg*Nc*MW
leaf surfaces-trnsfrm	2.19E-03	Rls*Nc*MW
ground-air	5.34E+01	Tga*Ng*MW
ground-leaf surface	0.00E+00	T_gc*Ng*MW
ground-soil	2.12E+01	Tgs*Ng*MW

ground-water	2.03E+00	Tgw*Ng*MW
ground-trnsfrm	1.82E+00	Rg*Ng*MW
soil-ground	7.81E+01	Tsg*Ns*MW
soil-leaves	4.44E+00	Tsl*Ns*MW
soil-vadose	7.65E-01	Tsv*Ns*MW
soil-trnsfrm	1.89E+03	Rs*Ns*MW
vadose-aquifer	1.03E-04	Tvq*Nv*MW
vadose-trnsfrm	7.65E-01	Rv*Nv*MW
aquifer-removal	1.07E+01	Lq*Nq*MW
water-air	3.14E-02	Twa*Nw*MW
water-sediment	1.36E-01	Twd*Nw*MW
water-out	1.73E+00	Two*Nw*MW
water-trnsfrm	2.72E-01	Rw*Nw*MW
sediment-water	1.36E-01	Tdw*Nd*MW
sedmnt-trnsfrm	7.16E-05	Rd*Nd*MW
sediment-out	2.86E-05	Tdo*Nd*MW

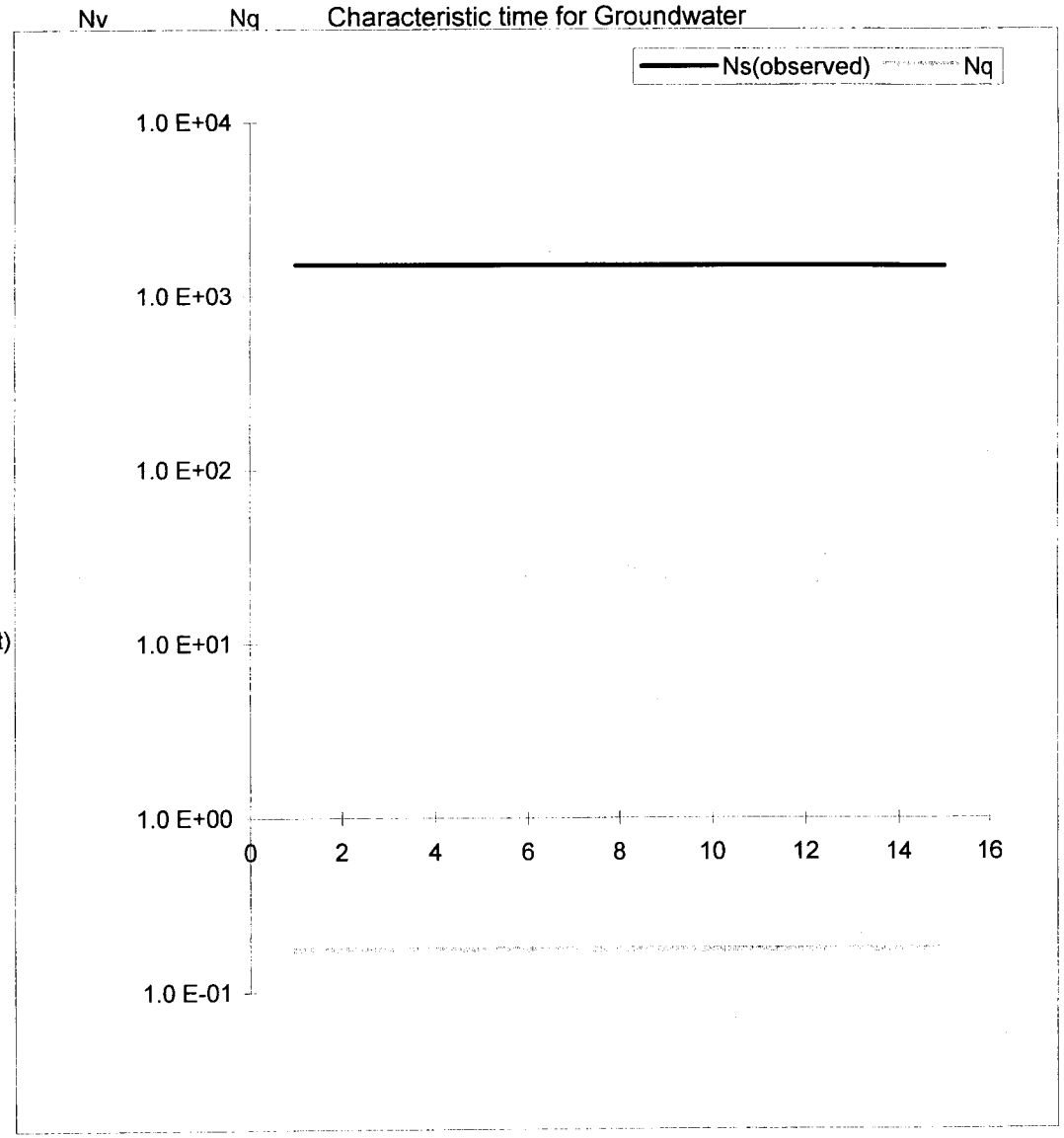
Time-dependent Compartment Inventories

Plot

Time (y)	Time (d)	Ns(observed)	Nq
1	365	1.5 E+03	1.7 E-01
2.4	876	1.5 E+03	1.7 E-01
3.8	1387	1.5 E+03	1.7 E-01
5.2	1898	1.5 E+03	1.7 E-01
6.6	2409	1.5 E+03	1.7 E-01
8	2920	1.5 E+03	1.7 E-01
9.4	3431	1.5 E+03	1.7 E-01
10.8	3942	1.5 E+03	1.7 E-01
12.2	4453	1.5 E+03	1.7 E-01
13.6	4964	1.5 E+03	1.7 E-01
15	5475	1.5 E+03	1.7 E-01

		Ns(0)[total]	
		1.1 E+05	
	const_sat	Ns(sat)	
	-4.797616749	1.5E+03	
t*	Ns(@Ns>=Nsat)	Ns(total)	Nv(@Ns=sat)
22577.146	1.08 E+05	1.1E+05	7.6E-02
22577.146	1.06 E+05	1.1E+05	7.6E-02
22577.146	1.03 E+05	1.0E+05	7.6E-02
22577.146	1.01 E+05	1.0E+05	7.6E-02
22577.146	9.83 E+04	9.8E+04	7.6E-02
22577.146	9.58 E+04	9.6E+04	7.6E-02
22577.146	9.34 E+04	9.3E+04	7.6E-02
22577.146	9.09 E+04	9.1E+04	7.6E-02
22577.146	8.85 E+04	8.8E+04	7.6E-02
22577.146	8.60 E+04	8.6E+04	7.6E-02
22577.146	8.36 E+04	8.4E+04	7.6E-02

Nv Nq



CalTOX™ 4.0 beta: Eight-Compartment Multimedia Exposure Model - Contaminated Soil

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Chemical ==> Endrin

Landscape ==> Calif. Residential Site (CA Res.)

Exposure Factors Set=> (Residential) Exposure Factors

Toxicity Data ==>

	potencies 1/(mg/kg-d)	ADIs (mg/kg-d)
Inhalation	0.0 E+00	0.0003
Ingestion	0.0 E+00	0.0003
Dermal	0.0 E+00	0.0003
Total dose		0

	Risk	Hazard quotie
Target Risk/Hazard =	1.0 E-06	1.00

	current value	should be >
Root-soil thickness ===>	1.4	OK
Alter root soil thickness to?	n/a	
Distance off-site for air exposure=	0.0 E+00	meters

Time after initial concentrations when exposure begins = 3.7 E+02 days

Measured Concentrations (at time = 0)

Root-zone soil	15	ppm (mg/kg)
Vadose-zone soil	0	ppm (mg/kg)
Ground water	0	ppm (mg/L)

Continuous inputs

Methane flux m/d		0
Source term to air (mol/d)	0.0 E+00	Sa
Source term to ground-surface soil (mol/d)	0.0 E+00	Sg
Source term to root-zone soil (mol/d)	0.0 E+00	Ss
Source term to surface water(mol/d)	0.0 E+00	Sw

Aquifer characteristics

	Distance to first well (m)	0.0 E+00	d_well
0.001341446	Darcy veleocity (m/d)	1.0 E-01	v_darc
	Water dispersion coeff. (m2/d)	5.0 E-02	D_T

Summary of Results:

Un-mitigated risk and/or hazard ratio

Risk	0.0 E+0		
Hazard ratio	1.8 E+1		

Target Soil Concentrations (in ppm)

Based on cancer risk:

Root soil	0.0 E+0	not avlbl.	
Vadose soil	0.0 E+0	not avlbl.	
		Root Soil	8.3 E-1
		Vadose soil	n/a

Based on hazard:

Root soil	8.3 E-1	
Vadose soil	0.0 E+0	not avlbl.

Concentration limits without NAPL

Root soil	3.1 E+01	mg/kg solid
Vadose soil	7.6 E+00	mg/kg solid
Ground water	2.5 E-01	mg/L water

Time avrg. Conc. in on-site environmental media

Air	1.9 E-05	mg/m3
Total Leaf	3.5 E-02	mg/kg(total)
Grnd-surface soil	3.5 E+00	mg/kg(total)
Root-zone soil	3.9 E+00	mg/kg(total)
Vadose-zone soil	1.5 E-03	mg/kg(total)
Ground water	3.6 E-05	mg/L(water)
Surface water	3.3 E-02	mg/L
Sediment	5.0 E+00	mg/kg

Chemical Properties

0.00297 0.003 1 -1.7 E+03

Compound	Endrin		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Molecular weight (g/mol)	MW	3.81 E+02	3.81E+02	0.01	1	
	Octanol-water partition coefficient	Kow	8.53 E+04	8.53E+04	0.36	1	
	Melting point (K)	Tm	4.73 E+02	4.73E+02	0.03	1	
	Vapor Pressure in (Pa)	VP	2.38 E-04	2.38E-04	1.26	1	
	Solubility in mol/m3	S	6.48 E-04	6.48E-04	0.05	1	Kaw
	Henry's law constant (Pa-m^3/mol)	H -	3.67 E-01	-9.90E+01	0.46	1	0.0001529
	Diffusion coefficient in pure air (m2/d)	Dair	1.08 E-01	1.08E-01	0.08	1	1.25 E-06
	Diffusion coefficient; pure water (m2/d)	Dwater	4.66 E-05	4.66E-05	0.25	1	5.40 E-10
	Organic carbon partition coefficient Koc	**Koc -**	1.14 E+04	1.14E+04	0.32	1	m^2/s
	Ocatanol/air partition coefficient	**Koa -**	5.58 E+08	-9.90E+01	0.10	1	
	Partition coefficient in ground/root soil layer	**Kd_s -**	1.42 E+02	-9.90E+01	0.10	1	
	Partition coefficient in vadose-zone soil layer	**Kd_v -**	3.49 E+01	-9.90E+01	0.10	1	
	Partition coefficient in aquifer layer	**Kd_q -**	3.49 E+01	-9.90E+01	0.10	1	A parameter with a "-" symbol after it, indicates a parameter that can be calculated by a default algoritm when **the value of mean for this parameter is <0**. Otherwise the liste value is used.
	Partition coeffic. in surface wtr sediments	**Kd_d -**	2.28 E+02	-9.90E+01	0.10	1	
	NOT USED	Kps -	1.09 E-02	-9.90E+01	4.00	1	
	Leaves/phlm wtr prtn cff.(wet kg/m3 per wet kg/m3)	**Kl_phl -**	1.77 E+01	-9.90E+01	0.10	1	
	Stem/xylem-fluid prtn cff (m^3[xylem]/m^3[stem])	**Ks_x -**	3.58 E+02	-9.90E+01	0.10	1	
	Transpiration stream cncntrtn fctr (m^3[wtr]/m^3[ts])	**TSCF -**	2.01 E-01	-9.90E+01	0.10	1	
	Biotrnsfr fctr, plant/air (m3[a]/kg[pFM])	**Kpa -**	1.39 E+03	-9.90E+01	14.00	1	
	Biotransfer factor; cattle-diet/milk (d/kg[milk])	**Bk -**	6.78 E-04	-9.90E+01	11.00	1	
	Biotransfer factor; cattle-diet/meat (d/L)	**Bt -**	2.14 E-03	-9.90E+01	13.00	1	
	Biotransfer fctr; hen-diet/eggs (d/kg[egg contents])	**Be -**	1.35 E-02	-9.90E+01	14.00	1	
	Biotrnsfr fctr; brst mlk/mthr intake (d/kg)	**Bbmk -**	1.71 E-02	-9.90E+01	10.00	1	
	Bioconcentration factor; fish/water	**BCF -**	1.87 E+03	1.87E+03	0.60	1	
	Particle scavenging ratio of rain drops	**Psr_rain -**	5.00 E+04	5.00E+04	2.40	1	
	Skin permeability coefficient; cm/h	**Kp_w -**	2.86 E-02	-9.90E+01	2.40	1	
	Skin-water/soil partition coefficient (L/kg)	**Km -**	1.00 E+00	-9.90E+01	1.30	1	
	Fraction dermal uptake from soil	**dfct_sl-**	2.01 E-01	2.01E-01	1.00	1	

Chemical Properties (continued)

Reaction half-life in air (d)	Thalf_a	5.30 E-01	5.30E-01	1.00	1	
Reaction half-life in surface soil (d)	Thalf_g	1.21 E+03	1.21E+03	1.10	1	
Reaction half-life in root-zone soil (d)	Thalf_s	1.21 E+03	1.21E+03	1.20	1	
Reaction half-life in vadose-zone soil (d)	Thalf_v	2.56 E+03	2.56E+03	1.00	1	
Reaction half-life in ground water (d)	Thalf_q	7.33 E+02	7.33E+02	1.30	1	
Reaction half-life in surface water (d)	Thalf_w	3.29 E+03	3.29E+03	1.20	1	
Reaction half-life in sediments (d)	Thalf_d	2.56 E+03	2.56E+03	1.40	1	
Reaction half-life in the leaf surface (d)	Thalf_ls	3.29 E+03	-9.90E+01	1.00	1	

Landscape properties

site name	Calif. Residential Site (CA Res.)		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Contaminated area in m2	Area	4.68 E+04	4.68E+04	0.10	1	(m/y)
	Annual average precipitation (m/d)	rain	1.12 E-03	1.12E-03	0.56	1	4.07 E-01
	Not currently used	rain_days	0.00 E+00	0.00E+00	0.00	1	
	Flux; surface water into landscape (m/d)	inflow	0.00 E+00	0.00E+00	0.10	1	0.00 E+00
	Land surface runoff (m/d)	runoff	5.47 E-04	6.10E-04	1.00	1	2.00 E-01
	Atmospheric dust load (kg/m3)	rhob_a	6.15 E-08	6.15E-08	0.20	1	
	Dry deposition velocity, air particles (m/d)	v_d	5.00 E+02	5.00E+02	0.30	1	
	Aerosol organic fraction	foc_ap	2.00 E-01	2.00E-01	1.00	1	
	Volume fraction of water in leaf	beta_leaf	5.00 E-01	5.00E-01	0.05	1	
	Volume fraction of air in leaf	alpha_leaf	1.80 E-01	1.80E-01	0.20	1	
	Volume fraction of lipid in leaf	lipid_leaf	2.00 E-03	2.00E-03	0.20	1	
	Volume fraction of water in stem	beta_stem	4.00 E-01	4.00E-01	0.20	1	
	Volume fraction of water in root	beta_root	6.00 E-01	6.00E-01	0.20	1	
	Primary produciton dry vegetation(kg/m2/y)	veg_prod	9.00 E-01	9.00E-01	0.20	1	
	One-sided Leaf Area Index	**LAI -**	3.63 E+00	-9.90E+01	0.40	1	
	Wet interception fraction	IF_w	1.00 E-01	1.00E-01	0.10	1	
	Avg thickness of leaf surface(cuticle)(m)	d_cuticle	2.00 E-06	2.00E-06	0.20	1	
	Stem wet density (kg/m3)	rho_stm	8.30 E+02	8.30E+02	0.20	1	
	Leaf wet density (kg/m3)	rho_leaf	8.20 E+02	8.20E+02	0.30	1	
	Root wet density (kg/m3)	rho_root	8.00 E+02	8.00E+02	0.05	1	
	Veg attenuation fctr, dry interception(m2/kg)	atf_leaf	2.90 E+00	2.90E+00	0.01	1	

Landscape properties (continued)

site name	Calif. Residential Site (CA Res.)	Value used	Mean value	Coeff. Var.	Adjustment	Notes
Stomata area frctn(area stomata/area leaf)	na_st	7.00 E-03	7.00E-03	0.20	1	
Effective pore depth	del_st	2.50 E-05	2.50E-05	0.20	1	
Boundary layer thickness over leafs	del_a	2.00 E-03	2.00E-03	1.00	1	
Leaf surface erosion half-life (d)	Thalf_le	1.40 E+01	1.40E+01	1.00	1	
Ground-water recharge (m/d)	recharge	5.58 E-05	5.58E-05	1.00	1	2.04 E-02
Evaporation of water from surface wtr (m/d)	evaporate	6.85 E-05	6.85E-05	1.00	1	
Thickness of the ground soil layer (m)	d_g	5.00 E-03	5.00E-03	1.00	1	
Soil particle density (kg/m3)	rhos_s	2.60 E+03	2.60E+03	0.05	1	
Water content in surface soil (vol fraction)	beta_g	1.92 E-01	1.92E-01	0.33	1	
Air content in the surface soil (vol frctn)	alpha_g	2.66 E-01	2.66E-01	0.29	1	cm/y
Erosion of surface soil (kg/m2-d)	erosion_g	2.03 E-04	2.03E-04	1.00	1	0.004636
Bioturbation (m^2/d)	D_bio	1.20 E-04	1.20E-04	1.00	1	
Thickness of the root-zone soil (m)	d_s	1.40 E+00	1.40E+00	0.47	1	
Water content of root-zone soil (vol. frctn.)	beta_s	2.06 E-01	2.06E-01	0.34	1	
Air content of root-zone soil (vol. frctn.)	alpha_s	2.53 E-01	2.53E-01	0.31	1	
Thickness of the vadose-zone soil (m)	d_v	2.00 E+00	2.00E+00	0.37	1	
Water content; vadose-zone soil (vol. frctn.)	beta_v	2.02 E-01	2.02E-01	0.32	1	
Air content of vadose-zone soil (vol. frctn.)	alpha_v	2.36 E-01	2.36E-01	0.30	1	
Thickness of the aquifer layer (m)	d_q	3.00 E+01	3.00E+01	0.30	1	
Solid material density in aquifer (kg/m3)	rhos_q	2.60 E+03	2.60E+03	0.05	1	
Porosity of the aquifer zone	beta_q	3.00 E-01	3.00E-01	0.20	1	
Fraction of land area in surface water	f_arw	1.00 E-04	1.00E-04	0.20	1	
Average depth of surface waters (m)	d_w	5.00 E+00	5.00E+00	1.00	1	
Suspended sedmnt in surface wtr (kg/m3)	rhob_w	8.00 E-01	8.00E-01	1.00	1	
Suspended sdmnt deposition (kg/m2/d)	deposit	1.05 E+01	1.05E+01	0.30	1	(m/s)
Thickness of the sediment layer (m)	d_d	5.00 E-02	5.00E-02	1.00	1	
Solid material density in sediment (kg/m3)	rhos_d	2.60 E+03	2.60E+03	0.05	1	
Porosity of the sediment zone	beta_d	2.00 E-01	2.00E-01	0.20	1	m/y
Sediment burial rate (m/d)	bury_d	1.00 E-06	1.00E-06	5.00	1	3.65 E-04
Ambient environmental temperature (K)	Temp	2.89 E+02	2.89E+02	0.06	1	(m/s)
Surface water current in m/d	current_w	0.00 E+00	0.00E+00	1.00	1	0.00 E+00

Landscape properties (continued)

site name	Calif. Residential Site (CA Res.)		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Organic carbon fraction in upper soil zone	foc_s	1.24 E-02	8.47E-03	1.98	1	
	Organic carbon fraction in vadose zone	foc_v	3.06 E-03	3.06E-03	0.96	1	
	Organic carbon fraction in aquifer zone	foc_q	3.06 E-03	3.06E-03	0.96	1	
	Organic carbon fraction in sediments	foc_d	2.00 E-02	2.00E-02	1.00	1	
	Bndry lyr thickness in air above soil (m)	del_ag	5.00 E-03	5.00E-03	0.20	1	(m/s)
	Yearly average wind speed (m/d)	v_w	2.80 E+05	2.80E+05	0.17	1	3.24 E+00

Human Exposure Factors

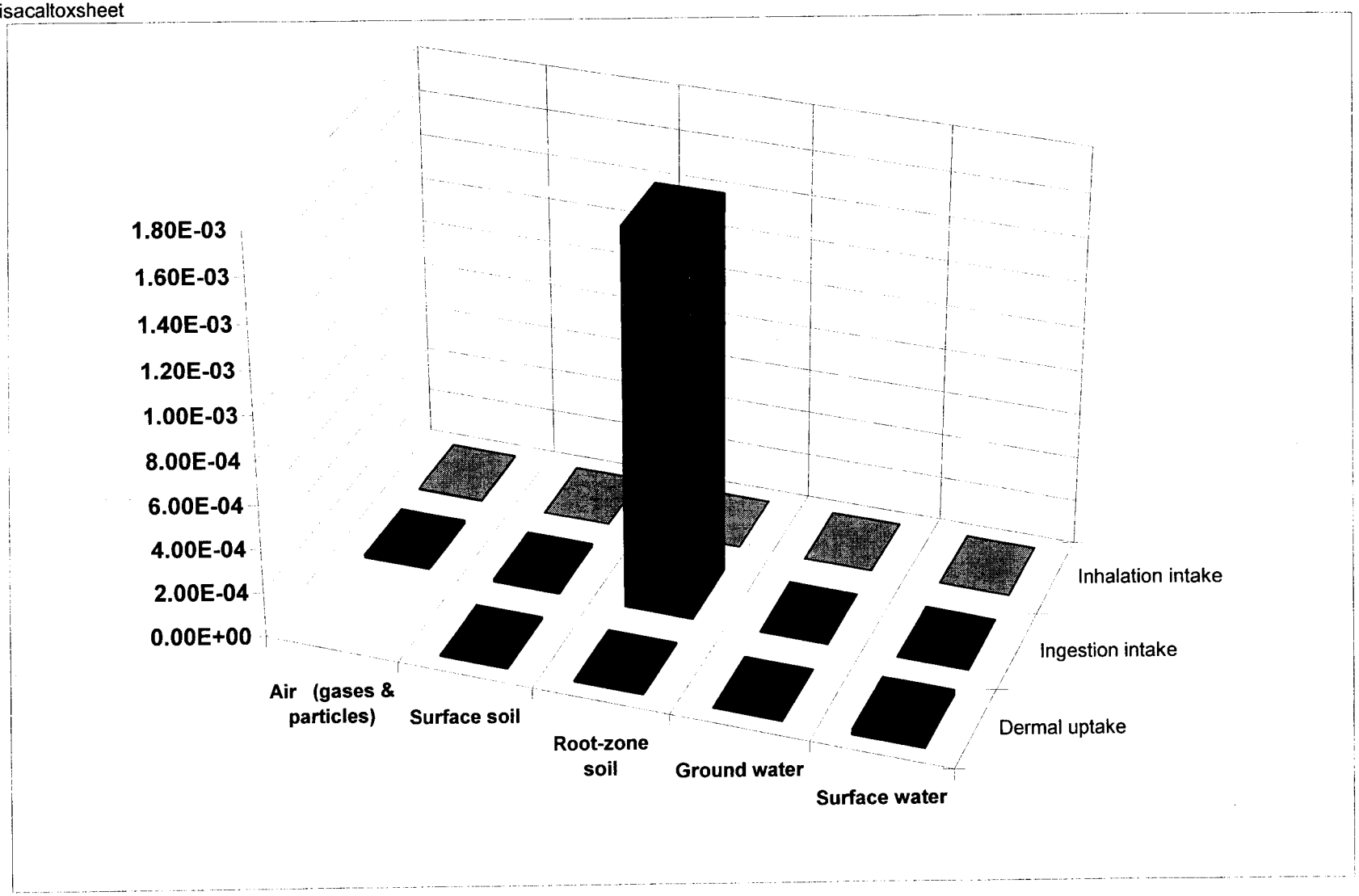
scenario	(Residential) Exposure Factors		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Body weight (kg)	BW	6.20 E+01	6.20E+01	0.20	1	
	Surface area (m2/kg)	SAb	2.60 E-02	2.60E-02	0.07	1	
	Active breathing rate (m3/kg-h)	BRa	1.90 E-02	1.90E-02	0.30	1	
	Resting breathing rate (m3/kg-h)	BRr	6.40 E-03	6.40E-03	0.20	1	
	Fluid Intake (L/kg-d)	Ifl	2.20 E-02	2.20E-02	0.20	1	
	Fruit and vegetable intake (kg/kg-d)	Ifv	4.90 E-03	4.90E-03	0.20	1	
	Grain intake (kg/kg-d)	Ig	3.70 E-03	3.70E-03	0.20	1	
	Milk intake (kg/kg-d)	Imk	6.50 E-03	6.50E-03	0.20	1	
	Meat intake (kg/kg-d)	Imt	3.00 E-03	3.00E-03	0.20	1	
	Egg intake (kg/kg-d)	Iegg	4.60 E-04	4.60E-04	0.30	1	
	Fish intake (kg/kg-d)	Ifsh	2.90 E-04	2.90E-04	0.40	1	
	Soil ingestion (kg/d)	Isl	3.50 E-07	3.50E-07	3.00	1	
	Breast milk ingestion by infants (kg/kg-d)	Ibm	1.10 E-01	1.10E-01	0.20	1	
	Inhalation by cattle (m3/d)	Inc	1.22 E+02	1.22E+02	0.30	1	
	Inhalation by hens (m3/d)	Inh	2.20 E+00	2.20E+00	0.30	1	
	Ingestion of pasture, dairy cattle (kg[FM]/d)	Ivdc	8.50 E+01	8.50E+01	0.20	1	
	Ingestion of pasture, beef cattle (kg[FM]/d)	Ivbc	6.00 E+01	6.00E+01	0.40	1	
	Ingestion of pasture by hens (kg[FM]/d)	Ivh	1.20 E-01	1.20E-01	0.04	1	
	Ingestion of water by dairy cattle (L/d)	Iwdc	3.50 E+01	3.50E+01	0.20	1	
	Ingestion of water by beef cattle (L/d)	Iwbc	3.50 E+01	3.50E+01	0.20	1	
	Ingestion of water by hens (L/d)	Iwh	8.40 E-02	8.40E-02	0.10	1	
	Ingestion of soil by cattle (kg/d)	Isc	4.00 E-01	4.00E-01	0.70	1	
	Ingestion of soil by hens (kg/d)	Ish	1.30 E-05	1.30E-05	1.00	1	

Human Exposure Factors (continued)

scenario	(Residential) Exposure Factors		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Fraction of water needs from ground water	fw_gw	8.00 E-01	8.00E-01	0.10	1	
	Fraction of water needs from surface water	fw_sw	2.00 E-01	2.00E-01	0.10	1	
	Water irrigation rate applied to agr.soil (l/m2-d)	R_irr	2.59 E+00	2.59E+00	1.00	1	
	Frctn frts & vgtbls that are exposed produce	fabv_grd_v	4.70 E-01	4.70E-01	0.10	1	
	Fraction of fruits and vegetables local	flocal_v	2.40 E-01	2.40E-01	0.70	1	
	Fraction of grains local	flocal_g	1.20 E-01	1.20E-01	0.70	1	
	Fraction of milk local	flocal_mk	4.00 E-01	4.00E-01	0.70	1	
	Fraction of meat local	flocal_mt	4.40 E-01	4.40E-01	0.50	1	
	Fraction of eggs local	flocal_egg	4.00 E-01	4.00E-01	0.70	1	
	Fraction of fish local	flocal_fsh	7.00 E-01	7.00E-01	0.30	1	
	Plant-air prttn fctr, particles, m3/kg[FM]	Kpa_part	3.30 E+03	3.30E+03	1.80	1	
	Rainsplash (mg/kg[plnt FM])/(mg/kg[dry soil])	rainsplash	3.40 E-03	3.40E-03	1.00	1	
	Water use in the shower (L/min)	Wshower	8.00 E+00	8.00E+00	0.40	1	
	Water use in the House (L/h)	Whouse	4.00 E+01	4.00E+01	0.40	1	
	Room ventilation rate, bathroom (m3/min)	VRbath	1.00 E+00	1.00E+00	0.40	1	
	Room ventilation rate, house (m3/h)	VRhouse	7.50 E+02	7.50E+02	0.30	1	
	Exposure time, in shower or bath (h/day)	ETsb	2.70 E-01	2.70E-01	0.60	1	
	Exposure time, active indoors (h/day)	ETai	8.00 E+00	8.00E+00	0.14	1	
	Exposure time, outdoors at home (h/day)	ETao	3.00 E-01	3.00E-01	0.14	1	
	Exposure time, indoors resting (h/day)	ETri	8.00 E+00	8.00E+00	0.04	1	
	Indoor dust load (kg/m^3)	dust_in	3.00 E-08	3.00E-08	0.40	1	
	Exposure frequency to soil on skin, (d/y)	EFsl	1.37 E+02	1.37E+02	0.60	1	
	Soil adherence to skin (mg/cm^2)	Slsk	5.00 E-01	5.00E-01	0.40	1	
	Ratio of indoor gas conc. to soil gas conc.	alpha_inair	1.00 E-04	1.00E-04	2.00	1	
	Exposure time swimming (h/d)	ETsw	5.00 E-01	5.00E-01	0.50	1	
	Exposure frequency, swimming (d/y)	EFsw	1.50 E+01	1.50E+01	4.00	1	
	Water ingestion while swimming (L/kg-h)	Isww	7.00 E-04	7.00E-04	1.00	1	
	Exposure duration (years)	ED	1.40 E+01	1.40E+01	1.15	1	
	Averaging time (days)	AT	2.56 E+04	2.56E+04	0.10	1	

Constants		
Gas Constant (Pa-m^3/mol-K)	8.31E+00	Rgas

thisisacaltoxsheet



Exposure Pathway-Include-and-Exclude Toggles

All inhalation exposures indoors active	1	Contaminant transfer, air to plants surfaces	1
All inhalation exposures indoors resting	1	Cntmnnt. transfer, grnd. soil to plant surfaces	1
Inhalation exposure in shower/bath	1	Contamnnt. transfer, root soil to plant tissues	1
Inhalation exposures outdoors active	1	On-site grazing of animals	0
Inhalation of air particles indoors	1		
Transfer of soil dust to indoor air	1	Ingestion of home-grown exposed produce	1
Transfer of soil vapors to indoor air	1	Ingestion of home-grown unexposed produce	1
On-site inhalation by animals	1	Ingestion of home-grown meat	0
		Ingestion of home-grown milk	0
Use of ground water as tap water	0	Ingestion of home-grown eggs	0
Use of surface water as tap water	0	Ingestion of locally caught fish	0
Ingestion of tap water	1	Direct soil ingestion	1
Use of ground water for irrigation	0	Soil contact exposure at home or at work	1
Use of surface water for irrigation	0	Dermal exposure during shower/bath	1
		Dermal & ingstn exposures while swimming	1
Use of ground water for feeding animals	0		
Use of surface water for feeding animals	0	Breast-milk ingestion by infants	1

MEDIA AND CORRESPONDING POTENTIAL DOSES IN mg/kg-d (averaged over the exposure duration)

PATHWAYS	Air (gases & particles)	Surface soil	Root-zone soil	Ground water	Surface water	Totals	%
INHALATION	3.98E-06	2.40E-08	9.68E-08	0.00E+00	0.00E+00	**4.10E-06**	0.23
INGESTION:							
Water				0.00E+00	4.77E-07	4.77E-07	0.03
Exposed produce	1.40E-05	1.33E-05	2.13E-05	0.00E+00	0.00E+00	4.86E-05	2.74
Unexposed produce			1.69E-03	0.00E+00	0.00E+00	1.69E-03	94.87
Meat	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Milk	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Eggs	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Fish					0.00E+00	0.00E+00	0.00
Soil		1.11E-08	1.25E-08			2.36E-08	0.00
Total ingestion	1.40 E-05	1.33 E-05	1.71 E-03	0.00 E+00	4.77 E-07	**1.74 E-03**	97.63
DERMAL UPTAKE		5.80E-06	6.53E-06	0.00E+00	2.57E-05	**3.80E-05**	2.14
Dose SUM	**1.79E-05**	**1.92E-05**	**1.71E-03**	**0.00E+00**	**2.61E-05**	**1.78E-03**	100.0

Breast milk concentration	Air (gases & particles)	Surface soil	Root-zone soil	Ground water	Surface water	total
	2.00 E-05	2.14 E-05	1.91 E-03	0.00 E+00	2.92 E-05	1.98 E-03
Infant dose	2.20 E-06	2.35 E-06	2.10 E-04	0.00 E+00	3.21 E-06	**dose_bm 2.18 E-04**

Ingestion dose used =>	1.74 E-03
Total dose used =>	1.78 E-03

ENVIRONMENTAL Media	Air (gases) mg/m^3 (air)	Air (dust) mg/m^3 (air)	Ground soil mg/kg(soil solids)	Root soil mg/kg(soil solids)	Ground water mg/L (pure)	Surface water mg/L (pure)
CONCENTRATIONS	1.89 E-05	1.59 E-07	3.93E+00	4.43 E+00	3.60 E-05	2.80 E-02

EXPOSURE MEDIA CONCENTRATIONS (averaged over the exposure duration)

EXPOSURE	Air (gases)	Air (dust)	Ground soil	Root soil	Ground water	Surface water
Indoor air (mg/m^3)	1.89 E-05	1.59 E-07	1.18 E-07	4.76 E-07	0.00 E+00	0.00 E+00
Bathroom air (mg/m^3)					0.00 E+00	0.00 E+00
Outdoor air (mg/m^3)	1.89 E-05	1.59 E-07				
Tap water (mg/L)					0.00 E+00	0.00 E+00
Exposed produce (mg/kg)	1.39 E-02	1.17 E-04	1.34 E-02	2.14 E-02	0.00 E+00	0.00 E+00
Unexposed produce (mg/kg)				2.71 E+00	0.00 E+00	0.00 E+00
Meat (mg/kg)	1.79 E-03	1.51 E-05	1.72 E-03	2.75 E-03	0.00 E+00	0.00 E+00
Milk (mg/kg)	8.02 E-04	6.77 E-06	7.70 E-04	1.23 E-03	0.00 E+00	0.00 E+00
Eggs (mg/kg)	2.31 E-05	1.95 E-07	2.17 E-05	3.47 E-05	0.00 E+00	0.00 E+00
Fish and seafood (mg/kg)						5.25 E+01
Household soil (mg/kg)			1.97 E+00	2.21 E+00		
Swimming water (mg/L)						3.31 E-02

PATHWAY CONTACT FACTORS (CR/BW*FI)

EXPOSURE Media	Units	Inhalation	Ingestion	Dermal
Indoor air (active)		1.52 E-01		
Indoor air (resting)		5.12 E-02		
Indoor air (shower/bath)		5.13 E-03		
Outdoor air (active)		5.70 E-03		
Tap water			2.20 E-02	2.41 E-03
Exposed produce			9.97 E-04	
Unexposed produce			6.23 E-04	
Meat			0.00 E+00	
Milk			0.00 E+00	
Eggs			0.00 E+00	
Fish and seafood			0.00 E+00	
Household soil			5.65 E-09	2.95 E-06
Swimming wtr			1.44 E-05	9.16 E-04

Dose ratios	inh-dose/Ns	ing-dose/Ns	drml-dose/Ns	inh-dose/Nq	ing-dose/Nq	drml-dose/Nq
	3.8 E-09	1.6 E-06	3.5 E-08	0.0 E+00	0.0 E+00	0.0 E+00

Time (y)	Total inhalation dose	Total ingestion dose	Total dermal dose	Total dose	Total dose from root soil	Total dose from ground water
1	1.3 E-05	5.4 E-03	1.2 E-04	5.6 E-03	5.6 E-03	0.0 E+00
2.4	9.5 E-06	4.0 E-03	8.8 E-05	4.1 E-03	4.1 E-03	0.0 E+00
3.8	7.0 E-06	3.0 E-03	6.5 E-05	3.1 E-03	3.1 E-03	0.0 E+00
5.2	5.2 E-06	2.2 E-03	4.8 E-05	2.3 E-03	2.3 E-03	0.0 E+00
6.6	3.9 E-06	1.6 E-03	3.6 E-05	1.7 E-03	1.7 E-03	0.0 E+00
8	2.9 E-06	1.2 E-03	2.7 E-05	1.2 E-03	1.2 E-03	0.0 E+00
9.4	2.1 E-06	9.0 E-04	2.0 E-05	9.2 E-04	9.2 E-04	0.0 E+00
10.8	1.6 E-06	6.7 E-04	1.5 E-05	6.8 E-04	6.8 E-04	0.0 E+00
12.2	1.2 E-06	4.9 E-04	1.1 E-05	5.1 E-04	5.1 E-04	0.0 E+00
13.6	8.6 E-07	3.7 E-04	8.0 E-06	3.8 E-04	3.8 E-04	0.0 E+00
15	6.4 E-07	2.7 E-04	5.9 E-06	2.8 E-04	2.8 E-04	0.0 E+00
Cumulative doses				9.084601886		
over ED by route, mg/kg	2.1 E-02	8.9 E+00	1.9 E-01	9.1 E+00	9.1 E+00	0.0 E+00
fraction	0.0023	0.9763	0.0214	1.0000	1.000	0.000
Average doses						
over ED by route, mg/kg-d	4.1 E-06	1.7 E-03	3.8 E-05	1.8 E-03	1.8 E-03	0.0 E+00
Maximum doses						
over ED by route, mg/kg-d	1.3 E-05	5.4 E-03	1.2 E-04	5.6 E-03	5.6 E-03	0.0 E+00
fraction	0.0023	0.9763	0.0214	1.0000	1.000	0.000

Max breast-milk dose	6.8 E-04	mg/kg-d	Max_ing	5.4 E-03

Off-site 1-h max X/Q (mol/m3-s)	6.2 E-03
Off-site Long-term X/Q	5.0 E-04
On-site Long-term X/Q	3.8 E-04
Off-site air dilution factor	1.0 E+00

Off-site pseudo Sa = 1.2 E-02 mol/day

bbb2 = 3.8 E-05 bbb4 = 2.5 E-01

bbb3 = 4.2 E-03 bbb5 = 1.8 E-04

			fugacity off-site	**fugacity on-site**	
Off-site air concentration (gases)	1.9 E-05	**mg/m3**	1.2 E-07	1.2 E-07	air
Off-site concentration (particles)	1.6 E-07	**mg/m3**			
Off-site surface-water concentrtn.	4.1 E-05	**mg/L**	4.0 E-08	2.7 E-05	water
Off-site surface soil concentration	5.7 E-03	**mg/kg**	3.9 E-08	2.7 E-05	ground soil
Off-site root-soil concentration	1.0 E-03	**mg/kg**	7.0 E-09	3.0 E-05	root soil

Off-site ground-water dilution	**0**

w	erf(w)
0.0 E+00	0.0 E+00
Dispsn redctn	3.5 E-01
decay reductn.	1.0 E+00

Darcy velociy of water	v_darc	1.0 E-01	m/d
Contaminant velocity	Vc	1.6 E-03	m/d
Trnsvrs. disprsn. coeff. (water)	D_T	5.0 E-02	m2/d
Trnsvrs. disprsn. coeff. (chem)	D_Tc	7.8 E-04	m2/d
Dispersion depth	dzz	10.4	m
Thickness of aquifer	d_q	30	m
Transverse dispersivity (chem)	alpha_t	5.0 E-01	m
Width of the contaminated area	Y	216	m
Distrance to off-site location	X	0	m
Mass tranfer rate, aquifer - out	T_qo	7.2 E-06	1/d

Calculated Properties

fugacity capacity of pure air	4.16E-04	Zair		
fugacity capacity of pure water	2.72E+00	Zwater		
height of the air compartment (m)	1.62E+01	d_a		
evapotranspiration of water from soil (m/d)	5.13E-04	evapotrans	1.87 E-01	m/y
transpiration of water from plants (m/d)	5.13E-04	transpire	1.87 E-01	m/y
Total surface water runoff (m/d)	4.78E-04	outflow	1.75 E-01	m/y
bndry lyr thickness in air above wtr (m)	5.62E-04	del_aw		
bndry lyr thickness in wtr below air (m)	1.94E-04	del_wa		
diffusion length in surface soil (m)	1.37E-02	del_g		
diffusion length in upper soil (m)	6.68E-01	del_s		
Thickness of the root-zone soil layer	1.40E+00	d_s		
wtr-side bndry lyr thickness with sed (m)	2.00E-02	del_wd		
sed-side bndry lyr thickness with wtr (m)	1.20E-03	del_dw		
Initial concentration in soil (mol/m3)	6.35E-02	Cs0		
Initial conc. in the vadose zone (mol/m3)	0.00E+00	Cv0		
Sediment resuspension rate (kg/m2-d)	1.23E+01	resuspend		
soil particle density; surface layer(kg/m3)	2.60E+03	rhos_g		
soil particle density; vadose layer(kg/m3)	2.60E+03	rhos_v		
Initial iventory in groundwater zone	0.00E+00	Nq0		
diffusion lag time in skin (h)	3.21E+01	tlag		
Skin/water partition coefficient	2.20E+03	Km		
Reaction rate constant in air (1/d)	1.31E+00	Ra		
Reaction rate constant, ground soil (1/d)	5.72E-04	Rg		
Reaction rate constant, root-zone soil (1/d)	5.72E-04	Rs		
Reaction rate constant, vadose-zone soil (1/d)	2.71E-04	Rv		
Reaction rate constant, ground water (1/d)	9.46E-04	Rq		
Reaction rate constant, surface water (1/d)	2.11E-04	Rw		
Reaction rate constant, sediment (1/d)	1.14E-07	Rd		
Reaction rate constant in leaf surface (1/d)	2.11E-04	Rls		
Continuous source term to air (mol/d)	0.00E+00	Sa		
Root lipid in root-zone soil(m3(organic)/m3(soil))	3.98E-03	RootLipid		

Leaf wet mass per area of soil (kg/m2)	1.15E+00	bm_leaf		
Wood and stem wet mass per area of soil(kg/m2)	2.69E+01	bm_stem		
Root wet mass per area of root-zone soil(kg/m2)	1.11E+01	bm_root		
Interception fraction for dry deposition on leaf	7.29E-01	IF_d		
Volume of the stem (m3)	1.52E+03	Vstm		
stomatal conductance (m/d)	1.51E+01	mtc_s		
cuticular conductance (m/d)	1.06E+01	mtc_c		
air side conductance over leaf (m/d)	5.40E+01	mtc_a		
cuticle water permeance (m/d)	1.61E-03	mtc_l		
conductance air/cuticle (m/d)	8.83E+00	mtc_ct		
conductance air/stomata (m/d)	1.18E+01	mtc_st		
root-soil / stem transfer factor	3.69E-07	x_rs		
stem / leaf transfer factor	4.43E-05	x_sl		
leaf / stem transfer factor	1.05E-03	p_ls		
stem / root-soil transfer factor	2.21E-06	p_sr		

Warnings

0 Ground soil depth greater than 2 cm
0 Root-zone soil too shallow for accuracy of diffusion model (must be at least 1.4*del_s)
0 Starting time cannot be 0 and should be greater than 365 day
0 Recharge velocity is negative
0 Recharge velocity is too large accuracy of model
0 Concentration in root-zone soil-water <0 or exceeds solubility when there are non-zero sources
0 Concentration in vadose-zone soil-water <0 or exceeds solubility when there are non-zero sources
0 Concentration in groundwater exceeds solubility or < 0
0 Concentration in surface water exceeds solubility
0 Concentration in sediment-zone water exceeds solubility
0 Exposure time indoors and outdoors at home or at work exceeds 24 h
0 Risk from breast milk exposure is large compared to other ingestion pathways
0 Hazard from breast milk exposure is large compared to other ingestion pathways
0 Fraction of water from groundwater plus fraction from surface >1
0 total

Fugacity (Pa)

Air	fa	1.19E-07
Cuticle	fc	1.43E-07
Leaf	fl	3.01E-07
Ground	fg	2.67E-05
Root	fs	3.00E-05
Vadose	fv	4.69E-08
Water	fw	2.70E-05
Sediment	fd	2.31E-05
Groundwater	fq	3.47E-08

Compartment Volumes (m^3)

Va	7.6 E+05	Air compartment
Vc	6.88E-01	Cuticle compartment
Vl	6.52E+01	Leaf compartment
Vg	2.3 E+02	Ground-soil compartment
Vs	6.6 E+04	Root-zone compartment
Vv	9.4 E+04	Vadose compartment volume
Vw	2.3 E+01	Water compartment
Vd	2.3 E-01	Sediment compartment
Vq	1.4 E+06	aquifer compartment

rhob_c 0.01141113 Volume fraction of atmospheric particles on cuticle (m3/m3)

phi 8.37E-03

Fugacity Capacities (mol/m^3 per Pa)

Zap	1.49E+05	fugacity capacity of air particles in mol/m3[s]-Pa
Zgp	1.01E+03	fugacity capacity of ground soil compartment particles in mol/m3[s]-Pa
Zsp	1.01E+03	fugacity capacity of root zone compartment particles in mol/m3[s]-Pa
Zvp	2.47E+02	fugacity capacity of vadose zone compartment particles in mol/m3[s]-Pa
Zwp	1.62E+03	fugacity capacity of suspended sediment in surface water in mol/m3[s]-Pa
Zdp	1.62E+03	fugacity capacity of bottom sediment particles in mol/m3[s]-Pa
Zqp	2.47E+02	fugacity capacity of aquifer solids in mol/m3-Pa
Zleaftotal	4.79E+02	fugacity capacity of the total leaf compartment in mol/Pa/m3
Za	4.20E-04	fugacity capacity of air compartment in mol/m3-Pa
Zc	4.13E+04	fugacity capacity of leaf surface compartment in mol/Pa/m3
Zl	4.83E+01	fugacity capacity of internal leaf compartment in mol/Pa/m3
Zg	5.46E+02	fugacity capacity of ground soil compartment in mol/m3-Pa
Zs	5.45E+02	fugacity capacity of root-soil compartment in mol/m3-Pa
Zv	1.40E+02	fugacity capacity of vadose-zone compartment in mol/m3-Pa
Zw	3.22E+00	fugacity capacity of water compartment in mol/m3-Pa
Zd	1.29E+03	fugacity capacity of sediment compartment in mol/m3-Pa
Zq	1.74E+02	fugacity capacity of aquifer compartment in mol/m3-Pa

Diffusion coefficients in m2/d

Compartment	Phase	Compartment		Boundary-layer thickness (del)	Fugacity mass-transfer coefficients mol/Pa-m2-d Y one-sided	both-sides
Dair	1.08E-01	Da	1.07E-01	5.62E-04	7.94E-02	7.08E-02
Dwater	4.66E-05	Dw	3.94E-05	1.94E-04	6.54E-01	
Dair_g	6.22E-03	Dg	1.20E-04	5.00E-03	8.99E-03	8.98E-03
Dwater_g	9.10E-07			1.37E-02	4.79E+00	
Dair_s	5.26E-03	Ds	1.20E-04	1.37E-02	4.79E+00	9.58E-02
Dwater_s	1.14E-06			6.68E-01	9.78E-02	
Dair_v	4.56E-03	Dv	1.20E-04	6.68E-01	9.78E-02	1.99E-02
Dwater_v	1.18E-06			6.69E-01	2.51E-02	
Dwater_d	5.45E-06	Dd	1.15E-08	2.00E-02	7.51E-03	4.67E-03
				1.20E-03	1.24E-02	

Overall intercompartment mass transfer rate constants (1/day) T

Diffusion	Advection	Total	Compartment Interface
1.04E-03	7.32E-05	1.11E-03	air-water, T_aw
4.40 E-03		4.40E-03	water-air, T_wa
1.32E+00	4.97E-01	1.81E+00	air-ground, T_ag
3.29E-03	4.36E-06	3.29E-03	ground-air, T_ga
3.51E-02	5.57E-05	3.52E-02	ground-soil, T_gs
1.26E-04	0.00E+00	1.26E-04	soil-ground, T_sg
	1.99E-07	1.99E-07	soil-vadose, T_sv
			vadose-soil, T_vs
2.90E-04	4.06E-01	4.06E-01	water-sediment, T_wd
7.22E-05	1.18E-01	1.18E-01	sediment-water, T_dw
3.91E+00	2.35E-01	4.15E+00	air-cuticle, T_ac
4.40E-02	2.48E-03	4.65E-02	cuticle-air, T_ca
2.62E+00		2.62E+00	air - leaf T_al
2.68E-01		2.68E-01	leaf-air, T_la
5.26E-02		5.26E-02	cuticle-leaf, T_cl
4.74E-01		4.74E-01	leaf-cuticle, T_lc
	4.98E-02	4.98E-02	cuticle-ground T_cg
	2.74E-03	2.74E-03	leaf-ground T_lg
	2.21E-06	2.21E-06	leaf-soil, T_ls
	3.66E-07	3.66E-07	soil-leaf, T_sl
		0.00E+00	ground-cuticle, T_gc
	5.44E-07	5.44E-07	vadose-aquifer, T_vq
	2.50E-05	2.50E-05	sediment-out, T_do
	2.98E+02	2.98E+02	air-out, T_ao
	5.74E-04	5.74E-04	ground-water, T_gw
	9.57E-01	9.57E-01	water-out, T_wo

aaa1	1.16E-03	C0_1	4.16E+03
aaa2	5.97E-04	C0_2	0.00E+00
aaa3	1.09E-05	S_1	0.00E+00
aaa4	8.69E-10	S_2	0.00E+00
aaa5	3.18E-03	AA	8.10E-04
bbb1	0.00E+00	BB	0.00E+00
bbb2	0.00E+00	CC	1.99E-07
bbb3	0.00E+00	DDD	2.72E-04
ccc1	5.78E-01	Gam1	-2.72E-04
ccc2	4.08E+00	Gam2	-8.10E-04
ccc3	3.06E+02	Gm1mGm2	5.39E-04
ccc4	4.16E-01	Gam1p	8.10E-04
ccc5	3.20E+00	Gam2p	2.72E-04
ccc6	1.61E-01	Gm1mGm2p	5.39E-04

aaa6	4.16E+03
aaa7	2.63E+00
aaa8	-2.63E+00
bbb4	0.00E+00
bbb5	0
Lam1	0.000587

Source terms (g/d)

air	0.0 E+00	ground	0.0 E+00	water	0.0 E+00

Compartment Name		Loss-rate constant (1/day) L	Total Inventory (moles) N	Concen-tration (mol/m3) C	Mass distri-bution %	Gains g/d	Losses g/d	Residence Time (days)
air	a	3.07E+02	3.80E-05	5.00E-11	0.00%	4.45E+00	4.45E+00	3.25E-03
leaf	l	7.45E-01	9.48E-04	1.45E-05	0.00%	2.69E-01	2.69E-01	1.34E+00
cuticle	c	1.49E-01	4.07E-03	5.92E-03	0.00%	2.31E-01	2.31 E-01	6.71E+00
ground-soil	g	3.96E-02	3.41E+00	1.46E-02	0.31%	5.14E+01	5.15E+01	2.53E+01
root-soil	s	6.98E-04	1.07E+03	1.64E-02	98.85%	4.57E+01	2.85E+02	1.43E+03
vadose-zone	v	2.72E-04	6.12E-01	6.54E-06	0.06%	8.14E-02	6.33E-02	3.68E+03
surface water	w	1.37E+00	2.04E-03	8.70E-05	0.00%	1.06E+00	1.06E+00	7.31E-01
sediment	d	1.18E-01	6.99E-03	2.99E-02	0.00%	3.15E-01	3.15E-01	8.46E+00
aquifer	q	9.53E-04	8.49E+00	6.04E-06	0.78%	1.27E-04	3.08E+00	1.05E+03

Mass Flows (g/d)

air-ground	2.62E-02	Tag*Na*MW
air-water	1.61E-05	Taw*Na*MW
air-out	4.31E+00	Tao*Na*MW
air-leaves	3.79E-02	Tal*Na*MW
air-leaf surfaces	6.00E-02	Tac*Na*MW
air-transform	1.89E-02	Ra*Na*MW
leaves-air	9.69E-02	Tla*Nl*MW
leaves-leaf surfaces	1.71E-01	Tlc*Nl*MW
leaves-ground	9.89E-04	Tlg*Nl*MW
leaves-soil	7.97E-07	Tls*Nl*MW
leaf-surface - air	7.21E-02	Tca*Nc*MW
leaf-surfaces - leaves	8.16E-02	Tcl*Nc*MW
leaf-surfaces - ground	7.72E-02	Tcg*Nc*MW
leaf surfaces-trnsfrm	3.27E-04	Rls*Nc*MW
ground-air	4.28E+00	Tga*Ng*MW
ground-leaf surface	0.00E+00	T_gc*Ng*MW
ground-soil	4.57E+01	Tgs*Ng*MW

ground-water	7.46E-01	Tgw*Ng*MW
ground-trnsfrm	7.43E-01	Rg*Ng*MW
soil-ground	5.14E+01	Tsg*Ns*MW
soil-leaves	1.50E-01	Tsl*Ns*MW
soil-vadose	8.14E-02	Tsv*Ns*MW
soil-trnsfrm	2.34E+02	Rs*Ns*MW
vadose-aquifer	1.27E-04	Tvq*Nv*MW
vadose-trnsfrm	6.32E-02	Rv*Nv*MW
aquifer-removal	3.08E+00	Lq*Nq*MW
water-air	3.41E-03	Twa*Nw*MW
water-sediment	3.15E-01	Twd*Nw*MW
water-out	7.43E-01	Two*Nw*MW
water-trnsfrm	1.64E-04	Rw*Nw*MW
sediment-water	3.15E-01	Tdw*Nd*MW
sedmnt-trnsfrm	3.04E-07	Rd*Nd*MW
sediment-out	6.66E-05	Tdo*Nd*MW

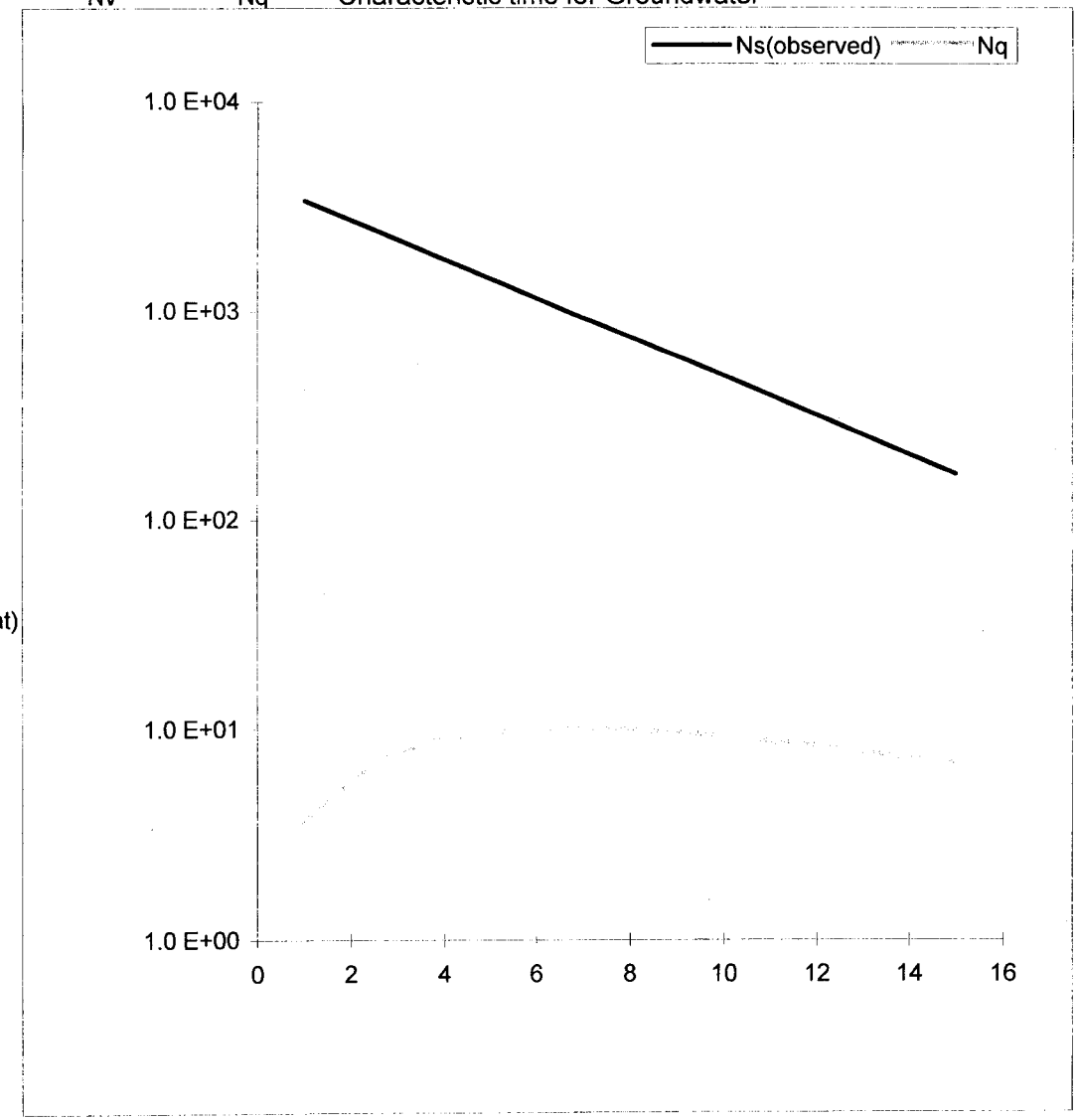
Time-dependent Compartment Inventories

Plot

Time (y)	Time (d)	Ns(observed)	Nq
1	365	3.4 E+03	3.6 E+00
2.4	876	2.5 E+03	6.9 E+00
3.8	1387	1.8 E+03	8.9 E+00
5.2	1898	1.4 E+03	9.8 E+00
6.6	2409	1.0 E+03	1.0 E+01
8	2920	7.5 E+02	9.9 E+00
9.4	3431	5.6 E+02	9.5 E+00
10.8	3942	4.1 E+02	8.9 E+00
12.2	4453	3.1 E+02	8.2 E+00
13.6	4964	2.3 E+02	7.5 E+00
15	5475	1.7 E+02	6.8 E+00

		Ns(0)[total]	
		4.2 E+03	
	const_sat	Ns(sat)	
	-4.987532018	8.5E+03	
t*	Ns(@Ns>=Nsat)	Ns(total)	Nv(@Ns=sat)
0	2.34 E+03	3.4E+03	5.9E-01
0	8.11 E+02	2.5E+03	1.0E+00
0	-5.94 E+01	1.8E+03	1.2E+00
0	-7.04 E+02	1.4E+03	1.4E+00
0	-1.18 E+03	1.0E+03	1.4E+00
0	-1.54 E+03	7.5E+02	1.4E+00
0	-1.80 E+03	5.6E+02	1.4E+00
0	-1.99 E+03	4.1E+02	1.4E+00
0	-2.14 E+03	3.1E+02	1.4E+00
0	-2.24 E+03	2.3E+02	1.3E+00
0	-2.32 E+03	1.7E+02	1.3E+00

Nv Nq Characteristic time for Groundwater



CalTOX™ 4.0 beta: Eight-Compartment Multimedia Exposure Model - Contaminated Soil

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Chemical ==>	Toxaphene
Landscape ==>	Calif. Residential Site (CA Res.)
Exposure Factors Set=>	(Residential) Exposure Factors

Toxicity Data ==>

	potencies 1/(mg/kg-d)	ADIs (mg/kg-d)
Inhalation	1.2 E+00	0.00025
Ingestion	1.2 E+00	0.00025
Dermal	1.2 E+00	0.00025
Total dose		0

	Risk	Hazard quotie
Target Risk/Hazard =	1.0 E-06	1.00

	current value	should be >
Root-soil thickness ===>	**1.4**	**3.6 E+0**
Alter root soil thickness to?	n/a	
Distance off-site for air exposure=	0.0 E+00	meters
Time after initial concentrations when exposure begins =	3.7 E+02	days

Measured Concentrations (at time = 0)

Root-zone soil	9724	ppm (mg/kg)
Vadose-zone soil	0	ppm (mg/kg)
Ground water	0	ppm (mg/L)

Continuous inputs

Methane flux m/d		0
Source term to air (mol/d)	0.0 E+00	Sa
Source term to ground-surface soil (mol/d)	0.0 E+00	Sg
Source term to root-zone soil (mol/d)	0.0 E+00	Ss
Source term to surface water(mol/d)	0.0 E+00	Sw

Aquifer characteristics

	Distance to first well (m)	0.0 E+00	d_well
0.001341446	Darcy veleocity (m/d)	1.0 E-01	v_darc
	Water dispersion coeff. (m2/d)	5.0 E-02	D_T

Summary of Results:

See Warnings Please

Un-mitigated risk and/or hazard ratio

Risk	1.3 E-2		
Hazard ratio	1.9 E+2		

Target Soil Concentrations (in ppm)

Based on cancer risk:

Root soil	**7.8 E-1**	**Non-linear**	
Vadose soil	**0.0 E+0**	**not avlbl.**	
		Root Soil	**7.8 E-1**
		Vadose soil	**n/a**

Based on hazard:

Root soil	**5.1 E+1**	**Non-linear**
Vadose soil	**0.0 E+0**	**not avlbl.**

Concentration limits without NAPL

Root soil	9.5 E+00	mg/kg solid
Vadose soil	2.7 E+00	mg/kg solid
Ground water	9.3 E-01	mg/L water

Time avrg. Conc. in on-site environmental media

Air	1.1 E-03	mg/m3
Total Leaf	1.4 E-05	mg/kg(total)
Grnd-surface soil	7.1 E-02	mg/kg(total)
Root-zone soil	9.5 E+00	mg/kg(total)
Vadose-zone soil	2.5 E-02	mg/kg(total)
Ground water	5.4 E-04	mg/L(water)
Surface water	7.6 E-03	mg/L
Sediment	1.0 E-01	mg/kg

Chemical Properties

Compound	Toxaphene		Value used	Mean value	Coeff. Var.	Adjustment	Notes
			0.00297	0.003	...	1	-1.3 E+06
	Molecular weight (g/mol)	MW	4.14 E+02	4.14E+02	0.01	1	
	Octanol-water partition coefficient	Kow	1.85 E+03	1.85E+03	0.08	1	
	Melting point (K)	Tm	3.58 E+02	3.58E+02	0.03	1	
	Vapor Pressure in (Pa)	VP	8.29 E-04	8.29E-04	0.66	1	
	Solubility in mol/m3	S	2.25 E-03	2.25E-03	1.00	1	Kaw
	Henry's law constant (Pa-m^3/mol)	H -	5.97 E+03	5.97E+03	0.46	1	2.4845429
	Diffusion coefficient in pure air (m2/d)	Dair	1.00 E-01	1.00E-01	0.08	1	1.16 E-06
	Diffusion coefficient; pure water (m2/d)	Dwater	4.40 E-05	4.40E-05	0.25	1	5.10 E-10
	Organic carbon partition coefficient Koc	**Koc -**	8.87 E+02	-9.90E+01	1.00	1	m^2/s
	Ocatanol/air partition coefficient	**Koa -**	7.43 E+02	-9.90E+01	0.10	1	
	Partition coefficient in ground/root soil layer	**Kd_s -**	1.10 E+01	-9.90E+01	0.10	1	
	Partition coefficient in vadose-zone soil layer	**Kd_v -**	2.71 E+00	-9.90E+01	0.10	1	
	Partition coefficient in aquifer layer	**Kd_q -**	2.71 E+00	-9.90E+01	0.10	1	A parameter with a "-" symbol after it, indicates a parameter that can be calculated by a default algoritm when **the value of mean for this parameter is <0**. Otherwise the liste value is used.
	Partition coeffic. in surface wtr sediments	**Kd_d -**	1.77 E+01	-9.90E+01	0.10	1	
	NOT USED	Kps -	9.96 E-02	-9.90E+01	4.00	1	
	Leaves/phlm wtr prtn cff.(wet kg/m3 per wet kg/m3)	**Kl_phl -**	1.32 E+00	-9.90E+01	0.10	1	
	Stem/xylem-fluid prtn cff (m^3[xylem]/m^3[stem])	**Ks_x -**	1.00 E+01	-9.90E+01	0.10	1	
	Transpiration stream cncntrtn fctr (m^3[wtr]/m^3[ts])	**TSCF -**	6.90 E-01	-9.90E+01	0.10	1	
	Biotrnsfr fctr, plant/air (m3[a]/kg[pFM])	**Kpa -**	2.32 E-03	-9.90E+01	14.00	1	
	Biotransfer factor; cattle-diet/milk (d/kg[milk])	**Bk -**	1.47 E-05	-9.90E+01	11.00	1	
	Biotransfer factor; cattle-diet/meat (d/L)	**Bt -**	4.64 E-05	-9.90E+01	13.00	1	
	Biotransfer fctr; hen-diet/eggs (d/kg[egg contents])	**Be -**	2.93 E-04	-9.90E+01	14.00	1	
	Biotrnsfr fctr; brst mlk/mthr intake (d/kg)	**Bbmk -**	3.69 E-04	-9.90E+01	10.00	1	
	Bioconcentration factor; fish/water	**BCF -**	8.87 E+01	-9.90E+01	0.60	1	
	Particle scavenging ratio of rain drops	**Psr_rain -**	5.00 E+04	5.00E+04	2.40	1	
	Skin permeability coefficient; cm/h	**Kp_w -**	1.19 E-03	-9.90E+01	2.40	1	
	Skin-water/soil partition coefficient (L/kg)	**Km -**	1.00 E+00	-9.90E+01	1.30	1	
	Fraction dermal uptake from soil	**dfct_sl-**	2.01 E-01	2.01E-01	1.00	1	

Chemical Properties (continued)

Reaction half-life in air (d)	Thalf_a	2.20 E+01	2.20E+01	1.00	1	
Reaction half-life in surface soil (d)	Thalf_g	4.02 E+03	4.02E+03	1.10	1	
Reaction half-life in root-zone soil (d)	Thalf_s	4.02 E+03	4.02E+03	1.20	1	
Reaction half-life in vadose-zone soil (d)	Thalf_v	1.85 E+03	1.85E+03	1.00	1	
Reaction half-life in ground water (d)	Thalf_q	1.85 E+03	1.85E+03	1.30	1	
Reaction half-life in surface water (d)	Thalf_w	4.38 E+03	4.38E+03	1.20	1	
Reaction half-life in sediments (d)	Thalf_d	2.58 E+03	2.58E+03	1.40	1	
Reaction half-life in the leaf surface (d)	Thalf_ls	4.38 E+03	-9.90E+01	1.00	1	

Landscape properties

site name	Calif. Residential Site (CA Res.)		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Contaminated area in m2	Area	4.68 E+04	4.68E+04	0.10	1	(m/y)
	Annual average precipitation (m/d)	rain	1.12 E-03	1.12E-03	0.56	1	4.07 E-01
	Not currently used	rain_days	0.00 E+00	0.00E+00	0.00	1	
	Flux; surface water into landscape (m/d)	inflow	0.00 E+00	0.00E+00	0.10	1	0.00 E+00
	Land surface runoff (m/d)	runoff	5.47 E-04	6.10E-04	1.00	1	2.00 E-01
	Atmospheric dust load (kg/m3)	rhob_a	6.15 E-08	6.15E-08	0.20	1	
	Dry deposition velocity, air particles (m/d)	v_d	5.00 E+02	5.00E+02	0.30	1	
	Aerosol organic fraction	foc_ap	2.00 E-01	2.00E-01	1.00	1	
	Volume fraction of water in leaf	beta_leaf	5.00 E-01	5.00E-01	0.05	1	
	Volume fraction of air in leaf	alpha_leaf	1.80 E-01	1.80E-01	0.20	1	
	Volume fraction of lipid in leaf	lipid_leaf	2.00 E-03	2.00E-03	0.20	1	
	Volume fraction of water in stem	beta_stem	4.00 E-01	4.00E-01	0.20	1	
	Volume fraction of water in root	beta_root	6.00 E-01	6.00E-01	0.20	1	
	Primary produciton dry vegetation(kg/m2/y)	veg_prod	9.00 E-01	9.00E-01	0.20	1	
	One-sided Leaf Area Index	**LAI -**	3.63 E+00	-9.90E+01	0.40	1	
	Wet interception fraction	IF_w	1.00 E-01	1.00E-01	0.10	1	
	Avg thickness of leaf surface(cuticle)(m)	d_cuticle	2.00 E-06	2.00E-06	0.20	1	
	Stem wet density (kg/m3)	rho_stm	8.30 E+02	8.30E+02	0.20	1	
	Leaf wet density (kg/m3)	rho_leaf	8.20 E+02	8.20E+02	0.30	1	
	Root wet density (kg/m3)	rho_root	8.00 E+02	8.00E+02	0.05	1	
	Veg attenuation fctr, dry interception(m2/kg)	atf_leaf	2.90 E+00	2.90E+00	0.01	1	

Landscape properties (continued)

site name	Calif. Residential Site (CA Res.)	Value used	Mean value	Coeff. Var.	Adjustment	Notes
Stomata area frctn(area stomata/area leaf)	na_st	7.00 E-03	7.00E-03	0.20	1	
Effective pore depth	del_st	2.50 E-05	2.50E-05	0.20	1	
Boundary layer thickness over leafs	del_a	2.00 E-03	2.00E-03	1.00	1	
Leaf surface erosion half-life (d)	Thalf_le	1.40 E+01	1.40E+01	1.00	1	
Ground-water recharge (m/d)	recharge	5.58 E-05	5.58E-05	1.00	1	2.04 E-02
Evaporation of water from surface wtr (m/d)	evaporate	6.85 E-05	6.85E-05	1.00	1	
Thickness of the ground soil layer (m)	d_g	5.00 E-03	5.00E-03	1.00	1	
Soil particle density (kg/m3)	rhos_s	2.60 E+03	2.60E+03	0.05	1	
Water content in surface soil (vol fraction)	beta_g	1.92 E-01	1.92E-01	0.33	1	
Air content in the surface soil (vol frctn)	alpha_g	2.66 E-01	2.66E-01	0.29	1	cm/y
Erosion of surface soil (kg/m2-d)	erosion_g	2.03 E-04	2.03E-04	1.00	1	0.004636
Bioturbation (m^2/d)	D_bio	1.20 E-04	1.20E-04	1.00	1	
Thickness of the root-zone soil (m)	d_s	1.40 E+00	1.40E+00	0.47	1	
Water content of root-zone soil (vol. frctn.)	beta_s	2.06 E-01	2.06E-01	0.34	1	
Air content of root-zone soil (vol. frctn.)	alpha_s	2.53 E-01	2.53E-01	0.31	1	
Thickness of the vadose-zone soil (m)	d_v	2.00 E+00	2.00E+00	0.37	1	
Water content; vadose-zone soil (vol. frctn.)	beta_v	2.02 E-01	2.02E-01	0.32	1	
Air content of vadose-zone soil (vol. frctn.)	alpha_v	2.36 E-01	2.36E-01	0.30	1	
Thickness of the aquifer layer (m)	d_q	3.00 E+01	3.00E+01	0.30	1	
Solid material density in aquifer (kg/m3)	rhos_q	2.60 E+03	2.60E+03	0.05	1	
Porosity of the aquifer zone	beta_q	3.00 E-01	3.00E-01	0.20	1	
Fraction of land area in surface water	f_arw	1.00 E-04	1.00E-04	0.20	1	
Average depth of surface waters (m)	d_w	5.00 E+00	5.00E+00	1.00	1	
Suspended sedmnt in surface wtr (kg/m3)	rhob_w	8.00 E-01	8.00E-01	1.00	1	
Suspended sdmnt deposition (kg/m2/d)	deposit	1.05 E+01	1.05E+01	0.30	1	(m/s)
Thickness of the sediment layer (m)	d_d	5.00 E-02	5.00E-02	1.00	1	
Solid material density in sediment (kg/m3)	rhos_d	2.60 E+03	2.60E+03	0.05	1	
Porosity of the sediment zone	beta_d	2.00 E-01	2.00E-01	0.20	1	m/y
Sediment burial rate (m/d)	bury_d	1.00 E-06	1.00E-06	5.00	1	3.65 E-04
Ambient environmental temperature (K)	Temp	2.89 E+02	2.89E+02	0.06	1	(m/s)
Surface water current in m/d	current_w	0.00 E+00	0.00E+00	1.00	1	0.00 E+00

Landscape properties (continued)

site name	Calif. Residential Site (CA Res.)		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Organic carbon fraction in upper soil zone	foc_s	1.24 E-02	8.47E-03	1.98	1	
	Organic carbon fraction in vadose zone	foc_v	3.06 E-03	3.06E-03	0.96	1	
	Organic carbon fraction in aquifer zone	foc_q	3.06 E-03	3.06E-03	0.96	1	
	Organic carbon fraction in sediments	foc_d	2.00 E-02	2.00E-02	1.00	1	
	Bndry lyr thickness in air above soil (m)	del_ag	5.00 E-03	5.00E-03	0.20	1	(m/s)
	Yearly average wind speed (m/d)	v_w	2.80 E+05	2.80E+05	0.17	1	3.24 E+00

Human Exposure Factors

scenario	(Residential) Exposure Factors		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Body weight (kg)	BW	6.20 E+01	6.20E+01	0.20	1	
	Surface area (m2/kg)	SAb	2.60 E-02	2.60E-02	0.07	1	
	Active breathing rate (m3/kg-h)	BRa	1.90 E-02	1.90E-02	0.30	1	
	Resting breathing rate (m3/kg-h)	BRr	6.40 E-03	6.40E-03	0.20	1	
	Fluid Intake (L/kg-d)	Ifl	2.20 E-02	2.20E-02	0.20	1	
	Fruit and vegetable intake (kg/kg-d)	Ifv	4.90 E-03	4.90E-03	0.20	1	
	Grain intake (kg/kg-d)	Ig	3.70 E-03	3.70E-03	0.20	1	
	Milk intake (kg/kg-d)	Imk	6.50 E-03	6.50E-03	0.20	1	
	Meat intake (kg/kg-d)	Imt	3.00 E-03	3.00E-03	0.20	1	
	Egg intake (kg/kg-d)	Iegg	4.60 E-04	4.60E-04	0.30	1	
	Fish intake (kg/kg-d)	Ifsh	2.90 E-04	2.90E-04	0.40	1	
	Soil ingestion (kg/d)	Isl	3.50 E-07	3.50E-07	3.00	1	
	Breast milk ingestion by infants (kg/kg-d)	Ibm	1.10 E-01	1.10E-01	0.20	1	
	Inhalation by cattle (m3/d)	Inc	1.22 E+02	1.22E+02	0.30	1	
	Inhalation by hens (m3/d)	Inh	2.20 E+00	2.20E+00	0.30	1	
	Ingestion of pasture, dairy cattle (kg[FM]/d)	Ivdc	8.50 E+01	8.50E+01	0.20	1	
	Ingestion of pasture, beef cattle (kg[FM]/d)	Ivbc	6.00 E+01	6.00E+01	0.40	1	
	Ingestion of pasture by hens (kg[FM]/d)	Ivh	1.20 E-01	1.20E-01	0.04	1	
	Ingestion of water by dairy cattle (L/d)	Iwdc	3.50 E+01	3.50E+01	0.20	1	
	Ingestion of water by beef cattle (L/d)	Iwbc	3.50 E+01	3.50E+01	0.20	1	
	Ingestion of water by hens (L/d)	Iwh	8.40 E-02	8.40E-02	0.10	1	
	Ingestion of soil by cattle (kg/d)	Isc	4.00 E-01	4.00E-01	0.70	1	
	Ingestion of soil by hens (kg/d)	Ish	1.30 E-05	1.30E-05	1.00	1	

Human Exposure Factors (continued)

scenario	(Residential) Exposure Factors		Value used	Mean value	Coeff. Var.	Adjustment	Notes
	Fraction of water needs from ground water	fw_gw	8.00 E-01	8.00E-01	0.10	1	
	Fraction of water needs from surface water	fw_sw	2.00 E-01	2.00E-01	0.10	1	
	Water irrigation rate applied to agr.soil (l/m2-d)	R_irr	2.59 E+00	2.59E+00	1.00	1	
	Frctn frts & vgtbls that are exposed produce	fabv_grd_v	4.70 E-01	4.70E-01	0.10	1	
	Fraction of fruits and vegetables local	flocal_v	2.40 E-01	2.40E-01	0.70	1	
	Fraction of grains local	flocal_g	1.20 E-01	1.20E-01	0.70	1	
	Fraction of milk local	flocal_mk	4.00 E-01	4.00E-01	0.70	1	
	Fraction of meat local	flocal_mt	4.40 E-01	4.40E-01	0.50	1	
	Fraction of eggs local	flocal_egg	4.00 E-01	4.00E-01	0.70	1	
	Fraction of fish local	flocal_fsh	7.00 E-01	7.00E-01	0.30	1	
	Plant-air prttn fctr, particles, m3/kg[FM]	Kpa_part	3.30 E+03	3.30E+03	1.80	1	
	Rainsplash (mg/kg[plnt FM])/(mg/kg[dry soil])	rainsplash	3.40 E-03	3.40E-03	1.00	1	
	Water use in the shower (L/min)	Wshower	8.00 E+00	8.00E+00	0.40	1	
	Water use in the House (L/h)	Whouse	4.00 E+01	4.00E+01	0.40	1	
	Room ventilation rate, bathroom (m3/min)	VRbath	1.00 E+00	1.00E+00	0.40	1	
	Room ventilation rate, house (m3/h)	VRhouse	7.50 E+02	7.50E+02	0.30	1	
	Exposure time, in shower or bath (h/day)	ETsb	2.70 E-01	2.70E-01	0.60	1	
	Exposure time, active indoors (h/day)	ETai	8.00 E+00	8.00E+00	0.14	1	
	Exposure time, outdoors at home (h/day)	ETao	3.00 E-01	3.00E-01	0.14	1	
	Exposure time, indoors resting (h/day)	ETri	8.00 E+00	8.00E+00	0.04	1	
	Indoor dust load (kg/m^3)	dust_in	3.00 E-08	3.00E-08	0.40	1	
	Exposure frequency to soil on skin, (d/y)	EFsl	1.37 E+02	1.37E+02	0.60	1	
	Soil adherence to skin (mg/cm^2)	Slsk	5.00 E-01	5.00E-01	0.40	1	
	Ratio of indoor gas conc. to soil gas conc.	alpha_inair	1.00 E-04	1.00E-04	2.00	1	
	Exposure time swimming (h/d)	ETsw	5.00 E-01	5.00E-01	0.50	1	
	Exposure frequency, swimming (d/y)	EFsw	1.50 E+01	1.50E+01	4.00	1	
	Water ingestion while swimming (L/kg-h)	Isww	7.00 E-04	7.00E-04	1.00	1	
	Exposure duration (years)	ED	1.40 E+01	1.40E+01	1.15	1	
	Averaging time (days)	AT	2.56 E+04	2.56E+04	0.10	1	

Constants		
Gas Constant (Pa-m^3/mol-K)	8.31E+00	Rgas

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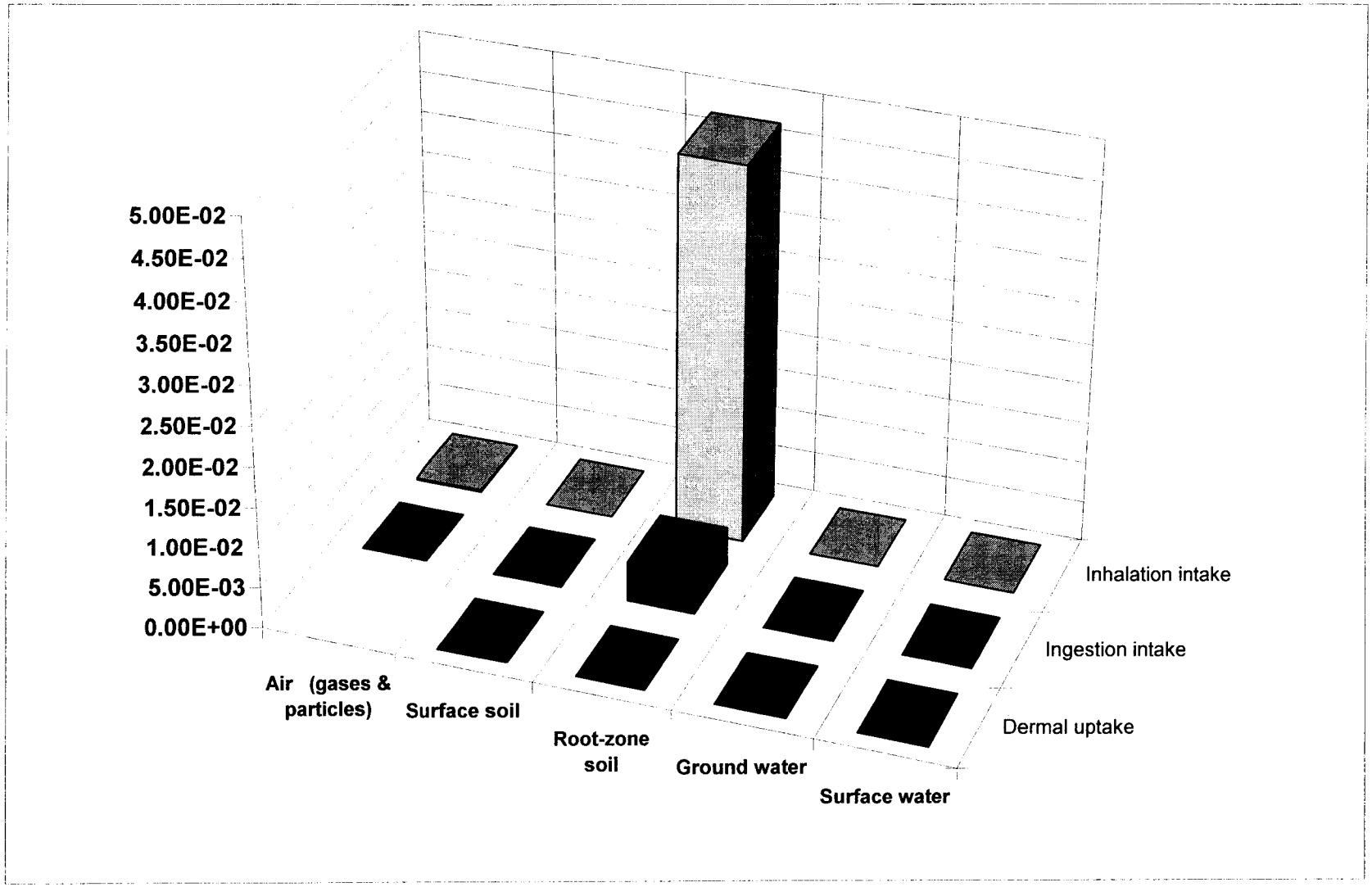


Exposure Pathway-Include-and-Exclude Toggles

All inhalation exposures indoors active	1	Contaminant transfer, air to plants surfaces	1
All inhalation exposures indoors resting	1	Cntmnnt. transfer, grnd. soil to plant surfaces	1
Inhalation exposure in shower/bath	1	Contamnnt. transfer, root soil to plant tissues	1
Inhalation exposures outdoors active	1	On-site grazing of animals	0
Inhalation of air particles indoors	1		
Transfer of soil dust to indoor air	1	Ingestion of home-grown exposed produce	1
Transfer of soil vapors to indoor air	1	Ingestion of home-grown unexposed produce	1
On-site inhalation by animals	1	Ingestion of home-grown meat	0
		Ingestion of home-grown milk	0
Use of ground water as tap water	0	Ingestion of home-grown eggs	0
Use of surface water as tap water	0	Ingestion of locally caught fish	0
Ingestion of tap water	1	Direct soil ingestion	1
Use of ground water for irrigation	0	Soil contact exposure at home or at work	1
Use of surface water for irrigation	0	Dermal exposure during shower/bath	1
		Dermal & ingstn exposures while swimming	1
Use of ground water for feeding animals	0		
Use of surface water for feeding animals	0	Breast-milk ingestion by infants	1

MEDIA AND CORRESPONDING POTENTIAL DOSES IN mg/kg-d (averaged over the exposure duration)

PATHWAYS	Air (gases & particles)	Surface soil	Root-zone soil	Ground water	Surface water	Totals	%
INHALATION	2.31E-04	4.66E-10	4.71E-02	0.00E+00	0.00E+00	**4.73E-02**	90.66
INGESTION:							
Water				0.00E+00	1.09E-07	1.09E-07	0.00
Exposed produce	1.60E-09	2.59E-07	1.19E-08	0.00E+00	0.00E+00	2.73E-07	0.00
Unexposed produce			4.85E-03	0.00E+00	0.00E+00	4.85E-03	9.31
Meat	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Milk	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Eggs	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Fish					0.00E+00	0.00E+00	0.00
Soil		2.16E-10	2.90E-08			2.92E-08	0.00
Total ingestion	1.60 E-09	2.60 E-07	4.85 E-03	0.00 E+00	1.09 E-07	**4.86 E-03**	9.31
DERMAL UPTAKE		1.13E-07	1.52E-05	0.00E+00	2.85E-07	**1.56E-05**	0.03
Dose SUM	**2.31E-04**	**3.73E-07**	**5.19E-02**	**0.00E+00**	**3.94E-07**	**5.22E-02**	100.0

Breast milk concentration	Air (gases & particles)	Surface soil	Root-zone soil	Ground water	Surface water	total
	5.59 E-06	9.01 E-09	1.25 E-03	0.00 E+00	9.51 E-09	1.26 E-03
Infant dose	6.15 E-07	9.91 E-10	1.38 E-04	0.00 E+00	1.05 E-09	**dose_bm 1.39 E-04**

Ingestion dose used =>	4.86 E-03
Total dose used =>	5.22 E-02

ENVIRONMENTAL Media	**Air (gases)** mg/m^3 (air)	**Air (dust)** mg/m^3 (air)	**Ground soil** mg/kg(soil solids)	**Root soil** mg/kg(soil solids)	**Ground water** mg/L (pure)	**Surface water** mg/L (pure)
CONCENTRATIONS	1.11 E-03	1.25 E-11	7.65E-02	1.03 E+01	5.37 E-04	7.48 E-03

EXPOSURE MEDIA CONCENTRATIONS (averaged over the exposure duration)

EXPOSURE	Air (gases)	Air (dust)	Ground soil	Root soil	Ground water	Surface water
Indoor air (mg/m^3)	1.11 E-03	1.25 E-11	2.30 E-09	2.32 E-01	0.00 E+00	0.00 E+00
Bathroom air (mg/m^3)					0.00 E+00	0.00 E+00
Outdoor air (mg/m^3)	1.11 E-03	1.25 E-11				
Tap water (mg/L)					0.00 E+00	0.00 E+00
Exposed produce (mg/kg)	1.61 E-06	1.81 E-14	2.60 E-04	1.19 E-05	0.00 E+00	0.00 E+00
Unexposed produce (mg/kg)				7.79 E+00	0.00 E+00	0.00 E+00
Meat (mg/kg)	6.28 E-06	7.06 E-14	7.24 E-07	3.32 E-08	0.00 E+00	0.00 E+00
Milk (mg/kg)	1.99 E-06	2.23 E-14	3.24 E-07	1.49 E-08	0.00 E+00	0.00 E+00
Eggs (mg/kg)	7.14 E-07	8.03 E-15	9.14 E-09	4.19 E-10	0.00 E+00	0.00 E+00
Fish and seafood (mg/kg)						6.63 E-01
Household soil (mg/kg)			3.83 E-02	5.14 E+00		
Swimming water (mg/L)						7.58 E-03

PATHWAY CONTACT FACTORS (CR/BW*FI)

EXPOSURE Media	Units	Inhalation	Ingestion	Dermal
Indoor air (active)		1.52 E-01		
Indoor air (resting)		5.12 E-02		
Indoor air (shower/bath)		5.13 E-03		
Outdoor air (active)		5.70 E-03		
Tap water			2.20 E-02	1.00 E-04
Exposed produce			9.97 E-04	
Unexposed produce			6.23 E-04	
Meat			0.00 E+00	
Milk			0.00 E+00	
Eggs			0.00 E+00	
Fish and seafood			0.00 E+00	
Household soil			5.65 E-09	2.95 E-06
Swimming wtr			1.44 E-05	3.81 E-05

Dose ratios	inh-dose/Ns	ing-dose/Ns	drml-dose/Ns	inh-dose/Nq	ing-dose/Nq	drml-dose/Nq
	2.0 E-05	2.0 E-06	6.4 E-09	0.0 E+00	0.0 E+00	0.0 E+00

Time (y)	Total inhalation dose	Total ingestion dose	Total dermal dose	Total dose	Total dose from root soil	Total dose from ground water
1	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
2.4	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
3.8	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
5.2	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
6.6	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
8	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
9.4	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
10.8	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
12.2	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
13.6	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
15	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
Cumulative doses				266.5119777		
over ED by route, mg/kg	2.4 E+02	2.5 E+01	8.0 E-02	2.7 E+02	2.7 E+02	0.0 E+00
fraction	0.9066	0.0931	0.0003	1.0000	1.000	0.000
Average doses						
over ED by route, mg/kg-d	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
Maximum doses						
over ED by route, mg/kg-d	4.7 E-02	4.9 E-03	1.6 E-05	5.2 E-02	5.2 E-02	0.0 E+00
fraction	0.9066	0.0931	0.0003	1.0000	1.000	0.000

Max breast-milk dose	1.4 E-04	mg/kg-d	Max_ing	4.9 E-03

Off-site 1-h max X/Q (mol/m3-s)	6.2 E-03
Off-site Long-term X/Q	5.0 E-04
On-site Long-term X/Q	3.8 E-04
Off-site air dilution factor	1.0 E+00

Off-site pseudo Sa = 6.1 E-01 mol/day

bbb2 = 2.0 E-03 bbb4 = 6.5 E-04

bbb3 = 4.1 E-06 bbb5 = 4.1 E-06

			fugacity off-site	**fugacity on-site**	
Off-site air concentration (gases)	1.1 E-03	**mg/m3**	6.4 E-06	6.4 E-06	air
Off-site concentration (particles)	1.2 E-11	**mg/m3**			
Off-site surface-water concentrtn.	5.0 E-07	**mg/L**	7.2 E-06	1.1 E-01	water
Off-site surface soil concentration	4.9 E-06	**mg/kg**	6.4 E-06	1.0 E-01	ground soil
Off-site root-soil concentration	2.8 E-06	**mg/kg**	3.6 E-06	1.3 E+01	root soil

Off-site ground-water dilution	**0**

w	erf(w)
0.0 E+00	0.0 E+00
Dispsn redctn	3.5 E-01
decay reductn.	1.0 E+00

Darcy velociy of water	v_darc	1.0 E-01	m/d
Contaminant velocity	Vc	1.9 E-02	m/d
Trnsvrs. disprsn. coeff. (water)	D_T	5.0 E-02	m2/d
Trnsvrs. disprsn. coeff. (chem)	D_Tc	9.6 E-03	m2/d
Dispersion depth	dzz	10.4	m
Thickness of aquifer	d_q	30	m
Transverse dispersivity (chem)	alpha_t	5.0 E-01	m
Width of the contaminated area	Y	216	m
Distrance to off-site location	X	0	m
Mass tranfer rate, aquifer - out	T_qo	8.8 E-05	1/d

Calculated Properties

fugacity capacity of pure air	4.16E-04	Zair		
fugacity capacity of pure water	1.68E-04	Zwater		
height of the air compartment (m)	1.62E+01	d_a		
evapotranspiration of water from soil (m/d)	5.13E-04	evapotrans	1.87 E-01	m/y
transpiration of water from plants (m/d)	5.13E-04	transpire	1.87 E-01	m/y
Total surface water runoff (m/d)	4.78E-04	outflow	1.75 E-01	m/y
bndry lyr thickness in air above wtr (m)	5.43E-04	del_aw		
bndry lyr thickness in wtr below air (m)	1.84E-04	del_wa		
diffusion length in surface soil (m)	2.22E-02	del_g		
diffusion length in upper soil (m)	2.57E+00	del_s		
Thickness of the root-zone soil layer	1.40E+00	d_s		
wtr-side bndry lyr thickness with sed (m)	2.00E-02	del_wd		
sed-side bndry lyr thickness with wtr (m)	6.60E-03	del_dw		
Initial concentration in soil (mol/m3)	3.79E+01	Cs0		
Initial conc. in the vadose zone (mol/m3)	0.00E+00	Cv0		
Sediment resuspension rate (kg/m2-d)	1.23E+01	resuspend		
soil particle density; surface layer(kg/m3)	2.60E+03	rhos_g		
soil particle density; vadose layer(kg/m3)	2.60E+03	rhos_v		
Initial iventory in groundwater zone	0.00E+00	Nq0		
diffusion lag time in skin (h)	3.62E+01	tlag		
Skin/water partition coefficient	1.03E+02	Km		
Reaction rate constant in air (1/d)	3.15E-02	Ra		
Reaction rate constant, ground soil (1/d)	1.73E-04	Rg		
Reaction rate constant, root-zone soil (1/d)	1.73E-04	Rs		
Reaction rate constant, vadose-zone soil (1/d)	3.75E-04	Rv		
Reaction rate constant, ground water (1/d)	3.75E-04	Rq		
Reaction rate constant, surface water (1/d)	1.58E-04	Rw		
Reaction rate constant, sediment (1/d)	1.45E-06	Rd		
Reaction rate constant in leaf surface (1/d)	1.58E-04	Rls		
Continuous source term to air (mol/d)	0.00E+00	Sa		
Root lipid in root-zone soil(m3(organic)/m3(soil))	3.98E-03	RootLipid		

Leaf wet mass per area of soil (kg/m2)	1.15E+00	bm_leaf		
Wood and stem wet mass per area of soil(kg/m2)	2.69E+01	bm_stem		
Root wet mass per area of root-zone soil(kg/m2)	1.11E+01	bm_root		
Interception fraction for dry deposition on leaf	7.29E-01	IF_d		
Volume of the stem (m3)	1.52E+03	Vstm		
stomatal conductance (m/d)	1.40E+01	mtc_s		
cuticular conductance (m/d)	4.37E-05	mtc_c		
air side conductance over leaf (m/d)	5.01E+01	mtc_a		
cuticle water permeance (m/d)	1.09E-04	mtc_l		
conductance air/cuticle (m/d)	4.37E-05	mtc_ct		
conductance air/stomata (m/d)	1.10E+01	mtc_st		
root-soil / stem transfer factor	1.55E-05	x_rs		
stem / leaf transfer factor	1.58E-03	x_sl		
leaf / stem transfer factor	1.41E-02	p_ls		
stem / root-soil transfer factor	7.88E-05	p_sr		

Warnings

0 Ground soil depth greater than 2 cm
1 Root-zone soil too shallow for accuracy of diffusion model (must be at least 1.4*del_s)
0 Starting time cannot be 0 and should be greater than 365 day
0 Recharge velocity is negative
0 Recharge velocity is too large accuracy of model
0 Concentration in root-zone soil-water <0 or exceeds solubility when there are non-zero sources
0 Concentration in vadose-zone soil-water <0 or exceeds solubility when there are non-zero sources
0 Concentration in groundwater exceeds solubility or < 0
0 Concentration in surface water exceeds solubility
0 Concentration in sediment-zone water exceeds solubility
0 Exposure time indoors and outdoors at home or at work exceeds 24 h
0 Risk from breast milk exposure is large compared to other ingestion pathways
0 Hazard from breast milk exposure is large compared to other ingestion pathways
0 Fraction of water from groundwater plus fraction from surface >1
1 total

Fugacity (Pa)

Air	fa	6.43E-06
Cuticle	fc	2.63E-05
Leaf	fl	5.36E-05
Ground	fg	1.00E-01
Root	fs	1.34E+01
Vadose	fv	1.28E-01
Water	fw	1.08E-01
Sediment	fd	9.22E-02
Groundwater	fq	7.75E-03

Compartment Volumes (m^3)

Va	7.6 E+05	Air compartment
Vc	6.88E-01	Cuticle compartment
Vl	6.52E+01	Leaf compartment
Vg	2.3 E+02	Ground-soil compartment
Vs	6.6 E+04	Root-zone compartment
Vv	9.4 E+04	Vadose compartment volume
Vw	2.3 E+01	Water compartment
Vd	2.3 E-01	Sediment compartment
Vq	1.4 E+06	aquifer compartment

rhob_c 0.01141113 Volume fraction of atmospheric particles on cuticle (m3/m3)

phi 1.12E-08

Fugacity Capacities (mol/m^3 per Pa)

Zap	1.98E-01	fugacity capacity of air particles in mol/m3[s]-Pa
Zgp	4.81E-03	fugacity capacity of ground soil compartment particles in mol/m3[s]-Pa
Zsp	4.81E-03	fugacity capacity of root zone compartment particles in mol/m3[s]-Pa
Zvp	1.18E-03	fugacity capacity of vadose zone compartment particles in mol/m3[s]-Pa
Zwp	7.72E-03	fugacity capacity of suspended sediment in surface water in mol/m3[s]-Pa
Zdp	7.72E-03	fugacity capacity of bottom sediment particles in mol/m3[s]-Pa
Zqp	1.18E-03	fugacity capacity of aquifer solids in mol/m3-Pa
Zleaftotal	7.93E-04	fugacity capacity of the total leaf compartment in mol/Pa/m3
Za	4.16E-04	fugacity capacity of air compartment in mol/m3-Pa
Zc	5.50E-02	fugacity capacity of leaf surface compartment in mol/Pa/m3
Zl	2.21E-04	fugacity capacity of internal leaf compartment in mol/Pa/m3
Zg	2.75E-03	fugacity capacity of ground soil compartment in mol/m3-Pa
Zs	2.74E-03	fugacity capacity of root-soil compartment in mol/m3-Pa
Zv	7.96E-04	fugacity capacity of vadose-zone compartment in mol/m3-Pa
Zw	1.70E-04	fugacity capacity of water compartment in mol/m3-Pa
Zd	6.21E-03	fugacity capacity of sediment compartment in mol/m3-Pa
Zq	8.77E-04	fugacity capacity of aquifer compartment in mol/m3-Pa

Diffusion coefficients in m2/d

Compartment Phase		Compartment		Boundary-layer thickness (del)	Fugacity mass-transfer coefficients mol/Pa-m2-d Y one-sided	both-sides	Overall intercompartment mass transfer rate constants (1/day) T Diffusion	Advection	Total	Compartment Interface
Dair	1.00E-01	Da	1.00E-01	5.43E-04	7.68E-02	4.02E-05	5.94E-07	2.80E-09	5.97E-07	air-water, T_aw
Dwater	4.40E-05	Dw	4.34E-05	1.84E-04	4.02E-05		4.73 E-02		4.73E-02	water-air, T_wa
Dair_g	5.78E-03	Dg	9.95E-04	5.00E-03	8.34E-03	1.21E-04	1.80E-02	2.50E-05	1.80E-02	air-ground, T_ag
Dwater_g	8.60E-07			2.22E-02	1.23E-04		8.84E+00	4.14E-06	8.84E+00	ground-air, T_ga
Dair_s	4.88E-03	Ds	8.62E-04	2.22E-02	1.23E-04	9.12E-07	6.64E-02	6.80E-04	6.70E-02	ground-soil, T_gs
Dwater_s	1.08E-06			2.57E+00	9.18E-07		2.38E-04	0.00E+00	2.38E-04	soil-ground, T_sg
Dair_v	4.23E-03	Dv	2.33E-03	2.57E+00	9.18E-07	4.04E-07		2.44E-06	2.44E-06	soil-vadose, T_sv
Dwater_v	1.12E-06			5.07E+00	7.22E-07					vadose-soil, T_vs
Dwater_d	5.15E-06	Dd	1.39E-07	2.00E-02	3.74E-07	9.69E-08	1.14E-04	3.67E-02	3.68E-02	water-sediment, T_wd
				6.60E-03	1.31E-07		3.12E-04	1.18E-01	1.18E-01	sediment-water, T_dw
							1.95E-05	3.02E-06	2.26E-05	air-cuticle, T_ac
							1.64E-01	2.48E-03	1.66E-01	cuticle-air, T_ca
							2.45E+00		2.45E+00	air - leaf T_al
							5.44E+04		5.44E+04	leaf-air, T_la
							1.64E-01		1.64E-01	cuticle-leaf, T_cl
							4.29E-01		4.29E-01	leaf-cuticle, T_lc
								4.98E-02	4.98E-02	cuticle-ground T_cg
								2.74E-03	2.74E-03	leaf-ground T_lg
								7.84E-05	7.84E-05	leaf-soil, T_ls
								1.53E-05	1.53E-05	soil-leaf, T_sl
									0.00E+00	ground-cuticle, T_gc
								5.87E-06	5.87E-06	vadose-aquifer, T_vq
								2.49E-05	2.49E-05	sediment-out, T_do
								2.98E+02	2.98E+02	air-out, T_ao
								6.69E-03	6.69E-03	ground-water, T_gw
								9.57E-01	9.57E-01	water-out, T_wo

aaa1	5.95E-07	C0_1	2.48E+06
aaa2	6.67E-03	C0_2	0.00E+00
aaa3	2.97E-02	S_1	0.00E+00
aaa4	5.15E-08	S_2	0.00E+00
aaa5	2.67E-05	AA	4.30E-04
bbb1	0.00E+00	BB	0.00E+00
bbb2	0.00E+00	CC	2.44E-06
bbb3	0.00E+00	DDD	3.81E-04
ccc1	5.44E+04	Gam1	-3.81E-04
ccc2	2.45E+00	Gam2	-4.30E-04
ccc3	3.00E+02	Gm1mGm2	4.87E-05
ccc4	5.44E+04	Gam1p	4.30E-04
ccc5	1.80E-02	Gam2p	3.81E-04
ccc6	5.90E-02	Gm1mGm2p	4.87E-05

aaa6	2.48E+06
aaa7	1.34E+05
aaa8	-1.34E+05
bbb4	0.00E+00
bbb5	0
Lam1	0.000426

Source terms (g/d)

air	0.0 E+00	ground	0.0 E+00	water	0.0 E+00

Compartment Name		Loss-rate constant (1/day) L	Total Inventory (moles) N	Concen-tration (mol/m3) C	Mass distri-bution %	Gains g/d	Losses g/d	Residence Time (days)
air	a	3.00E+02	2.04E-03	2.68E-09	0.00%	2.53E+02	2.53E+02	3.33E-03
leaf	l	5.44E+04	7.73E-07	1.19E-08	0.00%	1.74E+01	1.74E+01	1.84E-05
cuticle	c	3.80E-01	9.95E-07	1.45E-06	0.00%	1.56E-04	1.56 E-04	2.63E+00
ground-soil	g	8.92E+00	6.44E-02	2.75E-04	0.00%	2.37E+02	2.37E+02	1.12E-01
root-soil	s	4.28E-04	2.41E+03	3.68E-02	99.21%	1.79E+00	4.28E+02	2.34E+03
vadose-zone	v	3.81E-04	9.51E+00	1.02E-04	0.39%	2.43E+00	1.50E+00	2.62E+03
surface water	w	1.04E+00	4.29E-04	1.83E-05	0.00%	1.85E-01	1.85E-01	9.60E-01
sediment	d	1.18E-01	1.34E-04	5.73E-04	0.00%	6.54E-03	6.54E-03	8.48E+00
aquifer	q	4.64E-04	9.55E+00	6.80E-06	0.39%	2.31E-02	1.83E+00	2.16E+03

Mass Flows (g/d)

air-ground	1.52E-02	Tag*Na*MW
air-water	5.03E-07	Taw*Na*MW
air-out	2.51E+02	Tao*Na*MW
air-leaves	2.06E+00	Tal*Na*MW
air-leaf surfaces	1.90E-05	Tac*Na*MW
air-transform	2.66E-02	Ra*Na*MW
leaves-air	1.74E+01	Tla*Nl*MW
leaves-leaf surfaces	1.37E-04	Tlc*Nl*MW
leaves-ground	8.76E-07	Tlg*Nl*MW
leaves-soil	2.51E-08	Tls*Nl*MW
leaf-surface - air	6.83E-05	Tca*Nc*MW
leaf-surfaces - leaves	6.73E-05	Tcl*Nc*MW
leaf-surfaces - ground	2.05E-05	Tcg*Nc*MW
leaf surfaces-trnsfrm	6.51E-08	Rls*Nc*MW
ground-air	2.36E+02	Tga*Ng*MW
ground-leaf surface	0.00E+00	T_gc*Ng*MW
ground-soil	1.79E+00	Tgs*Ng*MW

ground-water	1.78E-01	Tgw*Ng*MW
ground-trnsfrm	4.60E-03	Rg*Ng*MW
soil-ground	2.37E+02	Tsg*Ns*MW
soil-leaves	1.53E+01	Tsl*Ns*MW
soil-vadose	2.43E+00	Tsv*Ns*MW
soil-trnsfrm	1.72E+02	Rs*Ns*MW
vadose-aquifer	2.31E-02	Tvq*Nv*MW
vadose-trnsfrm	1.48E+00	Rv*Nv*MW
aquifer-removal	1.83E+00	Lq*Nq*MW
water-air	8.40E-03	Twa*Nw*MW
water-sediment	6.54E-03	Twd*Nw*MW
water-out	1.70E-01	Two*Nw*MW
water-trnsfrm	2.81E-05	Rw*Nw*MW
sediment-water	6.54E-03	Tdw*Nd*MW
sedmnt-trnsfrm	8.05E-08	Rd*Nd*MW
sediment-out	1.38E-06	Tdo*Nd*MW

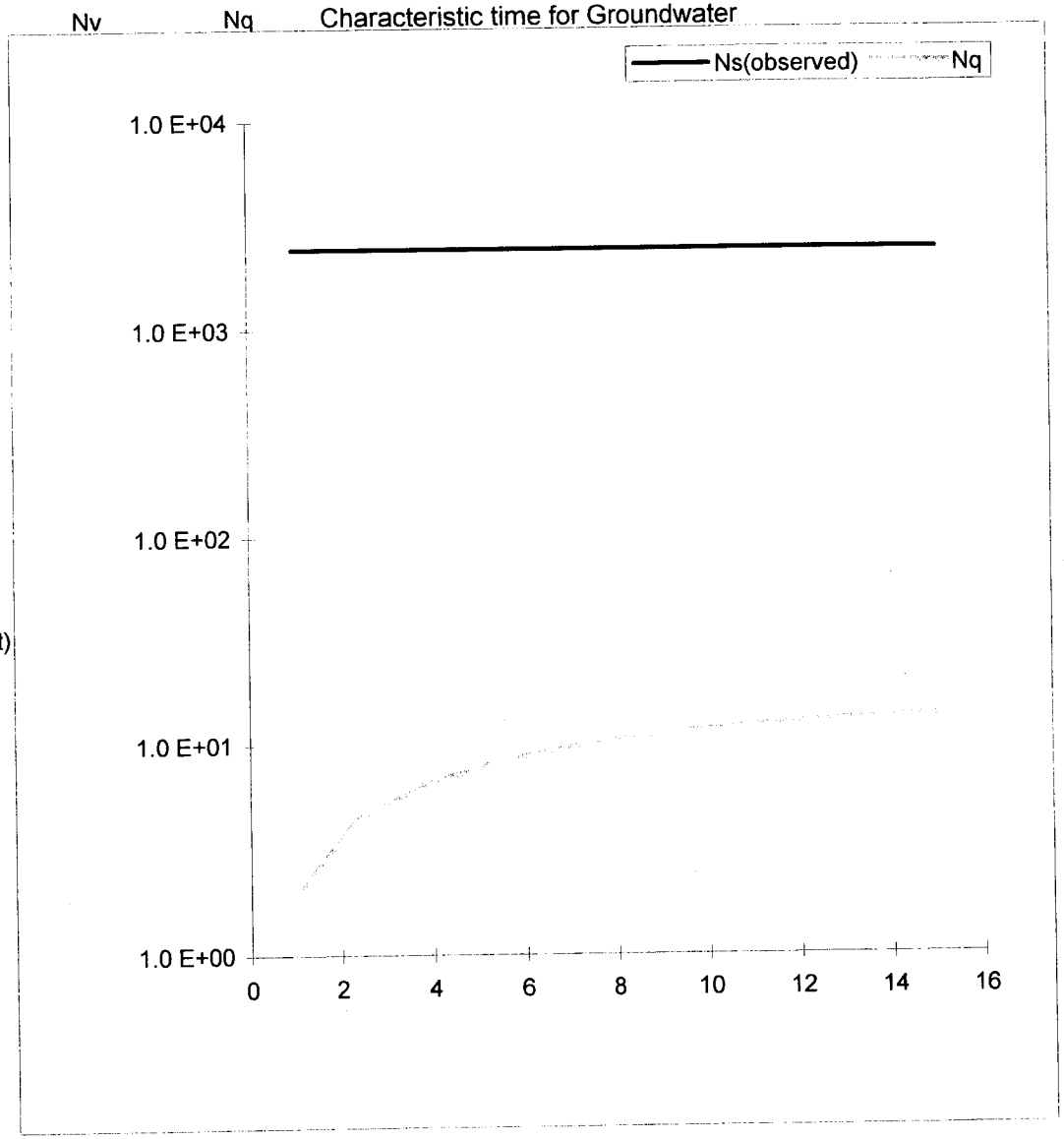
Time-dependent Compartment Inventories

Time (y)	Time (d)	Ns(observed)	Nq
1	365	2.4 E+03	2.0 E+00
2.4	876	2.4 E+03	4.4 E+00
3.8	1387	2.4 E+03	6.4 E+00
5.2	1898	2.4 E+03	8.0 E+00
6.6	2409	2.4 E+03	9.3 E+00
8	2920	2.4 E+03	1.0 E+01
9.4	3431	2.4 E+03	1.1 E+01
10.8	3942	2.4 E+03	1.2 E+01
12.2	4453	2.4 E+03	1.3 E+01
13.6	4964	2.4 E+03	1.3 E+01
15	5475	2.4 E+03	1.4 E+01

		Ns(0)[total]	
		2.5 E+06	
	const_sat	Ns(sat)	
	-1.029520705	2.4E+03	
t*	Ns(@Ns>=Nsat)	Ns(total)	Nv(@Ns=sat)
2410908.1	2.48 E+06	2.5E+06	2.0E+00
2410908.1	2.48 E+06	2.5E+06	4.4E+00
2410908.1	2.48 E+06	2.5E+06	6.3E+00
2410908.1	2.48 E+06	2.5E+06	8.0E+00
2410908.1	2.48 E+06	2.5E+06	9.3E+00
2410908.1	2.48 E+06	2.5E+06	1.0E+01
2410908.1	2.48 E+06	2.5E+06	1.1E+01
2410908.1	2.48 E+06	2.5E+06	1.2E+01
2410908.1	2.48 E+06	2.5E+06	1.3E+01
2410908.1	2.48 E+06	2.5E+06	1.3E+01
2410908.1	2.48 E+06	2.5E+06	1.4E+01

Plot

Nv Nq Characteristic time for Groundwater



Appendix F

Field Notes

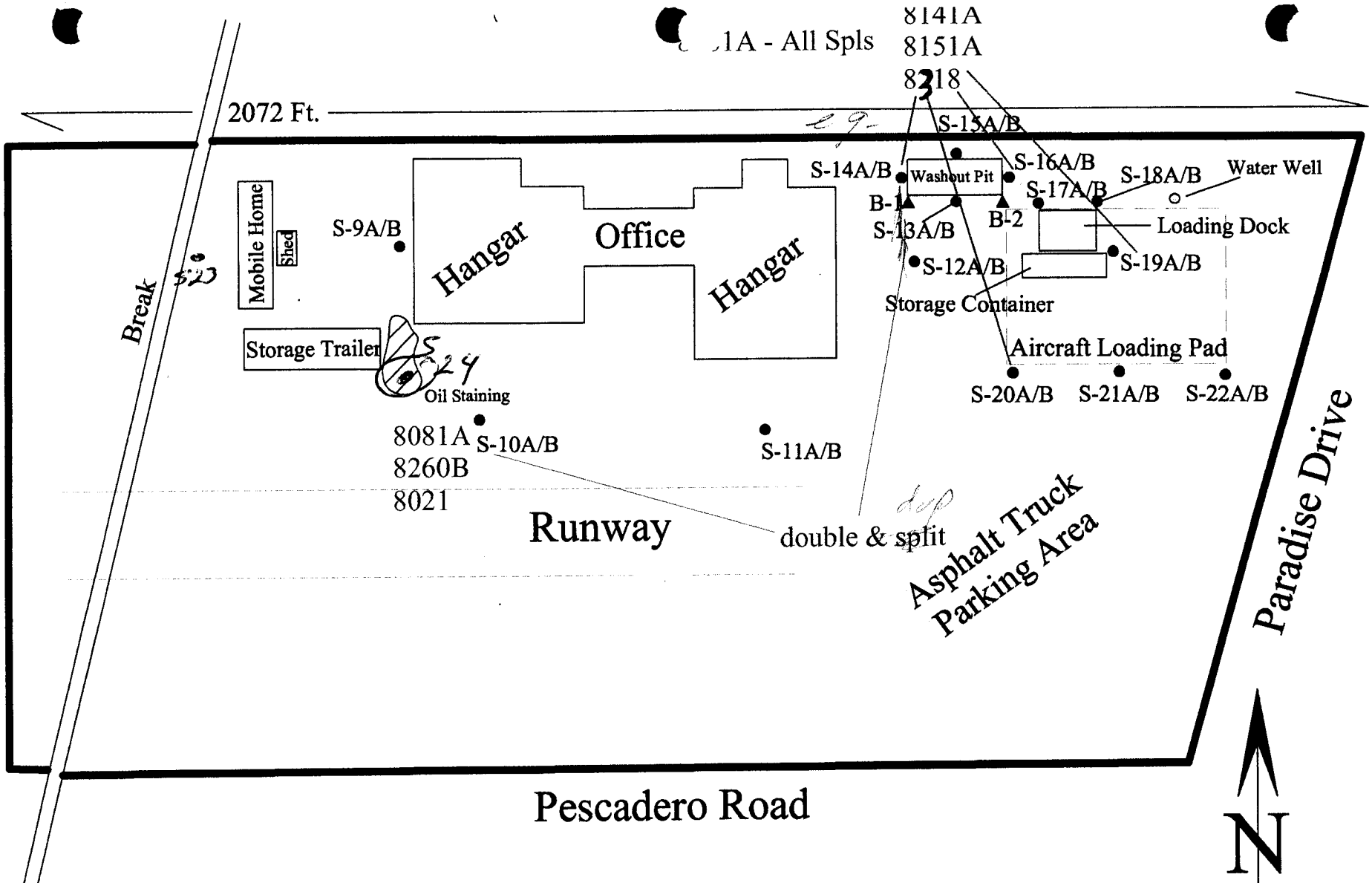


Figure 3
Detail Site Sketch Map
With Targeted Samplel Locations
Former Haley's Flying Service
21,000 Paradise Ave.
Tracy, CA

S-2A/B — Soil Sample Location & ID

B-2 — GeoProbe Soil Boring & ID

Scale 1 In. = 50 Ft.

Field/Activity Log

Job Name/Number: Haley's 474.2

Date(s): 8/24/03

Date	Time	Activity
8/24	655	arr. on site, Wx clear, mild 19°, NW wind 5 mph
	722	Eric Arrived
	733	Tailgate complete
	1110	eric left site
	1250	Temp 30°
	1400	stop work. cleaning up
8/25	705	arr at site
	750	finish rotohammer thru ~~base~~ road base along pad
	1010	26°
	1230	32°
	1238	quit work - clean up
	110	leave site

Additional Notes:

General Photos

#1 loaded truck

#2 decon setup & augers #2

Mileage:

To	From	Start Mileage	Stop Mileage	Total Miles
			Total Mileage-Job:	

Date	Time	Activity
9/26	610	arr site, WX cool clear, no wind.
		started by getting replacement 520
"	930	Finished shallow soil spls. Left site.

Soil Borings

Additional Notes: Wx Clear sunny, calm est 65°
9/6 arr on site 830 AM hand bored shallow holes for conductor, c

805 V&W arrived - had safety mtg
815 talked to eric - can't come out
935 set up on S-2, drilled thru 2' of 3.5" PVC. Found GW ± 11'
1015 took GW spl. Move to B-1.
1105 start on B-1
1125 took GW sp.

Grouted boring left loc at 1215

Station # S14

Photo

Sample ID S14 Date 8/24 Time 0800

Location
W end of pit

Soil Description

Color reddish brn 5YR 5/3 Texture (sand/silt/clay) sandy silt

Grain Size vf-silt Sorting poor

Comments
collected double spl for dup.
collected eq blank

Station # S10

Photo #3 spl pts

Moved sple pt 3' W & 3' S due to cse gravel under sump

Sample ID S10 Date 8/24 Time 930-95

Location
West drain sump

Soil Description

Color 5YR 5/3 reddish brn Texture (sand/silt/clay) silt

Grain Size Sorting —

Comments
0-6 spl for TEPH 8081
~~#~~ 6-12" " " " "
6-12" for VOC & dup.
sple # C is dup

Station # 3

Photo

Sample ID S15 Date 8/24 Time 941

Location N side of washoor pit.

Soil Description

Color 5YR 5/1 grey Texture (sand/silt/clay) silt

Grain Size Sorting

Comments

Station # 4

Photo #4 over looking pit

Sample ID S16 Date 8/24 Time 1135

Location E side of pit

Soil Description

Color 5YR 5/2 reddish gry Texture (sand/silt/clay) silt

Grain Size Sorting

Comments

Station # 5

Photo

Sample ID ~~5~~ 13 Date 8/24 Time 1156

Location
S side washout pit

Soil Description

Color 5YR 4/2 dk reddish gry Texture (sand/silt/clay) silty clay

Grain Size Sorting

Comments

Station # 6

Photo

Sample ID 518 Date 8/24 Time 1240

Location
NE corner loading dock

Soil Description

Color a.a. Texture (sand/silt/clay) clayey silt

Grain Size Sorting

Comments
8" road base on top of spl

Station # 7

Photo 5

rear of loading dock

Sample ID S17 Date 8/24 Time 12 55

Location

NW corner loading dock

Soil Description

Color 5YR 31 vy dk gry Texture (sand/silt/clay) silt

Grain Size _____ Sorting _____

Comments _____

oily odor on top

Station # 8

Photo 6

Sample ID S19 Date 8/24 Time 1340

Location

Trough in concrete

Soil Description

Color black Texture (sand/silt/clay) silty cly

Grain Size _____ Sorting _____

Comments _____

rare hammer thru ± 1" of conc.
oily odor
black stain

Station # 9

Photo 7

row of spl pts along S side of apron

Sample ID 522 Date 8/25 Time 805

Location E side of pad

Soil Description

Color 5 YR 3/3 dk reddish brn Texture (sand/silt/clay) sandy silt

Grain Size vf Sorting

Comments under 10" of road base

Station # 10

Photo

Sample ID 521 Date 8/25 Time 822

Location center S of pad

Soil Description

Color 9 a Texture (sand/silt/clay) sandy silt

Grain Size vf Sorting

Comments under 8" of road base

1051

Station # 11

Photo

Sample ID 520 Date 8/25 Time 835

Location
W side of pad

Soil Description
Color 5YR 4/6 yellowish red
Texture (sand/silt/clay) clayey silt
Grain Size
Sorting
Comments slightly plastic dot

W end S side of pad

under 10" road base

sample lost

see station 19

Station # 12

Photo

Sample ID 512 Date 8/25 Time 844

Location
E side of hanger - in depression

Soil Description
Color 5YR 4/3 reddish brn
Texture (sand/silt/clay) silt
Grain Size
Sorting
Comments

under 6" road base

Station # 13

Photo

Sample ID S11 Date 5/25 Time 928

Location sump infront of E Hanger

Soil Description

Color Fill Texture (sand/silt/clay)

Grain Size Sorting

Comments

sump is full of a mixture of cobbles & soil. Took spl 12-18" by removing material & separating the cobbles.

Station # 14

Photo 5

Sample ID S1 Date 5/25 Time 1009

Location

w end of parcel

Soil Description

Color 5YR 3/2 dk reddish brn Texture (sand/silt/clay) silt

Grain Size Sorting

Comments

under 6" of gravel

Station # 15

Photo

Sample ID 52 Date 8/25 Time 1045

Location
along air strip

Soil Description
yellowish red

Color 5YR 4/6 Texture (sand/silt/clay) Silt

Grain Size Sorting

Comments

Station # 16

Photo 9

Sample ID 53 Date 8/25 Time 1122

Location
along air strip

Soil Description

Color 5YR 5/4 reddish brn Texture (sand/silt/clay) Silt

Grain Size Sorting

Comments

Station # 17

Photo

Sample ID 54 Date 8/25 Time ~~1243~~ 1143

Location along air strip

Soil Description dk reddish brn

Color 5YR 3/2 Texture (sand/silt/clay) silty clay

Grain Size Sorting

Comments slighty plastic clot.

Station # 18

Photo

Sample ID 55 Date 8/25 Time 1220

Location along air strip

Soil Description

Color 5YR3/2 dk reddish brn Texture (sand/silt/clay) sandy silt

Grain Size vf Sorting

Comments

under 12" of mixed gravel

Station # 19

Photo 10

Sample ID S20 Date 8/26 Time 654

Location
e south side of pad - replacement for original S20

Soil Description

Color See stn # 11 Texture (sand/silt/clay) _____

Grain Size _____ Sorting _____

Comments _____

Taken 8" w of original spl pt

Station # 20

Photo 11

Sample ID S6 Date 8/26 Time 728

Location
along air strip

Soil Description

Color 5YR 3/3 dk brn Texture (sand/silt/clay) clayey silt

Grain Size _____ Sorting _____

Comments _____

scattered white mottling

Station # 21

Photo

Sample ID 57 Date 5/26 Time 753

Location
along air strip

Soil Description

Color aa. Texture (sand/silt/clay) clayey silt

Grain Size Sorting

Comments

less white mottling

Station # 22

Photo

Sample ID 58 Date 5/26 Time 811

Location
e end of runway

Soil Description

Color a a. Texture (sand/silt/clay) clayey silt

Grain Size Sorting

Comments

no mottling

Station # 23

Photo 12

Sample ID S9 Date 8/26 Time 835

Location w end of hangar

Soil Description

Color 5Y 3/4 dk brn Texture (sand/silt/clay) silt

Grain Size _____ Sorting _____

Comments sl. moist - crumbly

Station # 24

Photo _____

Sample ID S23 Date 8/26 Time 844

Location w of mobile home

Soil Description

Color 5Y 3/4 Texture (sand/silt/clay) clayey silt

Grain Size _____ Sorting _____

Comments _____

next to 3 drums w of old house trailer. Taken 1' bgs

Station # 25

Photo 13

Sample ID S24 Date 8/26 Time 905

Location
between hanger & storage structure
1m all stained area

Soil Description

Color dk brn 5YR 3/3 Texture (sand/silt/clay) silt

Grain Size _____ Sorting _____

Comments white mottling

under 10-12" of gravel
spl taken at 18"

Station # _____

Photo _____

Sample ID _____ Date _____ Time _____

Location

Soil Description

Color _____ Texture (sand/silt/clay) _____

Grain Size _____ Sorting _____

Comments _____

Station # 26

Photo _____
1 & 2
bore loc w
conductor

3 & 4
drilling

Sample ID B 2 Date 9/6 Time _____

Location 6' E & 1' S of SE corner of pit

Soil Description

Color _____ Texture (sand/silt/clay) _____

Grain Size _____ Sorting _____

Comments _____

Station # 27

Photo _____
5-8

Sample ID D-1 Date 9/6 Time _____

Location 8' W & 2' S of SW corner pit

Soil Description

Color _____ Texture (sand/silt/clay) _____

Grain Size _____ Sorting _____

Comments _____