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ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 300

[FRL-3730-8]

RIN 2050 AB73

Hazard Ranking System

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA) is adopting revisions to the Hazard Ranking System (HRS), the principal mechanism for placing sites on the National Priorities List (NPL). The revisions change the way EPA evaluates potential threats to human health and the environment from hazardous waste sites and make the HRS more accurate in assessing relative potential risk. These revisions comply with other statutory requirements in the Superfund Amendments and Reauthorization Act of 1986 (SARA).

DATES: Effective date March 14, 1991. As discussed in Section III H of this preamble, comments are invited on the addition of specific benchmarks in the air and soil exposure pathways until January 14, 1991.

ADDRESSES: Documents related to this rulemaking are available at and comments on the specific benchmarks in the air and soil exposure pathways may be mailed to the CERCLA Docket Office, OS-245, U.S. Environmental Protection Agency, Waterside Mall, 401 M Street, SW, Washington, DC 20460, phone 202-382-3046. Please send four copies of comments. The docket is available for viewing by appointment only from 9:00 am to 4:00 pm, Monday through Friday, excluding Federal holidays. The docket number is 105NCP-HRS.

FOR FURTHER INFORMATION CONTACT: Steve Caldwell or Agnes Ortiz, Hazardous Site Evaluation Division, Office of Emergency and Remedial Response, OS-230, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, or the Superfund Hotline at 800-424-9346 (in the Washington, DC area, 202-382-3000).

SUPPLEMENTARY INFORMATION:

Table of Contents

I. Background
II. Overview of the Final Rule
III. Discussion of Comments
A. Simplification
B. HRS Structure Issues
C. Hazardous Waste Quantity
D. Toxicity
E. Radionuclides
F. Mobility/Persistence
G. Observed Release
H. Benchmarks
I. Use Factors
J. Sensitive Environments
K. Use of Available Data
L. Ground Water Migration Pathway
M. Surface Water Migration Pathway
N. Soil Exposure Pathway
O. Air Migration Pathway
P. Large Volume Wastes
Q. Consideration of Removal Actions (Current Versus Initial Conditions)
R. Cutoff Score
IV. Section-by-Section Analysis of the Rule Changes
V. Required Analyses
A. Executive Order No. 12291
B. Regulatory Flexibility Analysis
C. Paperwork Reduction Act
D. Federalism Implications

I. Background

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601 *et seq.*), commonly called the Superfund, in response to the dangers posed by uncontrolled releases of hazardous substances, contaminants, and pollutants. To implement section 105(8)(A) of CERCLA and Executive Order 12316 (46 FR 42237, August 20, 1981), the U.S. Environmental Protection Agency (EPA) revised the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR part 300, on July 16, 1982 (47 FR 31180), with later revisions on September 16, 1985 (50 FR 37624), November 20, 1985 (50 FR 47912), and March 8, 1990 (55 FR 8666). The NCP sets forth guidelines and procedures for responding to releases or potential release of hazardous substances, pollutants, or contaminants.

Section 105(8)(A) of CERCLA (now section 105(a)(8)(A)) requires EPA to establish:

> Criteria for determining priorities among releases or threatened releases [of hazardous substances] throughout the United States for the purpose of taking remedial action and, to the extent practicable taking into account the potential urgency of such action, for the purpose of taking removal action. Criteria and priorities * * * shall be based upon the relative risk or danger to public health or welfare or the environment * * * taking into account to the extent possible the population at risk, the hazard potential of the hazardous substances at such facilities, the potential for contamination of drinking water supplies, the potential for direct human contact, [and] the potential for destruction of sensitive ecosystems * * *.

To meet this requirement and help set priorities, EPA adopted the Hazard Ranking System (HRS) as appendix A to the NCP (47 FR 31180, July 16, 1982). The HRS is a scoring system used to assess the relative threat associated with actual or potential releases of hazardous substances at sites. The HRS is the primary way of determining whether a site is to be included on the National Priorities List (NPL), the Agency's list of sites that are priorities for long-term evaluation and remedial response, and is a crucial part of the Agency's program to address the identification of actual and potential releases. (Each State can nominate one site to the NPL as a State top priority regardless of its HRS score; sites may also be added in response to a health advisory from the Agency for Toxic Substances and Disease Registry (see NCP, 40 CFR 300.425(c)(3)).) Under the original HRS, a score was determined for a site by evaluating three migration pathways—ground water, surface water, and air. Direct contact and fire and explosion threats were also evaluated to determine the need for emergency actions, but did not enter into the decision on whether to place a site on the NPL.

In 1986, Congress enacted the Superfund Amendments and Reauthorization Act of 1986 (SARA) (Pub. L. 99-499), which added section 105(c)(1) to CERCLA, requiring EPA to amend the HRS to assure "to the maximum extent feasible, that the hazard ranking system accurately assesses the relative degree of risk to human health and the environment posed by sites and facilities subject to review." Congress, in its Conference Report on SARA, stated the substantive standard against which HRS revisions could be assessed:

> This standard is to be applied within the context of the purpose for the National Priorities List; i.e., identifying for the States and the public those facilities and sites which appear to warrant remedial actions. * * * This standard does not, however, require the Hazard Ranking System to be equivalent to detailed risk assessments, quantitative or qualitative, such as might be performed as part of remedial actions. The standard requires the Hazard Ranking System to rank sites as accurately as the Agency believes is feasible using information from preliminary assessments and site inspections * * * Meeting this standard does not require long-term monitoring or an accurate determination of the full nature and extent of contamination at sites or the projected levels of exposure such as might be done during remedial investigations and feasibility studies. This provision is intended to ensure that the Hazard Ranking System performs with a degree of accuracy appropriate to its role in expeditiously identifying candidates for response actions. [H.R. Rep. No. 962, 99th Cong., 2nd Sess. at 199-200 [1986]]

Section 105(c)(2) further specifies that the HRS appropriately assess the human health risks associated with actual or potential contamination of surface waters used for recreation or drinking

water and that this assessment should take into account the potential migration of any hazardous substance through surface water to downstream sources of drinking water.

SARA added two criteria for evaluating sites under section 105(a)(8)(A): Actual or potential contamination of the ambient air and threats through the human food chain. In addition, CERCLA section 118, added by SARA, requires EPA to give a high priority to facilities where the release of hazardous substances has resulted in the closing of drinking water wells or has contaminated a principal drinking water supply. Finally, CERCLA section 125, added by SARA, requires revisions to the HRS to address facilities that contain substantial volumes of wastes specified in section 3001(b)(3)(A)(i) of the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act (RCRA). These wastes include fly ash wastes, bottom ash wastes, slag wastes, and flue gas emission control wastes generated primarily from the combustion of coal or other fossil fuels. Specifically, section 125 requires EPA to revise the HRS to assure the appropriate consideration of each of the following site-specific characteristics of such facilities:

- The quantity, toxicity, and concentrations of hazardous constituents that are present in such waste and a comparison with other wastes;
- The extent of, and potential for, release of such hazardous constituents into the environment; and
- The degree of risk to human health and the environment posed by such constituents.

EPA published an advance notice of proposed rulemaking (ANPRM) on April 9, 1987 (52 FR 11513), announcing its intention to revise the HRS and requesting comments on a number of issues. After a comprehensive review of the original HRS, including consideration of alternative models and Science Advisory Board review, EPA published a notice of proposed rulemaking (NPRM) for HRS revisions on December 23, 1988 (53 FR 51962). The NPRM contains a detailed preamble, which should be consulted for a more extensive discussion of CERCLA, SARA, the HRS, and the proposed changes to the HRS.

Today, EPA is publishing the revised HRS, which will supersede the HRS previously in effect as appendix A to the NCP. CERCLA section 105(c)(1) states that the revised HRS shall be applied to any site newly listed on the NPL after its effective date; as specified in section 105(c)(3), sites scored with the original HRS prior to that effective date need not be reevaluated.

The HRS is a scoring system based on factors grouped into three factor categories. The factor categories are multiplied and then normalized to 100 points to obtain a pathway score (e.g., the ground water migration pathway score). The final HRS score is obtained by combining the pathway scores using a root-mean-square method. The proposed HRS revised every factor to some extent. A few factors were replaced, and several new factors were added. The major proposed changes included:

(1) Consideration of potential as well as actual releases to air;

(2) Addition of mobility factors;

(3) Addition of dilution and distance weightings for the water migration pathways and modification of distance weighting in the air migration pathway;

(4) Revisions to the toxicity factor;

(5) Additions to the list of covered sensitive environments;

(6) Addition of human food chain and recreation threats to the surface water migration pathway;

(7) Revision of the hazardous waste quantity factor to allow a tiered approach;

(8) Addition of health-based benchmarks for evaluating population factors and ecological-based benchmarks for evaluating sensitive environments;

(9) Addition of factors for evaluating the maximally exposed individual; and

(10) Inclusion of a new onsite exposure pathway.

EPA conducted a field test of the proposed HRS to assess the feasibility of implementing the proposed HRS factors, to determine resources required for specific tasks, to assess the availability of information needed for evaluation of sites, and to identify difficulties with the use of the proposed revisions. To meet the objectives, site inspections were performed at 29 sites nationwide. The sites were selected either because work was already planned at the site or because the sites had specific features EPA wanted to test using the proposed revisions to the HRS. The major results of the field test were summarized on September 14, 1989 (54 FR 37949), when the field test report was made available for public review and comment.

II. Overview of the Final Rule

The rule being promulgated today incorporates substantial changes to revisions proposed in December 1988. EPA has changed the rule for three reasons: (1) To respond to the general comment submitted by many commenters that the factor categories and pathways need to be consistent with each other; (2) to respond to specific recommendations made by commenters; and (3) to respond to problems identified during the field test and discussed in the field test report. Major changes affecting multiple pathways include:

- Multiplication of hazardous waste quantity factor, toxicity, and other waste characteristics factors;
- Uncapping of population factors (i.e., no limit is placed on maximum value);
- Revised criteria for establishing an observed release;
- Capping of potential to release at a value less than observed release;
- Revision of the toxicity evaluation to select carcinogenic and non-cancer chronic values in preference to acute toxicity values;
- Elimination of Level III concentrations and extension of weighting based on levels of exposure to nearest individual (well/intake; formerly maximally exposed individual) factors;
- Modification of the weights assigned to Level I and Level II concentrations;
- Revisions to the benchmarks used and methods for determining exceedance of benchmarks;
- Use of ranges to assign values for potentially exposed populations;
- Inclusion of factors assessing exposures of the nearest individual in all pathways;
- Revisions to distance and dilution weights in all pathways except ground water migration;
- Replacement of the use factors with less heavily weighted resources factors;
- Evaluation of wetlands based on size or surface water frontage; and
- Specific instructions for the evaluation of radionuclides at radioactive waste sites and sites with radioactive and other hazardous substances wastes.

The major changes in the ground water migration pathway include:

- Replacement of depth to aquifer/hydraulic conductivity and sorptive capacity factors with travel time and depth to aquifer factors; and
- Revision of the mobility factor, including consideration of distribution coefficients.

In the surface water migration pathways, the major changes include:

- Elimination of the separate recreational use threat;
- Addition of a ground water to surface water component;

• Incorporation of bioaccumulation into the waste characteristics factor category rather than the targets factor category for the human food chain threat;

• Revision to allow use of additional tissue samples in establishing Level I concentrations for the human food chain threat; and

• Addition of ecosystem bioaccumulation potential factor for sensitive environments.

The major changes in the soil exposure pathway (formerly the onsite exposure pathway) include:

• Elimination of separate consideration of the high risk population;

• Inclusion of hazardous waste quantity in the waste characteristics factor category;

• Consideration of workers in the resident threat's targets factor category; and

• Revisions to scoring of terrestrial sensitive environments.

The major changes in the air migration pathway include:

• Separate evaluation of gas and particulate potential to release; and

• Consideration of actual contamination in evaluating sensitive environments.

Figures 1 to 4 show the differences between the pathways in the original HRS and in the final rule.

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Appendix B-1

Tables for Non-radioactive Hazardous Substances

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Acenaphthene	000083-32-9	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	10000	10000	11	0.2000	Yes	Yes
Acenaphthylene	000208-96-8	...	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	11	0.0200	Yes	Yes
Acetaldehyde	000075-07-0	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	10	10	17	1.0000	Yes	No
Acetone	000067-64-1	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	100	1	17	1.0000	Yes	No
Acetonitrile	000075-05-8	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.0700	0.5	0.5	0.5	0.5	1	1	17	1.0000	Yes	No
Acetophenone	000098-86-2	10*	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	5.0	5.0	5.0	5.0	1	1	11	1.0000	Yes	No
Acetyl-2-thiourea, 1-	000591-08-2	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Acrolein	000107-02-8	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	500.0	500.0	500.0	500.0	10000	1000	17	1.0000	Yes	No
Acrylamide	000079-06-1	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	5.0	5.0	5.0	5.0	1000	1000	6	0.2000	Yes	Yes
Acrylic acid	000079-10-7	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Acrylonitrile	000107-13-1	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	50.0	50.0	50.0	50.0	100	10	17	1.0000	Yes	No
Adipic acid	000124-04-9	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	6	0.0200	Yes	Yes
Aldicarb	000116-06-3	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	5.0	5.0	5.0	5.0	...	...	6	0.0200	Yes	Yes
Aldrin	000309-00-2	10000	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	50000.0	5000.0	50000.0	5000.0	10000	10000	11	0.0200	Yes	Yes
Allyl alcohol	000107-18-6	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Aluminum	007429-90-5	...	1.0E+00	...	...	...	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Aluminum phosphide	020859-73-8	10000	1.0E+00	...	...	...	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Ammonia	007664-41-7	100*	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0700	0.5	0.5	0.5	0.5	1000	10	17	1.0000	Yes	No
Ammonium picrate	000131-74-8	...	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Ammonium sulfamate	007773-06-0	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	NA	NA	No	Yes
Aniline	000062-53-3	10000	1.0E+00	1.0E+00	...	...	0.4000	0.0700	5.0	5.0	5.0	5.0	1000	10	NA	NA	No	Yes
Anthracene	000120-12-7	10	1.0E+00	1.0E-04	2.0E-03	2.0E-07	0.4000	0.4000	5000.0	5000.0	5000.0	5000.0	10000	10000	6	0.0020	Yes	Yes
Antimony	007440-36-0	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	500.0	0.5	500.0	...	...	NA	NA	No	Yes
Arsenic	007440-38-2	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	500.0	50.0	500.0	10	100	NA	NA	No	Yes
Asbestos	001332-21-4	10000	1.0E+00	1.0E-04	...	...	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Atrazine	001912-24-9	100	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.0700	50.0	50.0	50.0	50.0	...	...	6	0.0020	Yes	Yes
Azinphos- ethyl	002642-71-9	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	500.0	500.0	500.0	500.0	...	...	NA	NA	No	Yes
Azinphos- methyl	000086-50-0	100	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	10000	10000	NA	NA	No	Yes
Aziridine	000151-56-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Barium	007440-39-3	10*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	0.5	0.5	0.5	1	1	NA	NA	No	Yes
Barium cyanide	000542-62-1	10	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Benz(a)anthracene	000056-55-3	1000	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0002	Yes	Yes
Benzene	000071-43-2	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.4000	5000.0	5000.0	500.0	50000.0	10000	10000	17	1.0000	Yes	No
Benzene carbonyl chloride	000098-88-4	...	1.0E+00	1.0E+00	...	...	0.4000	1.0000	0.5	0.5	0.5	0.5	10	1	11	1.0000	Yes	No
Benzidine	000092-87-5	10000	1.0E+00	1.0E-04	1.0E+00	1.0E-04	0.4000	0.0700	50.0	50.0	50.0	50.0	...	...	0	0.0002	Yes	Yes
Benzo(a)pyrene	000050-32-8	10000	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	50000.0	500.0	50000.0	500.0	10000	1000	6	0.0002	Yes	Yes
Benzo(j,k)fluorene	000206-44-0	100	1.0E+00	...	...	...	1.0000	0.4000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Benzo(k)fluoranthene	000207-08-9	...	1.0E+00	...	2.0E-05	...	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	...	...	6	0.0002	Yes	Yes

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Benzofluoranthene, 3,4-	000205-99-2	10000	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	...	...	6	0.0020	Yes	Yes
Benzoic acid	000065-85-0	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	5.0	5.0	5000.0	5000.0	1	1	11	0.2000	Yes	Yes
Benzonitrile	000100-47-0	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	5.0	5.0	5.0	5.0	...	...	11	0.2000	Yes	Yes
Benzothiazole, 1,2,-	000095-16-9	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0700	50.0	50.0	50.0	50.0	...	...	11	0.2000	Yes	Yes
Benzyl chloride	000100-44-7	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.0700	0.0700	50.0	50.0	50.0	50.0	100	100	11	1.0000	Yes	No
Beryllium	007440-41-7	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	...	...	NA	NA	No	Yes
Biphenyl, 1,1-	000092-52-4	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.4000	500.0	500.0	500.0	500.0	100	100	11	0.2000	Yes	Yes
Bis (2-ethylhexyl) phthalate	000117-81-7	100	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	5000.0	5000.0	50000.0	50000.0	1000	1000	6	0.0020	Yes	Yes
Bis(2-chloroethoxy)methane	000111-91-1	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Bis(2-chloroethyl)ether	000111-44-4	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	1	1	11	1.0000	Yes	No
Bis(chloromethyl)ether	000542-88-1	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0007	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Boron	007440-42-8	100*	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Bromodichloromethane	000075-27-4	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	...	...	17	1.0000	Yes	No
Bromomethane	000074-83-9	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	5.0	5.0	5.0	5.0	10	10	17	1.0000	Yes	No
Bromoxynil	001689-84-5	100	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.0700	50.0	50.0	50.0	50.0	...	...	0	0.0002	Yes	Yes
Butadiene, 1,3-	000106-99-0	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0700	5.0	5.0	5.0	5.0	...	...	17	1.0000	Yes	No
Butanol	000071-36-3	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	5.0	5.0	5.0	1	1	11	1.0000	Yes	No
Butylbenzyl phthalate	000085-68-7	10	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	500.0	500.0	500.0	500.0	100	1000	6	0.0020	Yes	Yes
Butyric acid, 4-(2,4-dichlorophenoxy)	000094-82-6	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	50.0	50.0	50.0	50.0	100	100	0	0.0020	Yes	Yes

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

			Ground Water Mobility						Bioaccumulation									
			Liquid		Non-Liquid		Persistence		Food Chain		Environmental		Ecotoxicity					
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Cadmium	007440-43-9	10000	1.0E+00*	1.0E+00*	2.0E-01*	2.0E-01*	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	1000	1000	NA	NA	No	Yes
Captan	000133-06-2	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.0007	0.0700	50.0	50.0	50.0	50.0	10000	10000	6	0.0200	Yes	Yes
Carbaryl	000063-25-2	10	1.0E+00	1.0E+00	2.0E-01	2.0E-01	0.4000	0.0700	50.0	50.0	5.0	5.0	10000	10000	0	0.0020	Yes	Yes
Carbofuran	001563-66-2	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	...	...	11	1.0000	Yes	No
Carbon disulfide	000075-15-0	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	0.5	0.5	0.5	0.5	100	100	17	1.0000	Yes	No
Carbon Tetrachloride	000056-23-5	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	10	100	17	1.0000	Yes	No
Carbophenothion	000786-19-6	100	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	NA	NA	No	Yes
Chloral	000075-87-6	1000	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Chlordane	000057-74-9	10000	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0020	Yes	Yes
Chlorine cyanide	000506-77-4	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	10000	10000	17	1.0000	Yes	No
Chloro-3-methylphenol, 4-	000059-50-7	1	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	1000	1000	11	0.2000	Yes	Yes
Chloroaniline, p-	000106-47-8	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	5.0	5.0	5.0	5.0	...	...	11	0.2000	Yes	Yes
Chlorobenzene	000108-90-7	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	5000.0	5000.0	1000	1000	17	1.0000	Yes	No
Chloroform	000067-66-3	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	10	10	17	1.0000	Yes	No
Chloromethane	000074-87-3	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0700	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Chloromethyl methyl ether	000107-30-2	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0007	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Chloromethyloxirane, 2-	000106-89-8	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	10	10	17	1.0000	Yes	No
Chloronaphthalene, 2-	000091-58-7	10	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	11	0.2000	Yes	Yes
Chlorophenol, 2-	000095-57-8	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.4000	500.0	500.0	500.0	500.0	100	100	11	1.0000	Yes	No

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
— (305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Chlorpyrifos	002921-88-2	1000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	NA	NA	No	Yes
Chromium	007440-47-3	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	500.0	5.0	500.0	10000	10	NA	NA	No	Yes
Chromium(III)	016065-83-1	1*	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	500.0	500.0	500.0	500.0	10	10	NA	NA	No	Yes
Chromium(VI)	018540-29-9	10000	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	5.0	500.0	5.0	500.0	100	100	NA	NA	No	Yes
Chrysene	000218-01-9	...	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	6	0.0002	Yes	Yes
Cobalt	007440-48-4	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	...	...	NA	NA	No	Yes
Copper	007440-50-8	...*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	100	1000	NA	NA	No	Yes
Copper cyanide	000544-92-3	100	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	0.5*	0.5*	0.5*	0.5*	...	...	NA	NA	No	Yes
Coumaphos	000056-72-4	100	1.0E+00	1.0E-04	2.0E-01	2.0E-05	0.4000	0.4000	500.0	500.0	500.0	500.0	10000	1000	NA	NA	No	Yes
Creosote	008001-58-9	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	NA	NA	No	Yes
Cresol, m-	000108-39-4	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	5.0	5.0	5.0	100	100	11	1.0000	Yes	No
Cresol, p-	000106-44-5	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	0.4000	500.0	500.0	5000.0	5000.0	100	100	11	1.0000	Yes	No
Cumene	000098-82-8	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	100	1	17	1.0000	Yes	No
Cyanazine	021725-46-2	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	50.0	50.0	50.0	50.0	...	...	0	0.0020	Yes	Yes
Cyanide	000057-12-5	100	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1000	1000	NA	NA	No	Yes
Cyanogen	000460-19-5	100	1.0E+00	...	1.0E+00	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Cyanogen bromide	000506-68-3	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1000	1000	NA	NA	No	Yes
Cyclohexane	000110-82-7	1	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	10	100	17	1.0000	Yes	No
Cyclohexanone	000108-94-1	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	5.0	5.0	5.0	5.0	...	...	11	1.0000	Yes	No

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Cyclotrimethylenetrinitriamine	000121-82-4	1000	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
DDD	000072-54-8	100	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0020	Yes	Yes
DDE	000072-55-9	100	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0020	Yes	Yes
DDT	000050-29-3	1000	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0020	Yes	Yes
DEF	000078-48-8	10000	1.0E+00	...	...	...	1.0000	0.4000	5000.0	5000.0	5000.0	5000.0	1000	10000	NA	NA	No	Yes
Di-n-butyl phthalate	000084-74-2	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	1000	10000	6	0.0200	Yes	Yes
Di-n-octyl phthalate	000117-84-0	100	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	6	0.0020	Yes	Yes
Diazinon	000333-41-5	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.0700	500.0	500.0	500.0	500.0	10000	10000	17	1.0000	Yes	No
Dibenz(a,h)anthracene	000053-70-3	10000	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	...	...	NA	NA	No	Yes
Dibromo-3-chloropropane, 1,2-	000096-12-8	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	10	10	11	1.0000	Yes	No
Dibromochloromethane	000124-48-1	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	...	...	11	1.0000	Yes	No
Dibromoethane, 1,2-	000106-93-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	10	10000	17	1.0000	Yes	No
Dicamba	001918-00-9	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	6	0.0200	Yes	Yes
Dichlorobenzene, 1,2-	000095-50-1	10*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Dichlorobenzene, 1,3-	000541-73-1	...	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Dichlorobenzene, 1,4-	000106-46-7	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	50.0	50.0	50.0	50.0	100	10	17	1.0000	Yes	No
Dichlorobenzidine, 3,3-	000091-94-1	100	1.0E+00	1.0E-04	2.0E-01	2.0E-05	0.0700	0.0700	500.0	500.0	500.0	500.0	...	...	0	0.0002	Yes	Yes
Dichlorodifluoromethane	000075-71-8	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	...	...	17	1.0000	Yes	No
Dichloroethane, 1,1-	000075-34-3	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	...	...	17	1.0000	Yes	No

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

SCDM Version: AUG92

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Dichloroethane, 1,2-	000107-06-2	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Dichloroethene, 1,1-	000075-35-4	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	10	1	17	1.0000	Yes	No
Dichloroethylene, cis-1,2-	000156-59-2	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	...	...	17	1.0000	Yes	No
Dichloroethylene, trans-1,2-	000156-60-5	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	50.0	50.0	50.0	50.0	...	...	17	1.0000	Yes	No
Dichlorophenol, 2,4-	000120-83-2	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	0.4000	500.0	500.0	500.0	500.0	10000	10000	11	0.2000	Yes	Yes
Dichlorophenoxyacetic acid, 2,4-	000094-75-7	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	100	100	0	0.0020	Yes	Yes
Dichloropropane, 1,2-	000078-87-5	1000*	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	50.0	50.0	50.0	50.0	10	1	17	1.0000	Yes	No
Dichloropropene, 1,3-	000542-75-6	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.4000	5.0	5.0	5.0	5.0	100	100	17	1.0000	Yes	No
Dichlorvos	000062-73-7	100*	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	5.0	5.0	5.0	5.0	10000	10000	11	0.2000	Yes	Yes
Dicofol	000115-32-2	10	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	1000	NA	NA	No	Yes
Dieldrin	000060-57-1	10000	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	50000.0	5000.0	50000.0	5000.0	10000	10000	6	0.0020	Yes	Yes
Diethyl phthalate	000084-66-2	1	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	500.0	500.0	500.0	500.0	10000	10000	11	0.2000	Yes	Yes
Diethylene glycol	000111-46-6	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	11	0.2000	Yes	Yes
Diisopropylmethyl-phosphonate	001445-75-6	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Dimethoate	000060-51-5	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	10000	1000	0	0.0020	Yes	Yes
Dimethoxybenzidine, 3,3-	000119-90-4	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5.0	5.0	5.0	5.0	...	...	0	0.0020	Yes	Yes
Dimethyl phenol, 2,4-	000105-67-9	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	500.0	500.0	500.0	500.0	100	100	11	0.2000	Yes	Yes
Dimethyl phthalate	000131-11-3	1	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	0.4000	50.0	50.0	50.0	50.0	10	10	11	0.2000	Yes	Yes
Dimethyl sulfate	000077-78-1	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0700	5.0	5.0	5.0	5.0	100	10	11	1.0000	Yes	No

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HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

			Ground Water Mobility				Persistence		Bioaccumulation				Ecotoxicity					
			Liquid		Non-Liquid				Food Chain		Environmental							
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Dinitrobenzene, 1,3-	000099-65-0	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	5.0	5.0	5.0	5.0	100	100	6	0.0200	Yes	Yes
Dinitrophenol, 2,4-	000051-28-5	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	5.0	5.0	5.0	5.0	10000	10000	11	0.2000	Yes	Yes
Dinitrotoluene, 2,4-	000121-14-2	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	0.4000	50.0	50.0	50.0	50.0	10	10	6	0.0200	Yes	Yes
Dinitrotoluene, 2,6-	000606-20-2	10*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	50.0	50.0	50.0	50.0	10	10	6	0.0200	Yes	Yes
Dinoseb	000088-85-7	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	500.0	500.0	10000	100	6	0.0200	Yes	Yes
Dioxane, 1,4-	000123-91-1	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	1	1	11	1.0000	Yes	No
Dioxathion	000078-34-2	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	50.0	50.0	50.0	50.0	10000	10000	NA	NA	No	Yes
Diphenylhydrazine, 1,2-	000122-66-7	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	50.0	50.0	50.0	50.0	1000	1000	6	0.0200	Yes	Yes
Diquat	000085-00-7	1000	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1000	1000	NA	NA	No	Yes
Disulfoton	000298-04-4	10000	1.0E+00	1.0E+00	2.0E-01	2.0E-01	1.0000	1.0000	500.0	500.0	500.0	500.0	10000	10000	6	0.0200	Yes	Yes
Diuron	000330-54-1	1000	1.0E+00	...	2.0E-01	...	0.4000	0.0700	5000.0	5000.0	500.0	500.0	1000	100	NA	NA	No	Yes
Endosulfan (I or II)	000115-29-7	10000	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	0.4000	5000.0	5000.0	5000.0	5000.0	10000	10000	11	0.0020	Yes	Yes
Endosulfan sulfate	001031-07-8	...	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	...	...	17	1.0000	Yes	No
Endothall	000145-73-3	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	6	0.0200	Yes	Yes
Endrin	000072-20-8	10000	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	5000.0	5000.0	50000.0	5000.0	10000	10000	6	0.0020	Yes	Yes
Endrin aldehyde	007421-93-4	...	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	10000	10000	NA	NA	No	Yes
Ethion	000563-12-2	1000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	NA	NA	No	Yes
Ethyl acetate	000141-78-6	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.4000	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Ethyl benzene	000100-41-4	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.4000	50.0	50.0	50.0	50.0	100	1000	17	1.0000	Yes	No

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

			Ground Water Mobility						Bioaccumulation									
			Liquid		Non-Liquid		Persistence		Food Chain		Environmental		Ecotoxicity					
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Ethyl chloride	000075-00-3	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0700	5.0	5.0	5.0	5.0	...	...	17	1.0000	Yes	No
Ethyl ether	000060-29-7	10	1.0E+00	1.0E+00	2.0E-01	2.0E-01	0.4000	1.0000	0.5	0.5	0.5	0.5	1	1	17	1.0000	Yes	No
Ethyldipropylthiocarbamate, s-	000759-94-4	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	500.0	500.0	500.0	500.0	10	10	11	0.2000	Yes	Yes
Ethylene glycol	000107-21-1	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	0.5	0.5	0.5	0.5	1000	1	6	0.2000	Yes	Yes
Ethylene glycol monoethyl ether	000110-80-5	10	1.0E+00	1.0E+00	...	...	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Fenethion	000055-38-9	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	500.0	500.0	10000	100	NA	NA	No	Yes
Ferrous sulfate	007720-78-7	10	1.0E+00*	... *	... *	... *	1.0000	1.0000	0.5	0.5	0.5	0.5	1000	1000	NA	NA	No	Yes
Fluorene	000086-73-7	100	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	1000	1000	11	0.2000	Yes	Yes
Fluorine	007782-41-4	10	1.0E+00	1.0E-02	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Formaldehyde	000050-00-0	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	1000	10	11	1.0000	Yes	No
Formic acid	000064-18-6	1	1.0E+00	...	1.0E+00	...	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Furan	000110-00-9	1000	1.0E+00	...	1.0E+00	...	0.0700	0.0700	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Furfural	000098-01-1	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	10	10	11	1.0000	Yes	No
Glycidylaldehyde	000765-34-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Heptachlor	000076-44-8	1000	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	5000.0	5000.0	50000.0	50000.0	10000	10000	11	0.0200	Yes	Yes
Heptachlor epoxide	001024-57-3	10000	1.0E+00	1.0E+00	2.0E-03	2.0E-03	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	...	...	11	0.0200	Yes	Yes
Hexabromobenzene	000087-82-1	1000	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	...	...	6	0.0002	Yes	Yes
Hexachlorobenzene	000118-74-1	1000	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	5000.0	50000.0	50000.0	50000.0	10000	10000	11	0.0200	Yes	Yes
Hexachlorobutadiene	000087-68-3	1000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	50.0	50.0	5000.0	5000.0	...	...	17	0.2000	Yes	Yes

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HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

			Ground Water Mobility						Bioaccumulation									
			Liquid		Non-Liquid		Persistence		Food Chain		Environmental		Ecotoxicity					
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Hexachlorocyclohexane, alpha-	000319-84-6	10000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	5000.0	500.0	1000	1000	11	0.0200	Yes	Yes
Hexachlorocyclohexane, beta-	000319-85-7	100	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	500.0	500.0	5000.0	5000.0	...	...	6	0.0020	Yes	Yes
Hexachlorocyclohexane, delta-	000319-86-8	1*	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5.0	500.0	5000.0	500.0	...	...	6	0.0200	Yes	Yes
Hexachlorocyclopentadiene	000077-47-4	10000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5000.0	5000.0	50.0	50.0	10000	10000	17	0.2000	Yes	Yes
Hexachloroethane	000067-72-1	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	1000	1000	17	1.0000	Yes	No
Hexachlorophene	000070-30-4	10000	[illegible]	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	NA	NA	No	Yes
Hexane	000110-54-3	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	...	...	17	1.0000	Yes	No
Hydrazine	000302-01-2	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	0.5	0.5	0.5	0.5	10000	100	17	1.0000	Yes	No
Hydrochloric acid	007647-01-0	1000	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	NA	NA	No	Yes
Hydrogen cyanide	000074-90-8	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0700	0.0700	0.5	0.5	0.5	0.5	10000	10000	17	1.0000	Yes	No
Hydrogen sulfide	007783-06-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	1000	1000	17	1.0000	Yes	No
Ioxynil	001689-83-4	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.0700	500.0	500.0	500.0	500.0	...	...	NA	NA	No	Yes
Iron	015438-31-0	...	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	0.5	0.5	0.5	10	10	NA	NA	No	Yes
Isobutanol	000078-83-1	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	10	1	17	1.0000	Yes	No
Isophorone	000078-59-1	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	5.0	5.0	5.0	5.0	1	1	11	1.0000	Yes	No
Kepone	000143-50-0	10000	1.0E+00	...	2.0E-01	...	0.4000	0.0700	50000.0	50000.0	50000.0	50000.0	...	...	0	0.0020	Yes	Yes
Lead	007439-92-1	10000	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	0.5*	0.5*	0.5*	0.5*	1000	1000	NA	NA	No	Yes
Lindane	000058-89-9	10000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	500.0	500.0	500.0	500.0	10000	10000	11	0.0200	Yes	Yes
Malathion	000121-75-5	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	0	0.0020	Yes	Yes

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HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Maleic anhydride	000108-31-6	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	11	1.0000	Yes	No
Maleic hydrazide	000123-33-1	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Manganese	007439-96-5	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50000.0	5000.0	50000.0	50000.0	...	...	NA	NA	No	Yes
Mercury	007439-97-6	10000	1.0E+00	1.0E+00	2.0E-05	2.0E-05	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	11	0.2000	Yes	Yes
Methacrylonitrile	000126-98-7	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Methanol	000067-56-1	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	0.5	0.5	0.5	0.5	1	1	11	1.0000	Yes	No
Methomyl	016752-77-5	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Methoxychlor	000072-43-5	100	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	50000.0	5000.0	50000.0	50000.0	10000	10000	6	0.0020	Yes	Yes
Methyl chlorocarbonate	000079-22-1	100	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Methyl ethyl ketone	000078-93-3	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.4000	0.5	0.5	0.5	0.5	1	1	17	1.0000	Yes	No
Methyl isobutyl ketone	000108-10-1	10*	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Methyl methacrylate	000080-62-6	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Methylene bis (2-chloroaniline), 4,4-	000101-14-4	1000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	0.4000	0.0700	500.0	500.0	500.0	500.0	...	...	0	0.0002	Yes	Yes
Methylene chloride	000075-09-2	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Methylenediphenyl diisocyanate, 4,4-	000101-68-8	10000	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	0	0.0020	Yes	Yes
Metribuzin	021087-64-9	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	...	...	17	1.0000	Yes	No
Mirex	002385-85-5	10000	1.0E+00	...	...	...	0.4000	0.0700	5000.0	50000.0	50000.0	50000.0	10000	10000	NA	NA	No	Yes
Naphthalene	000091-20-3	100*	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.4000	500.0	5.0	500.0	5000.0	1000	1000	11	0.2000	Yes	Yes
Nickel	007440-02-0	10000	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	0.5	500.0	500.0	500.0	10	1000	NA	NA	No	Yes

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HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

			Ground Water Mobility						Bioaccumulation									
			Liquid		Non-Liquid		Persistence		Food Chain		Environmental		Ecotoxicity					
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Nitric acid	007697-37-2	...	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Nitric oxide	010102-43-9	10	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Nitroaniline, p-	000100-01-6	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Nitrobenzene	000098-95-3	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	5.0	5.0	5.0	...	...	11	1.0000	Yes	No
Nitrogen dioxide	010102-44-0	1*	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Nitroglycerine	000055-63-0	1	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	50.0	50.0	50.0	50.0	100	100	6	0.0200	Yes	Yes
Nitrophenol, 4-	000100-02-7	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	5.0	5.0	500.0	500.0	100	100	6	0.0200	Yes	Yes
Nitroso-di-n-butylamine, N-	000924-16-3	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	5.0	5.0	5.0	5.0	...	...	11	0.2000	Yes	Yes
Nitroso-di-n-methylurethane, N-	000615-53-2	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Nitrosodiethanolamine, N-	001116-54-7	1000	1.0E+00	1.0E+00	...	...	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	11	0.0200	Yes	Yes
Nitrosodiethylamine, N-	000055-18-5	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	0.5	0.5	0.5	0.5	1	1	11	1.0000	Yes	No
Nitrosodimethylamine, N-	000062-75-9	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	1	1	11	1.0000	Yes	No
Nitrosodiphenylamine, N-	000086-30-6	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	500.0	500.0	100	100	6	0.0200	Yes	Yes
Nitrosopyrrolidine, N-	000930-55-2	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	6	0.2000	Yes	Yes
Nitrotoluene, 4-	000099-99-0	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	...	...	11	0.2000	Yes	Yes
Parathion, ethyl-	000056-38-2	100	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	500.0	500.0	10000	10000	6	0.0020	Yes	Yes
Parathion, methyl-	000298-00-0	10000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	0.4000	0.5	0.5	0.5	0.5	10000	10000	6	0.0200	Yes	Yes
PCBs	001336-36-3	10000	1.0E+00	1.0E-04	...	...	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	NA	NA	No	Yes
Pentachlorobenzene	000608-93-5	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	1000	1000	11	0.2000	Yes	Yes

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Pentachloroethane	000076-01-7	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Pentachloronitrobenzene	000082-68-8	1000	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	...	...	11	0.0200	Yes	Yes
Pentachlorophenol	000087-86-5	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	500.0	500.0	5000.0	500.0	100	100	6	0.0200	Yes	Yes
Phenanthrene	000085-01-8	1	1.0E+00	1.0E-04	2.0E-01	2.0E-05	0.4000	0.4000	50.0	50.0	5000.0	50.0	1000	1000	11	0.0200	Yes	Yes
Phenol	000108-95-2	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	5.0	5.0	5.0	5.0	1000	100	11	1.0000	Yes	No
Phenyl sulfide	000139-66-2	10	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	11	0.0200	Yes	Yes
Phenylmercuric acetate	000062-38-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	50000.0	50000.0	50000.0	50000.0	10000	1000	6	0.0020	Yes	Yes
Phorate	000298-02-2	10000*	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.0007	0.0700	500.0	500.0	500.0	500.0	10000	10000	11	0.0200	Yes	Yes
Phosgene	000075-44-5	100	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Phosphamidon	013171-21-6	100	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Phosphine	007803-51-2	10000	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Phosphoric acid	007664-38-2	1	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Phosphorodithioc acid,phenyl-o-ethyl-o-(4-nit	002104-64-5	10000	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Phosphorous (elemental)	007723-14-0	1000	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	10000	10000	NA	NA	No	Yes
Phthalic anhydride	000085-44-9	1	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	5000.0	5000.0	...	...	NA	NA	No	Yes
Potassium silver cyanide	000506-61-6	10	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Pronamide	023950-58-5	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	...	...	11	0.2000	Yes	Yes
Pyrene	000129-00-0	100	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	50.0	50.0	50.0	50.0	...	...	6	0.0020	Yes	Yes
Pyridine	000110-86-1	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	100	100	11	1.0000	Yes	No

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HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Quinoline	000091-22-5	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	0.5	5.0	5.0	1000	1000	11	0.2000	Yes	Yes
Resorcinol	000108-46-3	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	5.0	5.0	5.0	5.0	...	...	6	0.0200	Yes	Yes
Ronnel	000299-84-3	10	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	1000	1000	NA	NA	No	Yes
Selenium	007782-49-2	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5000.0	50.0	5000.0	50.0	100	100	NA	NA	No	Yes
Selenourea	000630-10-4	100	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Silver	007440-22-4	100*	1.0E+00	1.0E-02	2.0E-05	2.0E-07	1.0000	1.0000	50.0	50.0	50.0	50.0	10000	10000	NA	NA	No	Yes
Silver Cyanide	000506-64-9	10	1.0E+00*	... *	... *	... *	1.0000	1.0000	0.5*	0.5*	0.5*	0.5*	...	...	NA	NA	No	Yes
Sodium	007440-23-5	...	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Strychnine	000057-24-9	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	5.0	5.0	5.0	5.0	1000	1000	NA	NA	No	Yes
Styrene	000100-42-5	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	10	10	17	1.0000	Yes	No
Sulfuric acid	007664-93-9	1000	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	10	10	NA	NA	No	Yes
TB, 2,4,5-	000093-80-1	...	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	500.0	500.0	500.0	500.0	...	...	0	0.0020	Yes	Yes
TCDD	001746-01-6	10000	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	...	...	6	0.0002	Yes	Yes
Tetrachlorobenzene, 1,2,4,5-	000095-94-3	10000	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	100	100	17	0.2000	Yes	Yes
Tetrachloroethane, 1,1,1,2-	000630-20-6	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.4000	50.0	50.0	50.0	50.0	10	10	17	1.0000	Yes	No
Tetrachloroethane, 1,1,2,2-	000079-34-5	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	5.0	5.0	5.0	5.0	100	100	11	1.0000	Yes	No
Tetrachloroethene	000127-18-4	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Tetrachlorophenol, 2,3,4,6-	000058-90-2	100	1.0E+00	1.0E-04	1.0E+00	1.0E-04	1.0000	1.0000	500.0	500.0	500.0	500.0	1000	100	11	0.2000	Yes	Yes
Tetraethyl lead	000078-00-2	10000	1.0E+00	...	2.0E-03	...	0.0700	0.0700	500.0	500.0	500.0	500.0	100	10000	17	1.0000	Yes	No

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HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Tetraethyldithiopyrophosphate	003689-24-5	1000	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	10000	10000	NA	NA	No	Yes
Tetrahydrofuran	000109-99-9	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Thallium	007440-28-0	1000*	1.0E+00*	1.0E-04*	... *	... *	1.0000	1.0000	0.5*	0.5*	0.5*	0.5*	...	...	NA	NA	No	Yes
Thiourea	000062-56-6	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	6	0.0200	Yes	Yes
Thiram	000137-26-8	100	1.0E+00	...	2.0E-01	...	0.4000	0.0700	5000.0	5000.0	5000.0	5000.0	...	...	NA	NA	No	Yes
Toluene	000108-88-3	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.4000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Toluene diisocyanate	000584-84-9	1000	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	11	0.2000	Yes	Yes
Toxaphene	008001-35-2	1000	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0020	Yes	Yes
TP, 2,4,5-	000093-72-1	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	500.0	500.0	500.0	500.0	1000	1000	0	0.0020	Yes	Yes
Tribromomethane	000075-25-2	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	50.0	50.0	50.0	50.0	10	10	11	1.0000	Yes	No
Trichloro-1,2,2-Trifluoroethane, 1,1,2-	000076-13-1	1	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	...	...	17	1.0000	Yes	No
Trichlorobenzene, 1,2,4-	000120-82-1	100*	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	1000	100	17	1.0000	Yes	No
Trichloroethane, 1,1,1-	000071-55-6	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	5.0	5.0	5.0	5.0	10	10	17	1.0000	Yes	No
Trichloroethane, 1,1,2-	000079-00-5	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	10	10	17	1.0000	Yes	No
Trichloroethylene	000079-01-6	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	10	10	17	1.0000	Yes	No
Trichlorofluoromethane	000075-69-4	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	...	...	17	1.0000	Yes	No
Trichlorophenol, 2,3,5-	000933-78-8	...	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	...	...	6	0.0200	Yes	Yes
Trichlorophenol, 2,3,6-	000933-75-5	...	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	6	0.0200	Yes	Yes
Trichlorophenol, 2,4,5-	000095-95-4	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	0.4000	500.0	500.0	5000.0	5000.0	1000	1000	11	0.2000	Yes	Yes

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HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Trichlorophenol, 2,4,6-	000088-06-2	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	500.0	500.0	500.0	500.0	1000	100	11	0.2000	Yes	Yes
Trichlorophenol, 3,4,5-	000609-19-8	...	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	11	0.0200	Yes	Yes
Trichlorophenoxyacetic acid, 2,4,5-	000093-76-5	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	50.0	50.0	500.0	500.0	10000	10000	0	0.0020	Yes	Yes
Trichloropropane, 1,2,3-	000096-18-4	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	5.0	5.0	5.0	5.0	...	...	11	1.0000	Yes	No
Triethanolamine	000102-71-6	1	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	0	0.0020	Yes	Yes
Trifluralin	001582-09-8	100	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	50000.0	50000.0	10000	1000	11	0.0200	Yes	Yes
Trinitrobenzene, 1,3,5-	000099-35-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	5.0	5.0	5.0	5.0	100	100	6	0.0200	Yes	Yes
Trinitrotoluene	000118-96-7	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	5.0	5.0	5.0	...	...	6	0.0200	Yes	Yes
Tris (2,3-dibromopropyl) phosphate	000126-72-7	1000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5.0	5.0	...	...	11	0.0200	Yes	Yes
Vanadium pentoxide	001314-62-1	100	1.0E+00	...	...	...	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Vinyl acetate	000108-05-4	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	10	100	17	1.0000	Yes	No
Vinyl chloride	000075-01-4	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.0007	0.0700	5.0	5.0	5.0	5.0	...	...	17	1.0000	Yes	No
Warfarin	000081-81-2	10000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.0700	50.0	50.0	50.0	50.0	10	10	0	0.0020	Yes	Yes
Xylene, m-	000108-38-3	1*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	500.0	500.0	500.0	500.0	100	100	17	1.0000	Yes	No
Xylene, o-	000095-47-6	1*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Xylene, p-	000106-42-3	1*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Zinc	007440-66-6	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	50000.0	500.0	50000.0	10	100	NA	NA	No	Yes
Zinc cyanide	000557-21-1	10	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	0.5*	0.5*	0.5*	0.5*	...	...	NA	NA	No	Yes
Zinc phosphide	001314-84-7	10000	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	0.5*	0.5*	0.5*	0.5*	...	...	NA	NA	No	Yes

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HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Zinc sulfate	007733-02-0	1	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	5.0	5.0	5.0	5.0	10000	1000	NA	NA	No	Yes

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HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

SCDM Version: AUG92

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Acenaphthene	000083-32-9	...	...	...	...	2.1E+00	...
Acenaphthylene	000208-96-8	...	...	...	...	...	...
Acetaldehyde	000075-07-0	...	9.0E-03*	4.5E-04	...	...	...
Acetone	000067-64-1	...	...	...	...	3.5E+00	...
Acetonitrile	000075-05-8	...	2.1E-01*	...	...	2.1E-01	...
Acetophenone	000098-86-2	...	... *	...	...	3.5E+00	...
Acetyl-2-thiourea, 1-	000591-08-2	...	...	...	...	...	...
Acrolein	000107-02-8	...	2.0E-05*	...	...	7.0E-01*	...
Acrylamide	000079-06-1	...	...	7.7E-07*	...	7.0E-03	7.8E-06
Acrylic acid	000079-10-7	...	3.0E-04*	...	...	2.8E+00	...
Acrylonitrile	000107-13-1	...	2.0E-03*	1.5E-05*	...	...	6.5E-05
Adipic acid	000124-04-9	...	...	...	...	...	...
Aldicarb	000116-06-3	...	...	...	...	7.0E-03	...
Aldrin	000309-00-2	...	...	2.0E-07*	...	1.1E-03	2.1E-06
Allyl alcohol	000107-18-6	...	...	...	...	1.8E-01	...
Aluminum	007429-90-5	...	...	...	...	...	...
Aluminum phosphide	020859-73-8	...	...	...	...	1.4E-02	...
Ammonia	007664-41-7	...	1.0E-01*	...	...	1.2E+03*	...
Ammonium picrate	000131-74-8	...	...	...	...	...	...
Ammonium sulfamate	007773-06-0	...	...	...	...	7.0E+00	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

SCDM Version: AUG92

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Aniline	000062-53-3	...	1.0E-03*	...	...	...	6.3E-03*
Anthracene	000120-12-7	...	...	...	...	1.1E+01	...
Antimony	007440-36-0	...	...	...	...	1.4E-02	...
Arsenic	007440-38-2	...	...	2.3E-07	5.0E-02	1.1E-02	2.0E-05
Asbestos	001332-21-4	...	...	4.3E-06* fibers/mL	...	...	...
Atrazine	001912-24-9	...	...	...	...	1.8E-01	1.6E-04
Azinphos- ethyl	002642-71-9	...	...	...	...	...	...
Azinphos- methyl	000086-50-0	...	...	...	...	...	...
Aziridine	000151-56-4	...	...	...	...	...	...
Barium	007440-39-3	...	... *	...	1.0E+00	2.5E+00	...
Barium cyanide	000542-62-1	...	...	...	...	3.5E+00*	...
Benz(a)anthracene	000056-55-3	...	...	...	...	...	...
Benzene	000071-43-2	...	...	1.2E-04	5.0E-03	...	1.2E-03
Benzene carbonyl chloride	000098-88-4	...	...	...	...	...	...
Benzidine	000092-87-5	...	...	1.5E-08*	...	1.1E-01	1.5E-07
Benzo(a)pyrene	000050-32-8	...	...	5.7E-07	...	...	4.8E-06*
Benzo(j,k)fluorene	000206-44-0	...	...	...	...	1.4E+00	...
Benzo(k)fluoranthene	000207-08-9	...	...	...	...	...	...
Benzofluoranthene, 3,4-	000205-99-2	...	...	...	...	...	...
Benzoic acid	000065-85-0	...	...	...	...	1.4E+02	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

SCDM Version: AUG92

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Benzonitrile	000100-47-0	...	...	...	...	...	...
Benzothiazole, 1,2,-	000095-16-9	...	...	...	...	...	...
Benzyl chloride	000100-44-7	...	...	...	...	...	2.1E-04
Beryllium	007440-41-7	1.0E-02	...	4.2E-07	...	1.8E-01	8.1E-06
Biphenyl, 1,1-	000092-52-4	...	...	...	...	1.8E+00	...
Bis (2-ethylhexyl) phthalate	000117-81-7	...	...	...	...	7.0E-01	2.5E-03
Bis(2-chloroethoxy)methane	000111-91-1	...	...	...	...	...	...
Bis(2-chloroethyl)ether	000111-44-4	...	...	3.0E-06*	...	...	3.2E-05
Bis(chloromethyl)ether	000542-88-1	...	...	1.6E-08*	...	...	1.6E-07
Boron	007440-42-8	...	2.0E-02*	...	...	3.2E+00	...
Bromodichloromethane	000075-27-4	...	...	...	...	7.0E-01	2.7E-04
Bromomethane	000074-83-9	...	5.0E-03*	...	...	4.9E-02	...
Bromoxynil	001689-84-5	...	...	...	...	7.0E-01	...
Butadiene, 1,3-	000106-99-0	...	...	3.6E-06	...	...	...
Butanol	000071-36-3	...	...	...	...	3.5E+00	...
Butylbenzyl phthalate	000085-68-7	...	...	...	...	7.0E+00	...
Butyric acid, 4-(2,4-dichlorophenoxy)	000094-82-6	...	...	...	...	2.8E-01	...
Cadmium	007440-43-9	...	...	5.6E-07	1.0E-02	1.8E-02	...
Captan	000133-06-2	...	...	...	...	4.6E+00	1.0E-02
Carbaryl	000063-25-2	...	...	...	...	3.5E+00	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Carbofuran	001563-66-2	...	...	...	...	1.8E-01	...
Carbon disulfide	000075-15-0	...	1.0E-02	...	...	3.5E+00	...
Carbon Tetrachloride	000056-23-5	...	...	6.7E-05*	5.0E-03	2.5E-02	2.7E-04
Carbophenothion	000786-19-6	...	...	...	...	...	...
Chloral	000075-87-6	...	...	...	...	7.0E-02	...
Chlordane	000057-74-9	...	...	2.7E-06	...	2.1E-03	2.7E-05
Chlorine cyanide	000506-77-4	...	...	...	...	1.8E+00	...
Chloro-3-methylphenol, 4-	000059-50-7	...	...	...	...	7.0E+01	...
Chloroaniline, p-	000106-47-8	...	...	...	...	1.4E-01	...
Chlorobenzene	000108-90-7	...	... *	...	...	7.0E-01	...
Chloroform	000067-66-3	...	...	4.3E-05	...	3.5E-01	5.7E-03
Chloromethane	000074-87-3	...	...	5.6E-04	...	...	2.7E-03
Chloromethyl methyl ether	000107-30-2	...	...	...	...	...	...
Chloromethyloxirane, 2-	000106-89-8	...	1.0E-03*	8.3E-04	...	..*	3.5E-03
Chloronaphthalene, 2-	000091-58-7	...	...	...	...	2.8E+00	...
Chlorophenol, 2-	000095-57-8	...	...	...	...	1.8E-01	...
Chlorpyrifos	002921-88-2	...	...	...	...	1.1E-01	...
Chromium	007440-47-3	...	...	... *	5.0E-02	1.8E-01	...
Chromium(III)	016065-83-1	...	... *	...	...	3.5E+01	...
Chromium(VI)	018540-29-9	...	... *	8.3E-08	...	1.8E-01	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		AIR PATHWAY			GROUND WATER PATHWAY		
Substance Name	CAS Number	NAAQS/NESHAPS (ug/m3)	Reference Dose Screen Conc (mg/m3)	Cancer Risk Screen Conc (mg/m3)	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)
Chrysene	000218-01-9	...	...	...	...	...	...
Cobalt	007440-48-4	...	...	...	...	...	...
Copper	007440-50-8	...	...	...	...	...	...
Copper cyanide	000544-92-3	...	...	...	...	1.8E-01	...
Coumaphos	000056-72-4	...	...	...	...	...	...
Creosote	008001-58-9	...	...	...	...	...	...
Cresol, m-	000108-39-4	...	...	...	...	1.8E+00	...
Cresol, p-	000106-44-5	...	...	...	...	1.8E+01	...
Cumene	000098-82-8	...	9.0E-03	...	...	1.4E+00	...
Cyanazine	021725-46-2	...	...	...	...	7.0E-02	...
Cyanide	000057-12-5	...	...	...	...	7.0E-01	...
Cyanogen	000460-19-5	...	...	...	...	1.4E+00	...
Cyanogen bromide	000506-68-3	...	...	...	...	3.2E+00	...
Cyclohexane	000110-82-7	...	...	...	...	...	...
Cyclohexanone	000108-94-1	...	...	...	...	1.8E+02	...
Cyclotrimethylenetrinitriamine	000121-82-4	...	...	...	...	1.1E-01	3.2E-04
DDD	000072-54-8	...	...	...	...	...	1.5E-04
DDE	000072-55-9	...	...	...	...	...	1.0E-04
DDT	000050-29-3	...	...	1.0E-05	...	1.8E-02	1.0E-04
DEF	000078-48-8	...	...	...	...	1.1E-03	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Di-n-butyl phthalate	000084-74-2	...	...	...	...	3.5E+00	...
Di-n-octyl phthalate	000117-84-0	...	...	...	...	7.0E-01	...
Diazinon	000333-41-5	...	...	...	...	3.2E-02	...
Dibenz(a,h)anthracene	000053-70-3	...	...	...	...	...	...
Dibromo-3-chloropropane, 1,2-	000096-12-8	...	2.0E-04*	1.5E-03*	...	...	2.5E-05*
Dibromochloromethane	000124-48-1	...	...	...	...	7.0E-01	4.2E-04
Dibromoethane, 1,2-	000106-93-4	...	...	4.5E-06	...	...	4.1E-07
Dicamba	001918-00-9	...	...	...	...	1.1E+00	...
Dichlorobenzene, 1,2-	000095-50-1	...	... *	...	...	3.2E+00	...
Dichlorobenzene, 1,3-	000541-73-1	...	...	...	...	...	...
Dichlorobenzene, 1,4-	000106-46-7	...	7.0E-01	...	7.5E-02	...	1.5E-03
Dichlorobenzidine, 3,3-	000091-94-1	...	...	...	...	...	7.8E-05
Dichlorodifluoromethane	000075-71-8	...	... *	...	...	7.0E+00	...
Dichloroethane, 1,1-	000075-34-3	...	3.5E-01	...	...	..*	...
Dichloroethane, 1,2-	000107-06-2	...	...	3.8E-05	5.0E-03	...	3.8E-04
Dichloroethene, 1,1-	000075-35-4	...	...	2.0E-05*	7.0E-03	3.2E-01	5.8E-05
Dichloroethylene, cis-1,2-	000156-59-2	...	... *	...	...	3.5E*01	...
Dichloroethylene, trans-1,2-	000156-60-5	...	...	...	...	7.0E-01	...
Dichlorophenol, 2,4-	000120-83-2	...	...	...	...	1.1E-01	...
Dichlorophenoxyacetic acid, 2,4-	000094-75-7	...	...	...	1.0E-01	3.5E-01	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

SCDM Version: AUG92

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Dichloropropane, 1,2-	000078-87-5	...	4.0E-03*	...	...	...	5.1E-04
Dichloropropene, 1,3-	000542-75-6	...	2.0E-02*	2.7E-05	...	1.1E-02	1.9E-04
Dichlorvos	000062-73-7	...	...	...	...	..*	1.2E-04
Dicofol	000115-32-2	...	...	...	...	...	... *
Dieldrin	000060-57-1	...	...	2.2E-07*	...	1.8E-03	2.2E-06
Diethyl phthalate	000084-66-2	...	...	...	...	2.8E+01	...
Diethylene glycol	000111-46-6	...	...	...	...	...	...
Diisopropylmethyl-phosphonate	001445-75-6	...	...	...	...	2.8E+00	...
Dimethoate	000060-51-5	...	...	...	...	7.0E-03	...
Dimethoxybenzidine, 3,3-	000119-90-4	...	...	...	...	...	2.5E-03
Dimethyl phenol, 2,4-	000105-67-9	...	...	...	...	7.0E-01	...
Dimethyl phthalate	000131-11-3	...	...	...	...	3.5E+02	...
Dimethyl sulfate	000077-78-1	...	...	...	...	...	...
Dinitrobenzene, 1,3-	000099-65-0	...	...	...	...	3.5E-03	...
Dinitrophenol, 2,4-	000051-28-5	...	...	...	...	7.0E-02	...
Dinitrotoluene, 2,4-	000121-14-2	...	...	...	...	7.0E*02	... *
Dinitrotoluene, 2,6-	000606-20-2	...	...	...	...	...	... *
Dinoseb	000088-85-7	...	...	...	...	3.5E-02	...
Dioxane, 1,4-	000123-91-1	...	...	...	...	...	3.2E-03
Dioxathion	000078-34-2	...	...	...	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

SCDM Version: AUG92

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Diphenylhydrazine, 1,2-	000122-66-7	...	...	4.5E-06*	...	...	4.4E-05
Diquat	000085-00-7	...	...	...	...	7.7E-02	...
Disulfoton	000298-04-4	...	...	...	...	1.4E-03	...
Diuron	000330-54-1	...	...	...	...	7.0E-02	...
Endosulfan (I or II)	000115-29-7	...	...	...	...	1.8E-03	...
Endosulfan sulfate	001031-07-8	...	...	...	...	...	...
Endothall	000145-73-3	...	...	...	...	7.0E-01	...
Endrin	000072-20-8	...	...	...	2.0E-04	1.1E-02	...
Endrin aldehyde	007421-93-4	...	...	...	...	...	...
Ethion	000563-12-2	...	...	...	...	1.8E-02	...
Ethyl acetate	000141-78-6	...	...	...	...	3.2E+01	...
Ethyl benzene	000100-41-4	...	1.0E+00*	...	...	3.5E+00	...
Ethyl chloride	000075-00-3	...	1.0E+01*	...	...	...	...
Ethyl ether	000060-29-7	...	...	...	...	7.0E+00	...
Ethyldipropylthiocarbamate, s-	000759-94-4	...	...	...	...	8.8E-01	...
Ethylene glycol	000107-21-1	...	...	...	...	7.0E+01	...
Ethylene glycol monoethyl ether	000110-80-5	...	2.0E-01*	...	...	...	...
Fenethion	000055-38-9	...	...	...	...	...	...
Ferrous sulfate	007720-78-7	...	...	...	...	...	...
Fluorene	000086-73-7	...	...	...	...	1.4E+00	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

SCDM Version: AUG92

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Fluorine	007782-41-4	...	...	...	...	2.1E+00	...
Formaldehyde	000050-00-0	...	...	7.7E-05*	...	7.0E+00	... *
Formic acid	000064-18-6	...	...	...	...	7.0E+01	...
Furan	000110-00-9	...	...	...	...	3.5E-02	...
Furfural	000098-01-1	...	... *	...	...	1.1E-01	...
Glycidylaldehyde	000765-34-4	...	1.0E-03	...	...	1.4E-02	...
Heptachlor	000076-44-8	...	...	7.7E-07*	...	1.8E-02	7.8E-06
Heptachlor epoxide	001024-57-3	...	...	3.8E-07	...	4.6E-04	3.8E-06
Hexabromobenzene	000087-82-1	...	...	...	...	7.0E-02	...
Hexachlorobenzene	000118-74-1	...	...	2.2E-06*	...	2.8E-02	2.2E-05
Hexachlorobutadiene	000087-68-3	...	...	4.5E-05*	...	7.0E-02	4.5E-04
Hexachlorocyclohexane, alpha-	000319-84-6	...	...	5.6E-07	...	...	5.6E-06
Hexachlorocyclohexane, beta-	000319-85-7	...	...	1.9E-06*	...	...	1.9E-05
Hexachlorocyclohexane, delta-	000319-86-8	...	...	... *	...	...	... *
Hexachlorocyclopentadiene	000077-47-4	...	7.0E-05	...	...	2.5E-01	...
Hexachloroethane	000067-72-1	...	...	2.5E-04	...	3.5E-02	2.5E-03
Hexachlorophene	000070-30-4	...	...	...	...	1.1E-02	...
Hexane	000110-54-3	...	2.0E-01*	...	...	2.1E+00	...
Hydrazine	000302-01-2	...	...	2.0E-07*	...	...	1.2E-05
Hydrochloric acid	007647-01-0	...	7.0E-03	...	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Hydrogen cyanide	000074-90-8	...	...	...	...	7.0E-01	...
Hydrogen sulfide	007783-06-4	...	9.0E-04*	...	...	1.1E-01	...
Ioxynil	001689-83-4	...	...	...	...	...	...
Iron	015438-31-0	...	...	...	...	...	...
Isobutanol	000078-83-1	...	...	...	...	1.1E+01	...
Isophorone	000078-59-1	...	...	...	...	7.0E+00	8.5E-03
Kepone	000143-50-0	...	...	...	...	...	...
Lead	007439-92-1	1.5E+00	...	...	5.0E-02	...	...
Lindane	000058-89-9	...	...	...	4.0E-03	1.1E-02	2.7E-05
Malathion	000121-75-5	...	...	...	...	7.0E-01	...
Maleic anhydride	000108-31-6	...	...	...	...	3.5E+00	...
Maleic hydrazide	000123-33-1	...	...	...	...	1.8E+01	...
Manganese	007439-96-5	...	4.0E-04*	...	...	3.5E+00	...
Mercury	007439-97-6	...	3.0E-04	...	2.0E-03	1.1E-02	...
Methacrylonitrile	000126-98-7	...	3.5E-03*	...	...	3.5E-03	...
Methanol	000067-56-1	...	...	...	...	1.8E+01	...
Methomyl	016752-77-5	...	...	...	...	8.8E-01	...
Methoxychlor	000072-43-5	...	...	...	1.0E-01	1.8E-01	...
Methyl chlorocarbonate	000079-22-1	...	...	...	...	...	...
Methyl ethyl ketone	000078-93-3	...	1.0E+00*	...	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

SCDM Version: AUG92

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Methyl isobutyl ketone	000108-10-1	...	... *	...	...	1.8E+00	...
Methyl methacrylate	000080-62-6	...	...	...	...	2.8E+00	...
Methylene bis (2-chloroaniline), 4,4-	000101-14-4	...	...	2.7E-05	...	2.5E-02	2.7E-04
Methylene chloride	000075-09-2	...	3.0E+00	2.1E-03*	...	2.1E+00	4.7E-03
Methylenediphenyl diisocyanate, 4,4-	000101-68-8	...	2.0E-05*	...	...	...	...
Metribuzin	021087-64-9	...	...	...	...	8.8E-01	...
Mirex	002385-85-5	...	...	...	...	7.0E-05	1.9E-05
Naphthalene	000091-20-3	...	...	...	...	1.4E+00	...
Nickel	007440-02-0	...	...	... *	...	7.0E-01	...
Nitric acid	007697-37-2	...	...	...	...	...	...
Nitric oxide	010102-43-9	...	...	...	...	3.5E+00	...
Nitroaniline, p-	000100-01-6	...	...	...	...	...	...
Nitrobenzene	000098-95-3	...	1.8E-02*	...	...	1.8E-02	...
Nitrogen dioxide	010102-44-0	1.0E+02	... *	...	...	3.5E+01	...
Nitroglycerine	000055-63-0	...	...	...	...	...	...
Nitrophenol, 4-	000100-02-7	...	...	...	...	...	...
Nitroso-di-n-butylamine, N-	000924-16-3	...	...	6.3E-07*	...	...	6.5E-06
Nitroso-di-n-methylurethane, N-	000615-53-2	...	...	...	...	...	...
Nitrosodiethanolamine, N-	001116-54-7	...	...	...	...	...	1.3E-05
Nitrosodiethylamine, N-	000055-18-5	...	...	2.3E-08*	...	...	2.3E-07

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

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Nitrosodimethylamine, N-	000062-75-9	...	...	7.1E-08*	...	...	6.9E-07
Nitrosodiphenylamine, N-	000086-30-6	...	...	...	...	...	7.1E-03
Nitrosopyrrolidine, N-	000930-55-2	...	...	1.6E-06*	...	...	1.7E-05
Nitrotoluene, 4-	000099-99-0	...	...	...	...	3.5E-01	...
Parathion, ethyl-	000056-38-2	...	...	...	...	2.1E-01	...
Parathion, methyl-	000298-00-0	...	...	...	...	8.8E-03	...
PCBs	001336-36-3	...	...	...	...	...	4.5E-06
Pentachlorobenzene	000608-93-5	...	...	...	...	2.8E-02	...
Pentachloroethane	000076-01-7	...	...	...	...	...	...
Pentachloronitrobenzene	000082-68-8	...	...	...	...	1.1E-01	1.3E-04
Pentachlorophenol	000087-86-5	...	...	...	...	1.1E+00	2.9E-04
Phenanthrene	000085-01-8	...	...	...	...	...	...
Phenol	000108-95-2	...	...	...	...	2.1E+01	...
Phenyl sulfide	000139-66-2	...	...	...	...	...	...
Phenylmercuric acetate	000062-38-4	...	...	...	...	2.8E-03	...
Phorate	000298-02-2	...	...	...	...	7.0E*03	...
Phosgene	000075-44-5	...	...	...	...	...	...
Phosphamidon	013171-21-6	...	...	...	...	...	...
Phosphine	007803-51-2	...	3.0E-05	...	...	1.1E-02	...
Phosphoric acid	007664-38-2	...	...	...	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

SCDM Version: AUG92

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Phosphorodithioc acid,phenyl-o-ethyl-o-(	002104-64-5	...	...	...	...	3.5E-04	...
Phosphorous (elemental)	007723-14-0	...	...	...	...	...	...
Phthalic anhydride	000085-44-9	...	...	...	...	7.0E+01	...
Potassium silver cyanide	000506-61-6	...	...	...	...	7.0E+00	...
Pronamide	023950-58-5	...	...	...	...	2.6E+00	...
Pyrene	000129-00-0	...	...	...	...	1.1E+00	...
Pyridine	000110-86-1	...	...	...	...	3.5E-02	...
Quinoline	000091-22-5	...	...	...	...	...	2.9E-06
Resorcinol	000108-46-3	...	...	...	...	...	...
Ronnel	000299-84-3	...	...	...	...	1.8E+00	...
Selenium	007782-49-2	...	...	...	1.0E-02	1.8E-01	...
Selenourea	000630-10-4	...	...	...	...	1.8E-01	...
Silver	007440-22-4	...	...	...	5.0E-02	1.8E-01*	...
Silver Cyanide	000506-64-9	...	...	...	...	3.5E+00	...
Sodium	007440-23-5	...	...	...	...	...	...
Strychnine	000057-24-9	...	...	...	...	1.1E-02	...
Styrene	000100-42-5	...	...	... *	...	7.0E+00	... *
Sulfuric acid	007664-93-9	...	...	...	...	...	...
TB, 2,4,5-	000093-80-1	...	...	...	...	...	...
TCDD	001746-01-6	...	...	2.0E-11	...	...	2.3E-10

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Tetrachlorobenzene, 1,2,4,5-	000095-94-3	...	...	...	...	1.1E-02	...
Tetrachloroethane, 1,1,1,2-	000630-20-6	...	...	1.3E-04	...	1.1E+00	1.3E-03
Tetrachloroethane, 1,1,2,2-	000079-34-5	...	...	1.8E-05	...	...	1.8E-04
Tetrachloroethene	000127-18-4	...	...	... *	...	3.5E-01	... *
Tetrachlorophenol, 2,3,4,6-	000058-90-2	...	...	...	...	1.1E+00	...
Tetraethyl lead	000078-00-2	...	...	...	...	3.5E-06	...
Tetraethyldithlopyrophosphate	003689-24-5	...	...	...	...	1.8E-02	...
Tetrahydrofuran	000109-99-9	...	...	...	...	...	...
Thallium	007440-28-0	...	...	...	...	... *	...
Thiourea	000062-56-6	...	...	...	...	...	...
Thiram	000137-26-8	...	...	...	...	1.8E-01	...
Toluene	000108-88-3	...	4.0E-01*	...	...	7.0E+00	...
Toluene diisocyanate	000584-84-9	...	...	...	...	...	...
Toxaphene	008001-35-2	...	...	3.2E-06	5.0E-03	...	3.2E-05
TP, 2,4,5-	000093-72-1	...	...	...	1.0E-02	2.8E-01	...
Tribromomethane	000075-25-2	...	...	9.1E-04*	...	7.0E-01	4.4E-03
Trichloro-1,2,2-Trifluoroethane, 1,1,2-	000076-13-1	...	2.7E+01	...	...	1.1E+03	...
Trichlorobenzene, 1,2,4-	000120-82-1	...	... *	...	...	3.5E-01*	...
Trichloroethane, 1,1,1-	000071-55-6	...	... *	...	2.0E-01	3.2E+00	...
Trichloroethane, 1,1,2-	000079-00-5	...	...	6.3E-05*	...	1.4E-01	6.1E-04

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	AIR PATHWAY NAAQS/NESHAPS (ug/m3)	AIR PATHWAY Reference Dose Screen Conc (mg/m3)	AIR PATHWAY Cancer Risk Screen Conc (mg/m3)	GROUND WATER PATHWAY MCL/MCLG (mg/L)	GROUND WATER PATHWAY Reference Dose Screen Conc (mg/L)	GROUND WATER PATHWAY Cancer Risk Screen Conc (mg/L)
Trichloroethylene	000079-01-6	...	...	... *	5.0E-03	...	... *
Trichlorofluoromethane	000075-69-4	...	... *	...	...	1.1E+01	...
Trichlorophenol, 2,3,5-	000933-78-8	...	...	...	...	...	...
Trichlorophenol, 2,3,6-	000933-75-5	...	...	...	...	...	...
Trichlorophenol, 2,4,5-	000095-95-4	...	...	...	...	3.5E+00	...
Trichlorophenol, 2,4,6-	000088-06-2	...	...	3.2E-04	...	...	3.2E-03
Trichlorophenol, 3,4,5-	000609-19-8	...	...	...	...	...	...
Trichlorophenoxyacetic acid, 2,4,5-	000093-76-5	...	...	...	...	3.5E-01	...
Trichloropropane, 1,2,3-	000096-18-4	...	...	...	...	2.1E-01	...
Triethanolamine	000102-71-6	...	...	...	...	...	...
Trifluralin	001582-09-8	...	...	...	...	2.6E-01	4.5E-03
Trinitrobenzene, 1,3,5-	000099-35-4	...	...	...	...	1.8E-03	...
Trinitrotoluene	000118-96-7	...	...	...	...	1.8E-02	1.2E-03
Tris (2,3-dibromopropyl) phosphate	000126-72-7	...	...	...	...	...	...
Vanadium pentoxide	001314-62-1	...	...	...	...	3.2E-01	...
Vinyl acetate	000108-05-4	...	2.0E-01*	...	...	3.5E+01	...
Vinyl chloride	000075-01-4	...	...	1.2E-05*	2.0E-03	...	1.8E-05
Warfarin	000081-81-2	...	...	...	...	1.1E-02	...
Xylene, m-	000108-38-3	...	... *	...	...	7.0E+01	...
Xylene, o-	000095-47-6	...	... *	...	...	7.0E+01	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		AIR PATHWAY			GROUND WATER PATHWAY		
Substance Name	CAS Number	NAAQS/NESHAPS (ug/m3)	Reference Dose Screen Conc (mg/m3)	Cancer Risk Screen Conc (mg/m3)	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)
Xylene, p-	000106-42-3	...	... *	...	...	...	...
Zinc	007440-66-6	...	...	...	...	7.0E+00	...
Zinc cyanide	000557-21-1	...	...	...	...	1.8E+00	...
Zinc phosphide	001314-84-7	...	...	...	...	1.1E-02	...
Zinc sulfate	007733-02-0	...	...	...	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
								AWQC/AALAC	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	Freshwater (ug/L)	Saltwater (ug/L)
Acenaphthene	000083-32-9	...	2.1E+00	...	...	7.8E+01	...	...	...
Acenaphthylene	000208-96-8	...	...	...	...	...	...	...	...
Acetaldehyde	000075-07-0	...	...	...	...	...	...	...	...
Acetone	000067-64-1	...	3.5E+00	...	...	1.3E+02	...	...	...
Acetonitrile	000075-05-8	...	2.1E-01	...	...	7.8E+00	...	...	...
Acetophenone	000098-86-2	...	3.5E+00	...	...	1.3E+02	...	...	...
Acetyl-2-thiourea, 1-	000591-08-2	...	...	...	...	...	...	...	...
Acrolein	000107-02-8	...	7.0E-01*	...	...	2.6E+01*	...	...	...
Acrylamide	000079-06-1	...	7.0E-03	7.8E-06	...	2.6E-01	2.9E-04	...	...
Acrylic acid	000079-10-7	...	2.8E+00	...	...	1.0E+02	...	...	...
Acrylonitrile	000107-13-1	...	...	6.5E-05	...	...	2.4E-03	...	...
Adipic acid	000124-04-9	...	...	...	...	...	...	...	...
Aldicarb	000116-06-3	...	7.0E-03	...	...	2.6E-01	...	...	...
Aldrin	000309-00-2	...	1.1E-03	2.1E-06	3.0E-01	3.9E-02	7.6E-05	3.0E+00	1.3E+00
Allyl alcohol	000107-18-6	...	1.8E-01	...	...	6.5E+00	...	...	...
Aluminum	007429-90-5	...	...	...	...	...	...	...	...
Aluminum phosphide	020859-73-8	...	1.4E-02	...	...	5.2E-01	...	...	...
Ammonia	007664-41-7	...	1.2E+03*	...	...	4.4E+04*	...	...	...
Ammonium picrate	000131-74-8	...	...	...	...	...	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
								AWQC/AALAC	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	Freshwater (ug/L)	Saltwater (ug/L)
Ammonium sulfamate	007773-06-0	...	7.0E+00	...	...	2.6E+02	...	...	...
Aniline	000062-53-3	...	...	6.3E-03*	...	...	2.3E-01*	...	...
Anthracene	000120-12-7	...	1.1E+01	...	...	3.9E+02	...	...	...
Antimony	007440-36-0	...	1.4E-02	...	...	5.2E-01	...	...	...
Arsenic	007440-38-2	5.0E-02	1.1E-02	2.0E-05*	...	3.9E-01	7.4E-04*	1.9E+02	3.6E+01
Asbestos	001332-21-4	...	...	...	...	...	...	...	...
Atrazine	001912-24-9	...	1.8E-01	1.6E-04	...	6.5E+00	5.9E-03	...	...
Azinphos- ethyl	002642-71-9	...	...	...	...	...	...	...	...
Azinphos- methyl	000086-50-0	...	...	...	...	...	...	...	...
Aziridine	000151-56-4	...	...	...	...	...	...	...	...
Barium	007440-39-3	1.0E+00	2.5E+00	...	...	9.1E+01	...	...	...
Barium cyanide	000542-62-1	...	3.5E+00*	...	...	1.3E+02*	...	...	...
Benz(a)anthracene	000056-55-3	...	...	...	...	...	...	...	...
Benzene	000071-43-2	5.0E-03	...	1.2E-03	...	...	4.5E-02	...	...
Benzene carbonyl chloride	000098-88-4	...	...	...	...	...	...	...	...
Benzidine	000092-87-5	...	1.1E-01	1.5E-07	...	3.9E+00	5.7E-06	...	...
Benzo(a)pyrene	000050-32-8	...	...	4.8E-06*	...	...	1.8E-04*	...	...
Benzo(j,k)fluorene	000206-44-0	...	1.4E+00	...	...	5.2E+01	...	...	...
Benzo(k)fluoranthene	000207-08-9	...	...	...	...	...	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	AWQC/AALAC Freshwater (ug/L)	AWQC/AALAC Saltwater (ug/L)
Benzofluoranthene, 3,4-	000205-99-2	...	...	...	...	...	...	...	...
Benzoic acid	000065-85-0	...	1.4E+02	...	...	5.2E+03	...	...	...
Benzonitrile	000100-47-0	...	...	...	...	...	...	...	...
Benzothiazole, 1,2,-	000095-16-9	...	...	...	...	...	...	...	...
Benzyl chloride	000100-44-7	...	...	2.1E-04	...	...	7.6E-03	...	...
Beryllium	007440-41-7	...	1.8E-01	8.1E-06	...	6.5E+00	3.0E-04	...	...
Biphenyl, 1,1-	000092-52-4	...	1.8E+00	...	...	6.5E+01	...	...	...
Bis (2-ethylhexyl) phthalate	000117-81-7	...	7.0E-01	2.5E-03	...	2.6E+01	9.3E-02	...	...
Bis(2-chloroethoxy)methane	000111-91-1	...	...	...	...	...	...	...	...
Bis(2-chloroethyl)ether	000111-44-4	...	...	3.2E-05	...	...	1.2E-03	...	...
Bis(chloromethyl)ether	000542-88-1	...	...	1.6E-07	...	...	5.9E-06	...	...
Boron	007440-42-8	...	3.2E+00	...	...	1.2E+02	...	...	...
Bromodichloromethane	000075-27-4	...	7.0E-01	2.7E-04	...	2.6E+01	1.0E-02	...	...
Bromomethane	000074-83-9	...	4.9E-02	...	...	1.8E+00	...	...	...
Bromoxynil	001689-84-5	...	7.0E-01	...	...	2.6E+01	...	...	...
Butadiene, 1,3-	000106-99-0	...	...	...	...	...	...	...	...
Butanol	000071-36-3	...	3.5E+00	...	...	1.3E+02	...	...	...
Butylbenzyl phthalate	000085-68-7	...	7.0E+00	...	...	2.6E+02	...	...	...
Butyric acid, 4-(2,4-dichlorophenoxy)	000094-82-6	...	2.8E-01	...	...	1.0E+01	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
								AWQC/AALAC	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	Freshwater (ug/L)	Saltwater (ug/L)
Cadmium	007440-43-9	1.0E-02	1.8E-02	...	...	1.3E+00	...	1.1E+00	9.3E+00
Captan	000133-06-2	...	4.6E+00	1.0E-02	...	1.7E+02	3.7E-01	...	...
Carbaryl	000063-25-2	...	3.5E+00	...	...	1.3E+02	...	...	...
Carbofuran	001563-66-2	...	1.8E-01	...	...	6.5E+00	...	...	...
Carbon disulfide	000075-15-0	...	3.5E+00	...	...	1.3E+02	...	...	...
Carbon Tetrachloride	000056-23-5	5.0E-03	2.5E-02	2.7E-04	...	9.1E-01	1.0E-02	...	...
Carbophenothion	000786-19-6	...	...	...	...	...	...	...	...
Chloral	000075-87-6	...	7.0E-02	...	...	2.6E+00	...	...	...
Chlordane	000057-74-9	...	2.1E-03	2.7E-05	3.0E-01	7.8E-02	1.0E-03	4.3E-03	4.0E-03
Chlorine cyanide	000506-77-4	...	1.8E+00	...	...	6.5E+01	...	4.0E-03	4.0E-03
Chloro-3-methylphenol, 4-	000059-50-7	...	7.0E+01*	...	...	2.6E+03*	...	...	...
Chloroaniline, p-	000106-47-8	...	1.4E-01	...	...	5.2E+00	...	...	...
Chlorobenzene	000108-90-7	...	7.0E-01	...	...	2.6E+01	...	...	...
Chloroform	000067-66-3	...	3.5E-01	5.7E-03	...	1.3E+01	2.1E-01	...	...
Chloromethane	000074-87-3	...	...	2.7E-03	...	...	1.0E-01	...	...
Chloromethyl methyl ether	000107-30-2	...	...	...	...	...	...	...	...
Chloromethyloxirane, 2-	000106-89-8	...	... *	3.5E-03	...	... *	1.3E-01	...	...
Chloronaphthalene, 2-	000091-58-7	...	2.8E+00	...	...	1.0E+02	...	...	...
Chlorophenol, 2-	000095-57-8	...	1.8E-01	...	...	6.5E+00	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
								AWQC/AALAC	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	Freshwater (ug/L)	Saltwater (ug/L)
Chlorpyrifos	002921-88-2	...	1.1E-01	...	...	3.9E+00	...	4.1E-02	5.6E-03
Chromium	007440-47-3	5.0E-02	1.8E-01	...	...	6.5E+00	...	...	...
Chromium(III)	016065-83-1	...	3.5E+01	...	...	1.3E+03	...	2.1E+02	2.1E+02
Chromium(VI)	018540-29-9	...	1.8E-01	...	...	6.5E+00	...	1.1E+01	5.0E+01
Chrysene	000218-01-9	...	...	...	...	...	...	...	...
Cobalt	007440-48-4	...	...	...	...	...	...	...	...
Copper	007440-50-8	...	... *	...	...	... *	...	1.2E+01	2.9E+00
Copper cyanide	000544-92-3	...	1.8E-01	...	...	6.5E+00	...	...	...
Coumaphos	000056-72-4	...	...	...	...	...	...	...	...
Creosote	008001-58-9	...	...	...	...	...	...	...	...
Cresol, m-	000108-39-4	...	1.8E+00	...	...	6.5E+01	...	...	...
Cresol, p-	000106-44-5	...	1.8E+01*	...	...	6.5E+02*	...	...	...
Cumene	000098-82-8	...	1.4E+00	...	...	5.2E+01	...	...	...
Cyanazine	021725-46-2	...	7.0E-02	...	...	2.6E+00	...	...	...
Cyanide	000057-12-5	...	7.0E-01	...	...	2.6E+01	...	5.2E+00	1.0E+00
Cyanogen	000460-19-5	...	1.4E+00	...	...	5.2E+01	...	...	...
Cyanogen bromide	000506-68-3	...	3.2E+00	...	...	1.2E+02	...	...	...
Cyclohexane	000110-82-7	...	...	...	...	...	...	...	...
Cyclohexanone	000108-94-1	...	1.8E+02	...	...	6.5E+03	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	AWQC/AALAC Freshwater (ug/L)	AWQC/AALAC Saltwater (ug/L)
Cyclotrimethylenetrinitriamine	000121-82-4	...	1.1E-01	3.2E-04	...	3.9E+00	1.2E-02	...	...
DDD	000072-54-8	...	...	1.5E-04	5.0E+00	...	5.4E-03	...	...
DDE	000072-55-9	...	...	1.0E-04	5.0E+00	...	3.8E-03	...	...
DDT	000050-29-3	...	1.8E-02	1.0E-04	5.0E+00	6.5E-01	3.8E-03	1.0E-03	1.0E-03
DEF	000078-48-8	...	1.1E-03	...	...	3.9E-02	...	...	...
Di-n-butyl phthalate	000084-74-2	...	3.5E+00	...	...	1.3E+02	...	...	...
Di-n-octyl phthalate	000117-84-0	...	7.0E-01	...	...	2.6E+01	...	...	...
Diazinon	000333-41-5	...	3.2E-02	...	...	1.2E+00	...	...	...
Dibenz(a,h)anthracene	000053-70-3	...	...	...	...	...	...	...	...
Dibromo-3-chloropropane, 1,2-	000096-12-8	...	...	2.5E-05*	...	...	9.3E-04*	...	...
Dibromochloromethane	000124-48-1	...	7.0E-01	4.2E-04	...	2.6E+01	1.5E-02	...	...
Dibromoethane, 1,2-	000106-93-4	...	...	4.1E-07	...	...	1.5E-05	...	...
Dicamba	001918-00-9	...	1.1E+00	...	...	3.9E+01	...	...	...
Dichlorobenzene, 1,2-	000095-50-1	...	3.2E+00	...	...	1.2E+02	...	...	...
Dichlorobenzene, 1,3-	000541-73-1	...	...	...	...	...	...	...	...
Dichlorobenzene, 1,4-	000106-46-7	7.5E-02	...	1.5E-03	...	...	5.4E-02	...	...
Dichlorobenzidine, 3,3-	000091-94-1	...	...	7.8E-05	...	...	2.9E-03	...	...
Dichlorodifluoromethane	000075-71-8	...	7.0E+00	...	...	2.6E+02	...	...	...
Dichloroethane, 1,1-	000075-34-3	...	... *	...	...	... *	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
								AWQC/AALAC	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	Freshwater (ug/L)	Saltwater (ug/L)
Dichloroethane, 1,2-	000107-06-2	5.0E-03	...	3.8E-04	...	...	1.4E-02	...	...
Dichloroethene, 1,1-	000075-35-4	7.0E-03	3.2E-01	5.8E-05	...	1.2E+01	2.2E-03	...	...
Dichloroethylene, cis-1,2-	000156-59-2	...	3.5E-01*	...	...	1.3E+01*	...	...	...
Dichloroethylene, trans-1,2-	000156-60-5	...	7.0E-01	...	...	2.6E+01	...	...	...
Dichlorophenol, 2,4-	000120-83-2	...	1.1E-01	...	...	3.9E+00	...	...	...
Dichlorophenoxyacetic acid, 2,4-	000094-75-7	1.0E-01	3.5E-01	...	...	1.3E+01	...	...	...
Dichloropropane, 1,2-	000078-87-5	...	...	5.1E-04	...	...	1.9E-02	...	...
Dichloropropene, 1,3-	000542-75-6	...	1.1E-02	1.9E-04	...	3.9E-01	7.2E-03	...	...
Dichlorvos	000062-73-7	...	... *	1.2E-04	...	... *	4.5E-03	...	...
Dicofol	000115-32-2	...	...	... *	...	...	... *	...	...
Dieldrin	000060-57-1	...	1.8E-03	2.2E-06	3.0E-01	6.5E-02	8.1E-05	1.9E-03	1.9E-03
Diethyl phthalate	000084-66-2	...	2.8E+01	...	...	1.0E+03	...	1.9E-03	1.9E-03
Diethylene glycol	000111-46-6	...	...	...	...	...	...	...	...
Diisopropylmethyl-phosphonate	001445-75-6	...	2.8E+00	...	...	1.0E+02	...	...	...
Dimethoate	000060-51-5	...	7.0E-03	...	...	2.6E-01	...	...	...
Dimethoxybenzidine, 3,3-	000119-90-4	...	...	2.5E-03	...	...	9.3E-02	...	...
Dimethyl phenol, 2,4-	000105-67-9	...	7.0E-01	...	...	2.6E+01	...	...	...
Dimethyl phthalate	000131-11-3	...	3.5E+02*	...	...	1.3E+04*	...	...	...
Dimethyl sulfate	000077-78-1	...	...	...	...	...	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	AWQC/AALAC Freshwater (ug/L)	AWQC/AALAC Saltwater (ug/L)
Dinitrobenzene, 1,3-	000099-65-0	...	3.5E-03	...	...	1.3E-01	...	...	...
Dinitrophenol, 2,4-	000051-28-5	...	7.0E-02	...	...	2.6E+00	...	...	...
Dinitrotoluene, 2,4-	000121-14-2	...	7.0E-02*	... *	...	2.6E+00*	... *	...	...
Dinitrotoluene, 2,6-	000606-20-2	...	...	... *	...	...	... *	...	...
Dinoseb	000088-85-7	...	3.5E-02	...	...	1.3E+00	...	...	...
Dioxane, 1,4-	000123-91-1	...	...	3.2E-03	...	...	1.2E-01	...	...
Dioxathion	000078-34-2	...	...	...	...	...	...	...	...
Diphenylhydrazine, 1,2-	000122-66-7	...	...	4.4E-05	...	...	1.6E-03	...	...
Diquat	000085-00-7	...	7.7E-02	...	...	2.9E+00	...	...	...
Disulfoton	000298-04-4	...	1.4E-03	...	...	5.2E-02	...	...	...
Diuron	000330-54-1	...	7.0E-02	...	...	2.6E+00	...	...	...
Endosulfan (I or II)	000115-29-7	...	1.8E-03	...	...	6.5E-02	...	5.6E-02	8.7E-03
Endosulfan sulfate	001031-07-8	...	...	...	...	...	...	...	...
Endothall	000145-73-3	...	7.0E-01	...	...	2.6E+01	...	...	...
Endrin	000072-20-8	2.0E-04	1.1E-02	...	3.0E-01	3.9E-01	...	2.3E-03	2.3E-03
Endrin aldehyde	007421-93-4	...	...	...	...	...	...	2.3E-03	2.3E-03
Ethion	000563-12-2	...	1.8E-02	...	...	6.5E-01	...	...	...
Ethyl acetate	000141-78-6	...	3.2E+01	...	...	1.2E+03	...	...	...
Ethyl benzene	000100-41-4	...	3.5E+00	...	...	1.3E+02	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
								AWQC/AALAC	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	Freshwater (ug/L)	Saltwater (ug/L)
Ethyl chloride	000075-00-3	...	...	...	...	...	...	...	...
Ethyl ether	000060-29-7	...	7.0E+00	...	...	2.6E+02	...	...	...
Ethyldipropylthiocarbamate, s-	000759-94-4	...	8.8E-01	...	...	3.3E+01	...	...	...
Ethylene glycol	000107-21-1	...	7.0E+01	...	...	2.6E+03	...	...	...
Ethylene glycol monoethyl ether	000110-80-5	...	...	...	...	...	...	...	...
Fenethion	000055-38-9	...	...	...	...	...	...	...	...
Ferrous sulfate	007720-78-7	...	...	...	...	...	...	...	...
Fluorene	000086-73-7	...	1.4E+00	...	...	5.2E+01	...	...	...
Fluorine	007782-41-4	...	2.1E+00	...	...	7.8E+01	...	...	...
Formaldehyde	000050-00-0	...	7.0E+00	... *	...	2.6E+02	... *	...	...
Formic acid	000064-18-6	...	7.0E+01	...	...	2.6E+03	...	...	...
Furan	000110-00-9	...	3.5E-02	...	...	1.3E+00	...	...	...
Furfural	000098-01-1	...	1.1E-01	...	...	3.9E+00	...	...	...
Glycidylaldehyde	000765-34-4	...	1.4E-02	...	...	5.2E-01	...	...	...
Heptachlor	000076-44-8	...	1.8E-02	7.8E-06	3.0E-01	6.5E-01	2.9E-04	3.8E-03	3.6E-03
Heptachlor epoxide	001024-57-3	...	4.6E-04	3.8E-06	3.0E-01	1.7E-02	1.4E-04	...	...
Hexabromobenzene	000087-82-1	...	7.0E-02	...	...	2.6E+00	...	...	...
Hexachlorobenzene	000118-74-1	...	2.8E-02	2.2E-05	...	1.0E+00	8.1E-04	...	...
Hexachlorobutadiene	000087-68-3	...	7.0E-02	4.5E-04	...	2.6E+00	1.7E-02	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	AWQC/AALAC Freshwater (ug/L)	AWQC/AALAC Saltwater (ug/L)
Hexachlorocyclohexane, alpha-	000319-84-6	...	...	5.6E-06	...	...	2.1E-04	...	...
Hexachlorocyclohexane, beta-	000319-85-7	...	...	1.9E-05	...	...	7.2E-04	...	...
Hexachlorocyclohexane, delta-	000319-86-8	...	...	... *	...	...	... *	...	...
Hexachlorocyclopentadiene	000077-47-4	...	2.5E-01	...	...	9.1E+00	...	...	...
Hexachloroethane	000067-72-1	...	3.5E-02	2.5E-03	...	1.3E+00	9.3E-02	...	...
Hexachlorophene	000070-30-4	...	1.1E-02	...	...	3.9E-01	...	...	...
Hexane	000110-54-3	...	2.1E+00	...	...	7.8E+01	...	...	...
Hydrazine	000302-01-2	...	...	1.2E-05	...	...	4.3E-04	...	...
Hydrochloric acid	007647-01-0	...	...	...	...	...	...	...	...
Hydrogen cyanide	000074-90-8	...	7.0E-01	...	...	2.6E+01	...	...	...
Hydrogen sulfide	007783-06-4	...	1.1E-01	...	...	3.9E+00	...	2.0E+00	2.0E+00
Ioxynil	001689-83-4	...	...	...	...	...	...	...	...
Iron	015438-31-0	...	...	...	...	...	...	1.0E+03	1.0E+03
Isobutanol	000078-83-1	...	1.1E+01	...	...	3.9E+02	...	...	...
Isophorone	000078-59-1	...	7.0E+00	8.5E-03	...	2.6E+02	3.2E-01	...	...
Kepone	000143-50-0	...	...	...	3.0E-01	...	...	...	...
Lead	007439-92-1	5.0E-02	...	...	...	...	...	... *	... *
Lindane	000058-89-9	4.0E-03	1.1E-02	2.7E-05	...	3.9E-01	1.0E-03	8.0E-02	8.0E-02
Malathion	000121-75-5	...	7.0E-01	...	...	2.6E+01	...	1.0E-01	1.0E-01

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
								AWQC/AALAC	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	Freshwater (ug/L)	Saltwater (ug/L)
Maleic anhydride	000108-31-6	...	3.5E+00	...	...	1.3E+02	...	...	...
Maleic hydrazide	000123-33-1	...	1.8E+01	...	...	6.5E+02	...	...	...
Manganese	007439-96-5	...	3.5E+00	...	...	1.3E+02	...	...	...
Mercury	007439-97-6	2.0E-03	1.1E-02	...	1.0E+00	3.9E-01	...	1.2E-02	2.5E-02
Methacrylonitrile	000126-98-7	...	3.5E-03	...	...	1.3E-01	...	...	...
Methanol	000067-56-1	...	1.8E+01	...	...	6.5E+02	...	...	...
Methomyl	016752-77-5	...	8.8E-01	...	...	3.3E+01	...	...	...
Methoxychlor	000072-43-5	1.0E-01	1.8E-01	...	...	6.5E+00	...	3.0E-02	3.0E-02
Methyl chlorocarbonate	000079-22-1	...	...	...	...	...	...	...	...
Methyl ethyl ketone	000078-93-3	...	... *	...	...	... *	...	...	...
Methyl isobutyl ketone	000108-10-1	...	1.8E+00	...	...	6.5E+01	...	...	...
Methyl methacrylate	000080-62-6	...	2.8E+00	...	...	1.0E+02	...	...	...
Methylene bis (2-chloroaniline), 4,4-	000101-14-4	...	2.5E-02	2.7E-04	...	9.1E-01	1.0E-02	...	...
Methylene chloride	000075-09-2	...	2.1E+00	4.7E-03	...	7.8E+01	1.7E-01	...	...
Methylenediphenyl diisocyanate, 4,4-	000101-68-8	...	...	...	...	...	...	...	...
Metribuzin	021087-64-9	...	8.8E-01	...	...	3.3E+01	...	...	...
Mirex	002385-85-5	...	7.0E-05	1.9E-05	1.0E-01	2.6E-03	7.2E-04	1.0E-03	1.0E-03
Naphthalene	000091-20-3	...	1.4E+00*	...	...	5.2E+01*	...	...	...
Nickel	007440-02-0	...	7.0E-01	...	...	2.6E+01	...	1.6E+02	8.3E+00

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	AWQC/AALAC Freshwater (ug/L)	AWQC/AALAC Saltwater (ug/L)
Nitric acid	007697-37-2	...	...	...	...	...	...	...	...
Nitric oxide	010102-43-9	...	3.5E+00	...	...	1.3E+02	...	...	...
Nitroaniline, p-	000100-01-6	...	...	...	...	...	...	...	...
Nitrobenzene	000098-95-3	...	1.8E-02	...	...	6.5E-01	...	...	...
Nitrogen dioxide	010102-44-0	...	3.5E+01	...	...	1.3E+03	...	...	...
Nitroglycerine	000055-63-0	...	...	...	...	...	...	...	...
Nitrophenol, 4-	000100-02-7	...	...	...	...	...	...	...	...
Nitroso-di-n-butylamine, N-	000924-16-3	...	...	6.5E-06	...	...	2.4E-04	...	...
Nitroso-di-n-methylurethane, N-	000615-53-2	...	...	...	...	...	...	...	...
Nitrosodiethanolamine, N-	001116-54-7	...	...	1.3E-05	...	...	4.6E-04	...	...
Nitrosodiethylamine, N-	000055-18-5	...	...	2.3E-07	...	...	8.7E-06	...	...
Nitrosodimethylamine, N-	000062-75-9	...	...	6.9E-07	...	...	2.5E-05	...	...
Nitrosodiphenylamine, N-	000086-30-6	...	...	7.1E-03	...	...	2.7E-01	...	...
Nitrosopyrrolidine, N-	000930-55-2	...	...	1.7E-05	...	...	6.2E-04	...	...
Nitrotoluene, 4-	000099-99-0	...	3.5E-01	...	...	1.3E+01	...	...	...
Parathion, ethyl-	000056-38-2	...	2.1E-01	...	...	7.8E+00	...	...	...
Parathion, methyl-	000298-00-0	...	8.8E-03	...	...	3.3E-01	...	...	...
PCBs	001336-36-3	...	...	4.5E-06	...	...	1.7E-04	1.4E-02	3.0E-02
Pentachlorobenzene	000608-93-5	...	2.8E-02	...	...	1.0E+00	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	AWQC/AALAC Freshwater (ug/L)	AWQC/AALAC Saltwater (ug/L)
Pentachloroethane	000076-01-7	...	...	...	...	...	...	...	...
Pentachloronitrobenzene	000082-68-8	...	1.1E-01	1.3E-04	...	3.9E+00	5.0E-03	...	...
Pentachlorophenol	000087-86-5	...	1.1E+00	2.9E-04	...	3.9E+01	1.1E-02	1.3E+01	1.3E+01
Phenanthrene	000085-01-8	...	...	...	...	...	...	...	...
Phenol	000108-95-2	...	2.1E+01	...	...	7.8E+02	...	...	...
Phenyl sulfide	000139-66-2	...	...	...	...	...	...	...	...
Phenylmercuric acetate	000062-38-4	...	2.8E-03	...	...	1.0E-01	...	...	...
Phorate	000298-02-2	...	7.0E-03*	...	...	2.6E-01*	...	...	...
Phosgene	000075-44-5	...	...	...	...	...	...	...	...
Phosphamidon	013171-21-6	...	...	...	...	...	...	...	...
Phosphine	007803-51-2	...	1.1E-02	...	...	3.9E-01	...	...	...
Phosphoric acid	007664-38-2	...	...	...	...	...	...	...	...
Phosphorodithioc acid,phenyl-o-ethyl-o-(	002104-64-5	...	3.5E-04	...	...	1.3E-02	...	...	...
Phosphorous (elemental)	007723-14-0	...	7.0E-04*	...	...	2.6E-02*	...	1.0E-01	1.0E-01
Phthalic anhydride	000085-44-9	...	7.0E+01	...	...	2.6E+03	...	...	...
Potassium silver cyanide	000506-61-6	...	7.0E+00	...	...	2.6E+02	...	...	...
Pronamide	023950-58-5	...	2.6E+00	...	...	9.8E+01	...	...	...
Pyrene	000129-00-0	...	1.1E+00	...	...	3.9E+01	...	...	...
Pyridine	000110-86-1	...	3.5E-02	...	...	1.3E+00	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	AWQC/AALAC Freshwater (ug/L)	AWQC/AALAC Saltwater (ug/L)
Quinoline	000091-22-5	...	...	2.9E-06	...	...	1.1E-04	...	...
Resorcinol	000108-46-3	...	...	...	...	...	...	...	...
Ronnel	000299-84-3	...	1.8E+00	...	...	6.5E+01	...	...	...
Selenium	007782-49-2	1.0E-02	1.8E-01	...	...	6.5E+00	...	3.6E+01	5.4E+01
Selenourea	000630-10-4	...	1.8E-01	...	...	6.5E+00	...	...	...
Silver	007440-22-4	5.0E-02	1.8E-01*	...	...	6.5E+00*	...	1.2E-01	1.2E-01
Silver Cyanide	000506-64-9	...	3.5E+00	...	...	1.3E+02	...	...	...
Sodium	007440-23-5	...	...	...	...	...	...	...	...
Strychnine	000057-24-9	...	1.1E-02	...	...	3.9E-01	...	...	...
Styrene	000100-42-5	...	7.0E+00	... *	...	2.6E+02	... *	...	...
Sulfuric acid	007664-93-9	...	...	...	...	...	...	...	...
TB, 2,4,5-	000093-80-1	...	...	...	...	...	...	...	...
TCDD	001746-01-6	...	...	2.3E-10	...	...	8.7E-09	...	...
Tetrachlorobenzene, 1,2,4,5-	000095-94-3	...	1.1E-02	...	...	3.9E-01	...	...	...
Tetrachloroethane, 1,1,1,2-	000630-20-6	...	1.1E+00	1.3E-03	...	3.9E+01	5.0E-02	...	...
Tetrachloroethane, 1,1,2,2-	000079-34-5	...	...	1.8E-04	...	...	6.5E-03	...	...
Tetrachloroethene	000127-18-4	...	3.5E-01	... *	...	1.3E+01	... *	...	...
Tetrachlorophenol, 2,3,4,6-	000058-90-2	...	1.1E+00	...	...	3.9E+01	...	...	...
Tetraethyl lead	000078-00-2	...	3.5E-06	...	...	1.3E-04	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	AWQC/AALAC Freshwater (ug/L)	AWQC/AALAC Saltwater (ug/L)
Tetraethyldithiopyrophosphate	003689-24-5	...	1.8E-02	...	...	6.5E-01	...	...	...
Tetrahydrofuran	000109-99-9	...	...	...	...	...	...	...	...
Thallium	007440-28-0	...	... *	...	...	... *	...	...	...
Thiourea	000062-56-6	...	...	...	...	...	...	...	...
Thiram	000137-26-8	...	1.8E-01	...	...	6.5E+00	...	...	...
Toluene	000108-88-3	...	7.0E+00	...	...	2.6E+02	...	...	...
Toluene diisocyanate	000584-84-9	...	...	...	...	...	...	...	...
Toxaphene	008001-35-2	5.0E-03	...	3.2E-05	5.0E+00	...	1.2E-03	1.3E-02	2.0E-04
TP, 2,4,5-	000093-72-1	1.0E-02	2.8E-01	...	...	1.0E+01	...	...	...
Tribromomethane	000075-25-2	...	7.0E-01	4.4E-03	...	2.6E+01	1.6E-01	...	...
Trichloro-1,2,2-Trifluoroethane, 1,1,2-	000076-13-1	...	1.1E+03	...	...	3.9E+04	...	...	...
Trichlorobenzene, 1,2,4-	000120-82-1	...	3.5E-01*	...	...	1.3E+01*	...	...	...
Trichloroethane, 1,1,1-	000071-55-6	2.0E-01	3.2E+00	...	...	1.2E+02	...	...	...
Trichloroethane, 1,1,2-	000079-00-5	...	1.4E-01	6.1E-04	...	5.2E+00	2.3E-02	...	...
Trichloroethylene	000079-01-6	5.0E-03	...	... *	...	...	... *	...	...
Trichlorofluoromethane	000075-69-4	...	1.1E+01	...	...	3.9E+02	...	...	...
Trichlorophenol, 2,3,5-	000933-78-8	...	...	...	...	...	...	...	...
Trichlorophenol, 2,3,6-	000933-75-5	...	...	...	...	...	...	...	...
Trichlorophenol, 2,4,5-	000095-95-4	...	3.5E+00	...	...	1.3E+02	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	AWQC/AALAC Freshwater (ug/L)	AWQC/AALAC Saltwater (ug/L)
Trichlorophenol, 2,4,6-	000088-06-2	...	...	3.2E-03	...	...	1.2E-01	...	...
Trichlorophenol, 3,4,5-	000609-19-8	...	...	...	...	...	...	...	...
Trichlorophenoxyacetic acid, 2,4,5-	000093-76-5	...	3.5E-01	...	...	1.3E+01	...	...	...
Trichloropropane, 1,2,3-	000096-18-4	...	2.1E-01	...	...	7.8E+00	...	...	...
Triethanolamine	000102-71-6	...	...	...	...	...	...	...	...
Trifluralin	001582-09-8	...	2.6E-01	4.5E-03	...	9.8E+00	1.7E-01	...	...
Trinitrobenzene, 1,3,5-	000099-35-4	...	1.8E-03	...	...	6.5E-02	...	...	...
Trinitrotoluene	000118-96-7	...	1.8E-02	1.2E-03	...	6.5E-01	4.3E-02	...	...
Tris (2,3-dibromopropyl) phosphate	000126-72-7	...	...	...	...	...	...	...	...
Vanadium pentoxide	001314-62-1	...	3.2E-01	...	...	1.2E+01	...	...	...
Vinyl acetate	000108-05-4	...	3.5E+01	...	...	1.3E+03	...	...	...
Vinyl chloride	000075-01-4	2.0E-03	...	1.8E-05	...	...	6.8E-04	...	...
Warfarin	000081-81-2	...	1.1E-02	...	...	3.9E-01	...	...	...
Xylene, m-	000108-38-3	...	7.0E+01	...	...	2.6E+03	...	...	...
Xylene, o-	000095-47-6	...	7.0E+01	...	...	2.6E+03	...	...	...
Xylene, p-	000106-42-3	...	...	...	...	...	...	...	...
Zinc	007440-66-6	...	7.0E+00	...	...	2.6E+02	...	1.1E+02	8.6E+01
Zinc cyanide	000557-21-1	...	1.8E+00	...	...	6.5E+01	...	...	...
Zinc phosphide	001314-84-7	...	1.1E-02	...	...	3.9E-01	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

		SURFACE WATER PATHWAY							
		DRINKING WATER			FOOD CHAIN			ENVIRONMENTAL	
Substance Name	CAS Number	MCL/MCLG (mg/L)	Reference Dose Screen Conc (mg/L)	Cancer Risk Screen Conc (mg/L)	FDAAL (ppm)	Reference Dose Screen Conc (mg/kg)	Cancer Risk Screen Conc (mg/kg)	AWQC/AALAC Freshwater (ug/L)	AWQC/AALAC Saltwater (ug/L)
Zinc sulfate	007733-02-0	...	...	...	...	...	...	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Acenaphthene	000083-32-9	3.5E+04	...
Acenaphthylene	000208-96-8	...	...
Acetaldehyde	000075-07-0	...	...
Acetone	000067-64-1	5.8E+04	...
Acetonitrile	000075-05-8	3.5E+03	...
Acetophenone	000098-86-2	5.8E+04	...
Acetyl-2-thiourea, 1-	000591-08-2	...	...
Acrolein	000107-02-8	1.2E+04*	...
Acrylamide	000079-06-1	1.2E+02	1.3E-01
Acrylic acid	000079-10-7	4.7E+04	...
Acrylonitrile	000107-13-1	...	1.1E+00
Adipic acid	000124-04-9	...	...
Aldicarb	000116-06-3	1.2E+02	...
Aldrin	000309-00-2	1.7E+01	3.4E-02
Allyl alcohol	000107-18-6	2.9E+03	...
Aluminum	007429-90-5	...	...
Aluminum phosphide	020859-73-8	2.3E+02	...
Ammonia	007664-41-7	2.0E+07*	...
Ammonium picrate	000131-74-8	...	...
Ammonium sulfamate	007773-06-0	1.2E+05	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Aniline	000062-53-3	...	1.0E+02*
Anthracene	000120-12-7	1.7E+05	...
Antimony	007440-36-0	2.3E+02	...
Arsenic	007440-38-2	1.7E+02	3.3E-01*
Asbestos	001332-21-4	...	...
Atrazine	001912-24-9	2.9E+03	2.6E+00
Azinphos- ethyl	002642-71-9	...	...
Azinphos- methyl	000086-50-0	...	...
Aziridine	000151-56-4	...	...
Barium	007440-39-3	4.1E+04	...
Barium cyanide	000542-62-1	5.8E+04*	...
Benz(a)anthracene	000056-55-3	...	...
Benzene	000071-43-2	...	2.0E+01
Benzene carbonyl chloride	000098-88-4	...	...
Benzidine	000092-87-5	1.7E+03	2.5E-03
Benzo(a)pyrene	000050-32-8	...	8.0E-02*
Benzo(j,k)fluorene	000206-44-0	2.3E+04	...
Benzo(k)fluoranthene	000207-08-9	...	...
Benzofluoranthene, 3,4-	000205-99-2	...	...
Benzoic acid	000065-85-0	2.3E+06	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Benzonitrile	000100-47-0	...	...
Benzothiazole, 1,2,-	000095-16-9	...	...
Benzyl chloride	000100-44-7	...	3.4E+00
Beryllium	007440-41-7	2.9E+03	1.4E-01
Biphenyl, 1,1-	000092-52-4	2.9E+04	...
Bis (2-ethylhexyl) phthalate	000117-81-7	1.2E+04	4.2E+01
Bis(2-chloroethoxy)methane	000111-91-1	...	...
Bis(2-chloroethyl)ether	000111-44-4	...	5.3E-01
Bis(chloromethyl)ether	000542-88-1	...	2.7E-03
Boron	007440-42-8	5.2E+04	...
Bromodichloromethane	000075-27-4	1.2E+04	4.5E+00
Bromomethane	000074-83-9	8.2E+02	...
Bromoxynil	001689-84-5	1.2E+04	...
Butadiene, 1,3-	000106-99-0	...	...
Butanol	000071-36-3	5.8E+04	...
Butylbenzyl phthalate	000085-68-7	1.2E+05	...
Butyric acid, 4-(2,4-dichlorophenoxy)	000094-82-6	4.7E+03	...
Cadmium	007440-43-9	2.9E+02	...
Captan	000133-06-2	7.6E+04	1.7E+02
Carbaryl	000063-25-2	5.8E+04	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Carbofuran	001563-66-2	2.9E+03	...
Carbon disulfide	000075-15-0	5.8E+04	...
Carbon Tetrachloride	000056-23-5	4.1E+02	4.5E+00
Carbophenothion	000786-19-6	...	...
Chloral	000075-87-6	1.2E+03	...
Chlordane	000057-74-9	3.5E+01	4.5E-01
Chlorine cyanide	000506-77-4	2.9E+04	...
Chloro-3-methylphenol, 4-	000059-50-7	1.2E+06*	...
Chloroaniline, p-	000106-47-8	2.3E+03	...
Chlorobenzene	000108-90-7	1.2E+04	...
Chloroform	000067-66-3	5.8E+03	9.6E+01
Chloromethane	000074-87-3	...	4.5E+01
Chloromethyl methyl ether	000107-30-2	...	...
Chloromethyloxirane, 2-	000106-89-8	... *	5.9E+01
Chloronaphthalene, 2-	000091-58-7	4.7E+04	...
Chlorophenol, 2-	000095-57-8	2.9E+03	...
Chlorpyrifos	002921-88-2	1.7E+03	...
Chromium	007440-47-3	2.9E+03	...
Chromium(III)	016065-83-1	5.8E+05	...
Chromium(VI)	018540-29-9	2.9E+03	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Chrysene	000218-01-9	...	...
Cobalt	007440-48-4	...	...
Copper	007440-50-8	... *	...
Copper cyanide	000544-92-3	2.9E+03	...
Coumaphos	000056-72-4	...	...
Creosote	008001-58-9	...	...
Cresol, m-	000108-39-4	2.9E+04	...
Cresol, p-	000106-44-5	2.9E+05*	...
Cumene	000098-82-8	2.3E+04	...
Cyanazine	021725-46-2	1.2E+03	...
Cyanide	000057-12-5	1.2E+04	...
Cyanogen	000460-19-5	2.3E+04	...
Cyanogen bromide	000506-68-3	5.2E+04	...
Cyclohexane	000110-82-7	...	...
Cyclohexanone	000108-94-1	2.9E+06	...
Cyclotrimethylenetrinitriamine	000121-82-4	1.7E+03	5.3E+00
DDD	000072-54-8	...	2.4E+00
DDE	000072-55-9	...	1.7E+00
DDT	000050-29-3	2.9E+02	1.7E+00
DEF	000078-48-8	1.7E+01	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Di-n-butyl phthalate	000084-74-2	5.8E+04	...
Di-n-octyl phthalate	000117-84-0	1.2E+04	...
Diazinon	000333-41-5	5.2E+02	...
Dibenz(a,h)anthracene	000053-70-3	...	...
Dibromo-3-chloropropane, 1,2-	000096-12-8	...	4.2E-01*
Dibromochloromethane	000124-48-1	1.2E+04	6.9E+00
Dibromoethane, 1,2-	000106-93-4	...	6.9E-03
Dicamba	001918-00-9	1.7E+04	...
Dichlorobenzene, 1,2-	000095-50-1	5.2E+04	...
Dichlorobenzene, 1,3-	000541-73-1	...	...
Dichlorobenzene, 1,4-	000106-46-7	...	2.4E+01
Dichlorobenzidine, 3,3-	000091-94-1	...	1.3E+00
Dichlorodifluoromethane	000075-71-8	1.2E+05	...
Dichloroethane, 1,1-	000075-34-3	... *	...
Dichloroethane, 1,2-	000107-06-2	...	6.4E+00
Dichloroethene, 1,1-	000075-35-4	5.2E+03	9.7E-01
Dichloroethylene, cis-1,2-	000156-59-2	5.8E+03*	...
Dichloroethylene, trans-1,2-	000156-60-5	1.2E+04	...
Dichlorophenol, 2,4-	000120-83-2	1.7E+03	...
Dichlorophenoxyacetic acid, 2,4-	000094-75-7	5.8E+03	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Dichloropropane, 1,2-	000078-87-5	...	8.6E+00
Dichloropropene, 1,3-	000542-75-6	1.7E+02	3.2E+00
Dichlorvos	000062-73-7	... *	2.0E+00
Dicofol	000115-32-2	...	... *
Dieldrin	000060-57-1	2.9E+01	3.6E-02
Diethyl phthalate	000084-66-2	4.7E+05	...
Diethylene glycol	000111-46-6	...	...
Diisopropylmethyl-phosphonate	001445-75-6	4.7E+04	...
Dimethoate	000060-51-5	1.2E+02	...
Dimethoxybenzidine, 3,3-	000119-90-4	...	4.2E+01
Dimethyl phenol, 2,4-	000105-67-9	1.2E+04	...
Dimethyl phthalate	000131-11-3	5.8E+06*	...
Dimethyl sulfate	000077-78-1	...	...
Dinitrobenzene, 1,3-	000099-65-0	5.8E+01	...
Dinitrophenol, 2,4-	000051-28-5	1.2E+03	...
Dinitrotoluene, 2,4-	000121-14-2	1.2E+03*	... *
Dinitrotoluene, 2,6-	000606-20-2	...	... *
Dinoseb	000088-85-7	5.8E+02	...
Dioxane, 1,4-	000123-91-1	...	5.3E+01
Dioxathion	000078-34-2	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Diphenylhydrazine, 1,2-	000122-66-7	...	7.3E-01
Diquat	000085-00-7	1.3E+03	...
Disulfoton	000298-04-4	2.3E+01	...
Diuron	000330-54-1	1.2E+03	...
Endosulfan (I or II)	000115-29-7	2.9E+01	...
Endosulfan sulfate	001031-07-8	...	...
Endothall	000145-73-3	1.2E+04	...
Endrin	000072-20-8	1.7E+02	...
Endrin aldehyde	007421-93-4	...	...
Ethion	000563-12-2	2.9E+02	...
Ethyl acetate	000141-78-6	5.2E+05	...
Ethyl benzene	000100-41-4	5.8E+04	...
Ethyl chloride	000075-00-3	...	...
Ethyl ether	000060-29-7	1.2E+05	...
Ethyldipropylthiocarbamate, s-	000759-94-4	1.5E+04	...
Ethylene glycol	000107-21-1	1.2E+06	...
Ethylene glycol monoethyl ether	000110-80-5	...	...
Fenethion	000055-38-9	...	...
Ferrous sulfate	007720-78-7	...	...
Fluorene	000086-73-7	2.3E+04	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Fluorine	007782-41-4	3.5E+04	...
Formaldehyde	000050-00-0	1.2E+05	... *
Formic acid	000064-18-6	1.2E+06	...
Furan	000110-00-9	5.8E+02	...
Furfural	000098-01-1	1.7E+03	...
Glycidylaldehyde	000765-34-4	2.3E+02	...
Heptachlor	000076-44-8	2.9E+02	1.3E-01
Heptachlor epoxide	001024-57-3	7.6E+00	6.4E-02
Hexabromobenzene	000087-82-1	1.2E+03	...
Hexachlorobenzene	000118-74-1	4.7E+02	3.6E-01
Hexachlorobutadiene	000087-68-3	1.2E+03	7.5E+00
Hexachlorocyclohexane, alpha-	000319-84-6	...	9.3E-02
Hexachlorocyclohexane, beta-	000319-85-7	...	3.2E-01
Hexachlorocyclohexane, delta-	000319-86-8	...	... *
Hexachlorocyclopentadiene	000077-47-4	4.1E+03	...
Hexachloroethane	000067-72-1	5.8E+02	4.2E+01
Hexachlorophene	000070-30-4	1.7E+02	...
Hexane	000110-54-3	3.5E+04	...
Hydrazine	000302-01-2	...	1.9E-01
Hydrochloric acid	007647-01-0	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Hydrogen cyanide	000074-90-8	1.2E+04	...
Hydrogen sulfide	007783-06-4	1.7E+03	...
Ioxynil	001689-83-4	...	...
Iron	015438-31-0	...	...
Isobutanol	000078-83-1	1.7E+05	...
Isophorone	000078-59-1	1.2E+05	1.4E+02
Kepone	000143-50-0	...	...
Lead	007439-92-1	...	...
Lindane	000058-89-9	1.7E+02	4.5E-01
Malathion	000121-75-5	1.2E+04	...
Maleic anhydride	000108-31-6	5.8E+04	...
Maleic hydrazide	000123-33-1	2.9E+05	...
Manganese	007439-96-5	5.8E+04	...
Mercury	007439-97-6	1.7E+02	...
Methacrylonitrile	000126-98-7	5.8E+01	...
Methanol	000067-56-1	2.9E+05	...
Methomyl	016752-77-5	1.5E+04	...
Methoxychlor	000072-43-5	2.9E+03	...
Methyl chlorocarbonate	000079-22-1	...	...
Methyl ethyl ketone	000078-93-3	... *	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Methyl isobutyl ketone	000108-10-1	2.9E+04	...
Methyl methacrylate	000080-62-6	4.7E+04	...
Methylene bis (2-chloroaniline), 4,4-	000101-14-4	4.1E+02	4.5E+00
Methylene chloride	000075-09-2	3.5E+04	7.8E+01
Methylenediphenyl diisocyanate, 4,4-	000101-68-8	...	...
Metribuzin	021087-64-9	1.5E+04	...
Mirex	002385-85-5	1.2E+00	3.2E-01
Naphthalene	000091-20-3	2.3E+04*	...
Nickel	007440-02-0	1.2E+04	...
Nitric acid	007697-37-2	...	...
Nitric oxide	010102-43-9	5.8E+04	...
Nitroaniline, p-	000100-01-6	...	...
Nitrobenzene	000098-95-3	2.9E+02	...
Nitrogen dioxide	010102-44-0	5.8E+05	...
Nitroglycerine	000055-63-0	...	...
Nitrophenol, 4-	000100-02-7	...	...
Nitroso-di-n-butylamine, N-	000924-16-3	...	1.1E-01
Nitroso-di-n-methylurethane, N-	000615-53-2	...	...
Nitrosodiethanolamine, N-	001116-54-7	...	2.1E-01
Nitrosodiethylamine, N-	000055-18-5	...	3.9E-03

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Nitrosodimethylamine, N-	000062-75-9	...	1.1E-02
Nitrosodiphenylamine, N-	000086-30-6	...	1.2E+02
Nitrosopyrrolidine, N-	000930-55-2	...	2.8E-01
Nitrotoluene, 4-	000099-99-0	5.8E+03	...
Parathion, ethyl-	000056-38-2	3.5E+03	...
Parathion, methyl-	000298-00-0	1.5E+02	...
PCBs	001336-36-3	...	7.6E-02
Pentachlorobenzene	000608-93-5	4.7E+02	...
Pentachloroethane	000076-01-7	...	...
Pentachloronitrobenzene	000082-68-8	1.7E+03	2.2E+00
Pentachlorophenol	000087-86-5	1.7E+04	4.9E+00
Phenanthrene	000085-01-8	...	...
Phenol	000108-95-2	3.5E+05	...
Phenyl sulfide	000139-66-2	...	...
Phenylmercuric acetate	000062-38-4	4.7E+01	...
Phorate	000298-02-2	1.2E+02*	...
Phosgene	000075-44-5	...	...
Phosphamidon	013171-21-6	...	...
Phosphine	007803-51-2	1.7E+02	...
Phosphoric acid	007664-38-2	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Phosphorodithioc acid,phenyl-o-ethyl-o-(	002104-64-5	5.8E+00	...
Phosphorous (elemental)	007723-14-0	1.2E+01*	...
Phthalic anhydride	000085-44-9	1.2E+06	...
Potassium silver cyanide	000506-61-6	1.2E+05	...
Pronamide	023950-58-5	4.4E+04	...
Pyrene	000129-00-0	1.7E+04	...
Pyridine	000110-86-1	5.8E+02	...
Quinoline	000091-22-5	...	4.9E-02
Resorcinol	*000108-46-3*	...	...
Ronnel	000299-84-3	2.9E+04	...
Selenium	007782-49-2	2.9E+03	...
Selenourea	000630-10-4	2.9E+03	...
Silver	007440-22-4	2.9E+03*	...
Silver Cyanide	000506-64-9	5.8E+04	...
Sodium	007440-23-5	...	...
Strychnine	000057-24-9	1.7E+02	...
Styrene	000100-42-5	1.2E+05	... *
Sulfuric acid	007664-93-9	...	...
TB, 2,4,5-	000093-80-1	...	...
TCDD	001746-01-6	...	3.9E-06

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Tetrachlorobenzene, 1,2,4,5-	000095-94-3	1.7E+02	...
Tetrachloroethane, 1,1,1,2-	000630-20-6	1.7E+04	2.2E+01
Tetrachloroethane, 1,1,2,2-	000079-34-5	...	2.9E+00
Tetrachloroethene	000127-18-4	5.8E+03	... *
Tetrachlorophenol, 2,3,4,6-	000058-90-2	1.7E+04	...
Tetraethyl lead	000078-00-2	5.8E-02	...
Tetraethyldithiopyrophosphate	003689-24-5	2.9E+02	...
Tetrahydrofuran	000109-99-9	...	...
Thallium	007440-28-0	... *	...
Thiourea	000062-56-6	...	...
Thiram	000137-26-8	2.9E+03	...
Toluene	000108-88-3	1.2E+05	...
Toluene diisocyanate	000584-84-9	...	...
Toxaphene	008001-35-2	...	5.3E-01
TP, 2,4,5-	000093-72-1	4.7E+03	...
Tribromomethane	000075-25-2	1.2E+04	7.4E+01
Trichloro-1,2,2-Trifluoroethane, 1,1,2-	000076-13-1	1.7E+07	...
Trichlorobenzene, 1,2,4-	000120-82-1	5.8E+03*	...
Trichloroethane, 1,1,1-	000071-55-6	5.2E+04	...
Trichloroethane, 1,1,2-	000079-00-5	2.3E+03	1.0E+01

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Trichloroethylene	000079-01-6	...	... *
Trichlorofluoromethane	000075-69-4	1.7E+05	...
Trichlorophenol, 2,3,5-	000933-78-8	...	...
Trichlorophenol, 2,3,6-	000933-75-5	...	...
Trichlorophenol, 2,4,5-	000095-95-4	5.8E+04	...
Trichlorophenol, 2,4,6-	000088-06-2	...	5.3E+01
Trichlorophenol, 3,4,5-	000609-19-8	...	...
Trichlorophenoxyacetic acid, 2,4,5-	000093-76-5	5.8E+03	...
Trichloropropane, 1,2,3-	000096-18-4	3.5E+03	...
Triethanolamine	000102-71-6	...	...
Trifluralin	001582-09-8	4.4E+03	7.6E+01
Trinitrobenzene, 1,3,5-	000099-35-4	2.9E+01	...
Trinitrotoluene	000118-96-7	2.9E+02	1.9E+01
Tris (2,3-dibromopropyl) phosphate	000126-72-7	...	...
Vanadium pentoxide	001314-62-1	5.2E+03	...
Vinyl acetate	000108-05-4	5.8E+05	...
Vinyl chloride	000075-01-4	...	3.1E-01
Warfarin	000081-81-2	1.7E+02	...
Xylene, m-	000108-38-3	1.2E+06	...
Xylene, o-	000095-47-6	1.2E+06	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(305 Substances)

Substance Name	CAS Number	SOIL PATHWAY Reference Dose Screen Conc (mg/kg)	SOIL PATHWAY Cancer Risk Screen Conc (mg/kg)
Xylene, p-	000106-42-3	...	...
Zinc	007440-66-6	1.2E+05	...
Zinc cyanide	000557-21-1	2.9E+04	...
Zinc phosphide	001314-84-7	1.7E+02	...
Zinc sulfate	007733-02-0	...	...

HAZARD RANKING SYSTEM
Hazardous Substance Benchmarks
(6 Radionuclides)

		AIR PATHWAY	GROUND WATER PATHWAY		SURFACE WATER PATHWAY			SOIL EXPOSURE		
					Drinking Water		Food Chain		Cancer Risk Screen Conc	
Substance Name	CAS Number	Cancer Risk Screen Conc (pCi/m3)	MCL (pCi/L)	Cancer Risk Screen Conc (pCi/L)	MCL (pCi/L)	Cancer Risk Screen Conc (pCi/L)	Cancer Risk Screen Conc (pCi/kg)	UMTRCA (pCi/kg)	Ingestion (pCi/kg)	External Exposure (pCi/kg)
Radium 226 (radionuclide)	007440-14-4	6.5E-04	5.0E+00	1.6E-01	5.0E+00	1.6E-01	6.0E+00	...	3.1E+03	...
Radon 222 (radionuclide)	010043-92-2	2.7E+00	...	...	...	...	...	...	...	...
Uranium 233 (radionuclide)	007440-61-1	7.2E-05	...	1.4E-01	...	1.4E-01	5.2E+00	...	2.6E+03	...
Uranium 234 (radionuclide)	007440-61-1	7.2E-05	...	1.4E-01	...	1.4E-01	5.2E+00	...	2.6E+03	...
Uranium 235 (radionuclide)	007440-61-1	7.8E-05	...	1.5E-01	...	1.5E-01	5.6E+00	...	2.8E+03	...
Uranium 238 (radionuclide)	007440-61-1	8.2E-05	...	1.5E-01	...	1.5E-01	5.6E+00	...	2.8E+03	...

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(6 Radionuclides)

			Ground Water Mobility						Bioaccumulation									
			Liquid		Non-Liquid		Persistence		Food Chain		Environmental		Ecotoxicity					
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Radium 226 (radionuclide)	007440-14-4	10000*	1.0E+00*	1.0E-02*	2.0E-05*	2.0E-07*	1.0000*	1.0000	0.5*	0.5*	0.5*	0.5*	10000*	10000*	0*	0.0000*	No *	Yes*
Radon 222 (radionuclide)	010043-92-2	100*	1.0E+00*	1.0E+00*	2.0E-05*	2.0E-05*	1.0000*	0.4000*	0.5*	0.5*	0.5*	0.5*	100	100	17	1.0000	Yes	No
Uranium 233 (radionuclide)	007440-61-1	10000*	1.0E+00*	1.0E-02*	2.0E-05*	2.0E-07*	1.0000	1.0000	5.0*	5.0*	5.0*	5.0*	10000*	10000*	0	0.0000	No	Yes
Uranium 234 (radionuclide)	007440-61-1	10000*	1.0E+00*	1.0E-02*	2.0E-05*	2.0E-07*	1.0000	1.0000	5.0*	5.0*	5.0*	5.0*	10000*	10000*	0	0.0000	No	Yes
Uranium 235 (radionuclide)	007440-61-1	10000	1.0E+00*	1.0E-02*	2.0E-05*	2.0E-07*	1.0000	1.0000	5.0*	5.0*	5.0*	5.0*	10000*	10000*	0	0.0000	No	Yes
Uranium 238 (radionuclide)	007440-61-1	10000*	1.0E+00*	1.0E-02*	2.0E-05*	2.0E-07*	1.0000	1.0000	5.0	5.0	5.0	5.0	10000	10000*	0	0.0000	No	Yes

Synonyms List
by SCDM Chemical Name

CAS Number	SCDM Name	Synonym Name
000083-32-9	Acenaphthene	*-Acenaphthylene, 1,2-dihydro
		A
000208-96-8	Acenaphthylene	
000075-07-0	Acetaldehyde	*-Ethyl aldehyde
000067-64-1	Acetone	*-2-Propanone
000075-05-8	Acetonitrile	*-Methyl cyanide
000098-86-2	Acetophenone	*-Acetylbenzene
000591-08-2	Acetyl-2-thiourea, 1-	*-Acetylthiocarbamide, n-
000107-02-8	Acrolein	*-Propenal
000079-06-1	Acrylamide	*-Propenamide
000079-10-7	Acrylic acid	*-Propenoic acid
000107-13-1	Acrylonitrile	*-Vinyl cyanide
000124-04-9	Adipic acid	*-Hexanedioic acid
000116-06-3	Aldicarb	
000309-00-2	Aldrin	
000107-18-6	Allyl alcohol	*-Propenol, 2-
007429-90-5	Aluminum	
020859-73-8	Aluminum phosphide	*-Phostoxin
007664-41-7	Ammonia	
000131-74-8	Ammonium picrate	*-Phenol, 2,4,6-trinitro-, ammonium salt
007773-06-0	Ammonium sulfamate	*-Sulfamic acid, monoammonium salt
000062-53-3	Aniline	*-Benzeneamine
000120-12-7	Anthracene	*-Paranaphthalene
007440-36-0	Antimony	
007440-38-2	Arsenic	
001332-21-4	Asbestos	
001912-24-9	Atrazine	
002642-71-9	Azinphos- ethyl	*-Ethyl guthion
000086-50-0	Azinphos- methyl	*-Methyl guthion
000151-56-4	Aziridine	*-Ethylenimine
007440-39-3	Barium	
000542-62-1	Barium cyanide	*-Barium dicyanide
000056-55-3	Benz(a)anthracene	*-Benzanthrene

Synonyms List
by SCDM Chemical Name

CAS Number	SCDM Name	Synonym Name
000071-43-2	Benzene	*-Coal naptha
000098-88-4	Benzene carbonyl chloride	*-Benzoyl chloride
000092-87-5	Benzidine	*-(1,1'-biphenyl)-4,4'-diamine
000050-32-8	Benzo(a)pyrene	*-Benz(a)pyrene
000206-44-0	Benzo(j,k)fluorene	*-Fluoranthene
000207-08-9	Benzo(k)fluoranthene	*-Dibenzo(bjk)fluorene
000205-99-2	Benzofluoranthene, 3,4-	*-Benzo(b)fluoranthene
000065-85-0	Benzoic acid	*-Benzoate
000100-47-0	Benzonitrile	*-Phenyl cyanide
000095-16-9	Benzothiazole, 1,2,-	
000100-44-7	Benzyl chloride	*-Chloromethyl benzene
007440-41-7	Beryllium	
000092-52-4	Biphenyl, 1,1-	*-Biphenyl
000117-81-7	Bis (2-ethylhexyl) phthalate	*-Benzenedicarboxylic acid, bis (2-ethylhexyl) ester, 1,2-
000111-91-1	Bis(2-chloroethoxy)methane	
000111-44-4	Bis(2-chloroethyl)ether	*-1,1'-oxybis(2-chloroethane)
000542-88-1	Bis(chloromethyl)ether	*-Oxybis(chloromethane)
007440-42-8	Boron	
000075-27-4	Bromodichloromethane	*-Dichlorobromomethane
000074-83-9	Bromomethane	*-Methylbromide
001689-84-5	Bromoxynil	*-3,4-dibromo-4-hydroxy-benzonitrile
000106-99-0	Butadiene, 1,3-	*-Butadiene
000071-36-3	Butanol	*-Butyl alcohol
000085-68-7	Butylbenzyl phthalate	*-1,2-benzenedicarboxylic acid, butyl phenylmethyl ester
000094-82-6	Butyric acid, 4-(2,4-dichlorophenoxy)	*-2,4-DB
007440-43-9	Cadmium	
000133-06-2	Captan	
000063-25-2	Carbaryl	*-Methylcarbamate-1-naphthalenol
001563-66-2	Carbofuran	*-2,3-dihydro-2,2-dimethyl-7-benzofuranol methylcarbamate
000075-15-0	Carbon disulfide	*-Dithiocarbonic anhydride
000056-23-5	Carbon Tetrachloride	*-Tetrachloromethane
000786-19-6	Carbophenothion	*-Carbofenthion
00007 -6	Chloral	*-Trichloroacetaldehyde

Synonyms List
by SCDM Chemical Name

CAS Number	SCDM Name	Synonym Name
000057-74-9	Chlordane	*-Octachloro-4,7-methanotetrahydroindane
000506-77-4	Chlorine cyanide	*-Cyanogen chloride
000059-50-7	Chloro-3-methylphenol, 4-	*-Chloro-m-cresol, p-
000106-47-8	Chloroaniline, p-	*-Chloro-benzeneamine, 4-
000108-90-7	Chlorobenzene	*-Phenyl chloride
000067-66-3	Chloroform	*-Trichlormethane
000074-87-3	Chloromethane	*-Methyl chloride
000107-30-2	Chloromethyl methyl ether	*-Chloromethoxy-methane
000106-89-8	Chloromethyloxirane, 2-	*-Chloropropylene oxide, 3-
000091-58-7	Chloronaphthalene, 2-	*-Chloronaphthalene, beta-
000095-57-8	Chlorophenol, 2-	*-Hydroxychlorobenzene, 2-
002921-88-2	Chlorpyrifos	*-Dursban
007440-47-3	Chromium	*-Chrome
016065-83-1	Chromium(III)	
018540-29-9	Chromium(VI)	
000218-01-9	Chrysene	*-Benzophenanthrene, 1,2-
007440-48-4	Cobalt	
007440-50-8	Copper	
000544-92-3	Copper cyanide	*-Cuprous cyanide
000056-72-4	Coumaphos	*-Coumafos
008001-58-9	Creosote	*-Naphthalene oil
000108-39-4	Cresol, m-	*-Methyl phenol, 3-
000106-44-5	Cresol, p-	*-Methyl phenol, 4-
000098-82-8	Cumene	*-Methylethylbenzene, 1-
021725-46-2	Cyanazine	
000057-12-5	Cyanide	*-Hydrocyanic acid
000460-19-5	Cyanogen	*-Oxalonitrile
000506-68-3	Cyanogen bromide	*-Bromocyanide
000110-82-7	Cyclohexane	*-Hexahydrobenzene
000108-94-1	Cyclohexanone	*-Pimelic ketone
000121-82-4	Cyclotrimethylenetrinitriamine	
000072-54-8	DDD	*-Dichlorodiphenyl dichloroethane
000072-55-9	DDE	*-Dichlorodiphenyldichloroethylene, p,p-

Synonyms List
by SCDM Chemical Name

CAS Number	SCDM Name	Synonym Name
000050-29-3	DDT	*-Dichlorodiphenyltrichloroethane, 4,4-
000078-48-8	DEF	*-Tributyl phosphorotrithioate, s,s,s-
000084-74-2	Di-n-butyl phthalate	*-Benzenedicarboxylic acid, dibutyl ester, 1,2-
000117-84-0	Di-n-octyl phthalate	*-Benzenedicarboxylic acid, dioctyl ester, 1,2-
000333-41-5	Diazinon	
000053-70-3	Dibenz(a,h)anthracene	*-Dibenz(a)anthracene, 1,2:5,6-
000096-12-8	Dibromo-3-chloropropane, 1,2-	*-Nemazon
000124-48-1	Dibromochloromethane	
000106-93-4	Dibromoethane, 1,2-	*-Ethylene dibromide (EDB)
001918-00-9	Dicamba	*-Methoxy-3,6-dichlorobenzoic acid, 2-
000095-50-1	Dichlorobenzene, 1,2-	*-Dichlorobenzene, o-
000541-73-1	Dichlorobenzene, 1,3-	*-Phenylene dichloride, m-
000106-46-7	Dichlorobenzene, 1,4-	*-Chlorophenyl chloride, p-
000091-94-1	Dichlorobenzidine, 3,3-	*-Dichlorobenzidine, o,o-
000075-71-8	Dichlorodifluoromethane	*-Freon 12
000075-34-3	Dichloroethane, 1,1-	*-Ethylidene chloride
000107-06-2	Dichloroethane, 1,2-	*-Ethylene chloride
000075-35-4	Dichloroethene, 1,1-	*-Dichloroethylene, 1,1-
000156-59-2	Dichloroethylene, cis-1,2-	*-cis-dichloroethylene
000156-60-5	Dichloroethylene, trans-1,2-	*-1,2-dichloroethylene
000120-83-2	Dichlorophenol, 2,4-	*-Dichlorophenol, 4,6-
000094-75-7	Dichlorophenoxyacetic acid, 2,4-	*-2,4- D, acid
000078-87-5	Dichloropropane, 1,2-	*-Propylene chloride
000542-75-6	Dichloropropene, 1,3-	*-Dichloropropylene, 1,3-
000062-73-7	Dichlorvos	*-Dimethyl dichlorovinyl phosphate
000115-32-2	Dicofol	*-Dichlorokelthane
000060-57-1	Dieldrin	*-Aldrin epoxide
000084-66-2	Diethyl phthalate	*-Benzenedicarboxylic acid, didecyl ester, 1,2-
000111-46-6	Diethylene glycol	*-Oxybis-ethanol, 2,2-
001445-75-6	Diisopropylmethyl-phosphonate	
000060-51-5	Dimethoate	*-Dimethyl S-(N-methylcarbamoylmethyl) dithiophosphate, o,o-
000119-90-4	Dimethoxybenzidine, 3,3-	*-Diamino-3,3-dimethoxybiphenyl, 4,4-
00010[illegible]-9	Dimethyl phenol, 2,4-	*-1-Hydroxy-2,4-dimethylbenzene

Synonyms List
by SCDM Chemical Name

CAS Number	SCDM Name	Synonym Name
000131-11-3	Dimethyl phthalate	*-Benzenedicarboxylic acid, dimethyl ester, 1,2-
000077-78-1	Dimethyl sulfate	*-Sulfuric acid, dimethyl ester
000099-65-0	Dinitrobenzene, 1,3-	*-Dinitrobenzene, 1,2-
000051-28-5	Dinitrophenol, 2,4-	*-Hydroxy-2,4-dinitrobenzene, 1-
000121-14-2	Dinitrotoluene, 2,4-	*-Methyl-2,4-dinitrobenzene, 1-
000606-20-2	Dinitrotoluene, 2,6-	*-2-Methyl-1,3-dinitrobenzene
000088-85-7	Dinoseb	*-Dinitro-6-(1-methylpropyl) phenol, 2,4-
000123-91-1	Dioxane, 1,4-	*-Tetrahydro-1,4-dioxin
000078-34-2	Dioxathion	
000122-66-7	Diphenylhydrazine, 1,2-	*-Hydrazodibenzene
000085-00-7	Diquat	*-Diquat dibromide
000298-04-4	Disulfoton	
000330-54-1	Diuron	*-(3,4-Dichlorophenyl)-1,1-dimethylurea, 3-
000115-29-7	Endosulfan (I or II)	
001031-07-8	Endosulfan sulfate	*-Thiodan sulfate
000145-73-3	Endothall	*-Phthalic acid, hexahydro-3,6-endo-oxy-
000072-20-8	Endrin	
007421-93-4	Endrin aldehyde	
000563-12-2	Ethion	*-Tetraethyl S,S'-methylenebisphosphorithioate, o,o,o',o'-
000141-78-6	Ethyl acetate	*-Acetic acid, ethyl ester
000100-41-4	Ethyl benzene	*-Phenylethane
000075-00-3	Ethyl chloride	*-Chloroethane
000060-29-7	Ethyl ether	*-Diethyl ether
000759-94-4	Ethyldipropylthiocarbamate, s-	*-Carbamothioic acid, dipropyl-, s-ethyl ester
000107-21-1	Ethylene glycol	*-Ethanediol, 1,2-
000110-80-5	Ethylene glycol monoethyl ether	*-Ethoxy-ethanol, 2-
000055-38-9	Fenethion	*-Phosphorothioic acid, o,o-dimethyl
007720-78-7	Ferrous sulfate	*-Sulfuric acid iron salt (1:1)
000086-73-7	Fluorene	*-Methylenebiphenyl, 2,2-
007782-41-4	Fluorine	*-Fluorine-19
000050-00-0	Formaldehyde	*-Methylene oxide
000064-18-6	Formic acid	*-Methanoic acid
000110-00-9	Furan	*-Oxacyclopentadiene

Synonyms List
by SCDM Chemical Name

CAS Number	SCDM Name	Synonym Name
000098-01-1	Furfural	*-Furancarboxaldehyde, 2-
000765-34-4	Glycidylaldehyde	*-Oxiranecarboxaldehyde
000076-44-8	Heptachlor	*-Chlorochlordene, 3-
001024-57-3	Heptachlor epoxide	*-Epoxyheptachlor
000087-82-1	Hexabromobenzene	
000118-74-1	Hexachlorobenzene	*-Perchlorobenzene
000087-68-3	Hexachlorobutadiene	*-Perchlorobutadiene
000319-84-6	Hexachlorocyclohexane, alpha-	*-alpha-BHC
000319-85-7	Hexachlorocyclohexane, beta-	*-beta-BHC
000319-86-8	Hexachlorocyclohexane, delta-	*-BHC-delta
000077-47-4	Hexachlorocyclopentadiene	*-Perchlorocyclopentadiene
000067-72-1	Hexachloroethane	*-Perchloroethane
000070-30-4	Hexachlorophene	*-Methylene bis (3,4,6-trichlorophenol), 2,2-
000110-54-3	Hexane	
000302-01-2	Hydrazine	*-Diamine
007647-01-0	Hydrochloric acid	*-Muriatic acid
000074-90-8	Hydrogen cyanide	*-Hydrocyanic acid
007783-06-4	Hydrogen sulfide	*-Hydrosulfuric acid
001689-83-4	Ioxynil	*-Hydroxy-3,5-diiodo-benzonitrile, 4-
015438-31-0	Iron	
000078-83-1	Isobutanol	*-Isobutyl alcohol
000078-59-1	Isophorone	*-Trimethyl-2-cyclohexen-1-one, 3,5,5-
000143-50-0	Kepone	*-Chlordecone
007439-92-1	Lead	
000058-89-9	Lindane	*-Hexachlorocyclohexane- gamma
000121-75-5	Malathion	
000108-31-6	Maleic anhydride	*-Furandione, 2,5-
000123-33-1	Maleic hydrazide	*-Dihydro-3,6-pyridazinedione, 1,2-
007439-96-5	Manganese	
007439-97-6	Mercury	
000126-98-7	Methacrylonitrile	*-Methyl-2-propanenitrile, 2-
000067-56-1	Methanol	*-Methyl alcohol
0167[illegible]-5	Methomyl	*-Ethanimidothioic acid, n-

Synonyms List
by SCDM Chemical Name

CAS Number	SCDM Name	Synonym Name
000072-43-5	Methoxychlor	*-(2,2,2-trichloroethylidiene)bis(4-methoxy-benzene), 1,1'-
000079-22-1	Methyl chlorocarbonate	*-Carbonochloridic acid, methyl ester
000078-93-3	Methyl ethyl ketone	*-Butanone
000108-10-1	Methyl isobutyl ketone	*-Methyl-2-pentanone, 4-
000080-62-6	Methyl methacrylate	*-Methyl-2-propenoic acid, methyl ester, 2-
000101-14-4	Methylene bis (2-chloroaniline), 4,4-	*-Methylene bis (2-chloro-benzeneamine), 4,4'-
000075-09-2	Methylene chloride	*-Dichloromethane
000101-68-8	Methylenediphenyl diisocyanate, 4,4-	
021087-64-9	Metribuzin	
002385-85-5	Mirex	*-Dechlorane
000091-20-3	Naphthalene	*-Tar camphor
007440-02-0	Nickel	
007697-37-2	Nitric acid	*-Hydrogen nitrate
010102-43-9	Nitric oxide	*-Nitrogen oxide
000100-01-6	Nitroaniline, p-	*-Benzeneamine, 4-nitro-
000098-95-3	Nitrobenzene	*-Nitrobenzol
010102-44-0	Nitrogen dioxide	*-Nitrogen oxide
000055-63-0	Nitroglycerine	*-Propanetriol, trinitrate, 1,2,3-
000100-02-7	Nitrophenol, 4-	*-Hydroxynitrobenzene, 4-
000924-16-3	Nitroso-di-n-butylamine, N-	*-Butyl-n-nitroso-1-butanamine, n-
000615-53-2	Nitroso-di-n-methylurethane, N-	*-Methylnitroso-carbamic acid, ethyl ester
001116-54-7	Nitrosodiethanolamine, N-	*-(nitrosoimino) bis-ethanol, 2,2'-
000055-18-5	Nitrosodiethylamine, N-	*-Ethyl-n-nitroso-ethanamine, n-
000062-75-9	Nitrosodimethylamine, N-	*-Methyl-n-nitroso-methanomine, n-
000086-30-6	Nitrosodiphenylamine, N-	*-Nitrosophenylbenzeneamine, n-
000930-55-2	Nitrosopyrrolidine, N-	*-Nitrosopyrrolidine, 1-
000099-99-0	Nitrotoluene, 4-	*-Methylnitrobenzene, p-
000056-38-2	Parathion, ethyl-	*-Diethyl 4-nitrophenyl phosphorothionate
000298-00-0	Parathion, methyl-	*-Dimethyl p-nitrophenyl thiophosphate
001336-36-3	PCBs	*-Polychlorinated biphenyls
000608-93-5	Pentachlorobenzene	
000076-01-7	Pentachloroethane	*-Pentalin
000082-68-8	Pentachloronitrobenzene	

Synonyms List
by SCDM Chemical Name

CAS Number	SCDM Name	Synonym Name
000087-86-5	Pentachlorophenol	
000085-01-8	Phenanthrene	*-Phenanthren
000108-95-2	Phenol	*-Phenyl alcohol
000139-66-2	Phenyl sulfide	
000062-38-4	Phenylmercuric acetate	*-acetoxyphenylmercury
000298-02-2	Phorate	
000075-44-5	Phosgene	*-Carbonic dichloride
013171-21-6	Phosphamidon	
007803-51-2	Phosphine	*-Hydrogen phosphide
007664-38-2	Phosphoric acid	
002104-64-5	Phosphorodithioc acid,phenyl-o-ethyl-o-(4-nitrophenyl)ester	*-EPN
007723-14-0	Phosphorous (elemental)	*-Phosphorous, white
000085-44-9	Phthalic anhydride	*-Benzenedicarboxylic anhydride, 1,2-
000506-61-6	Potassium silver cyanide	*-Potassium dicyanoargentate
023950-58-5	Pronamide	*-Dichloro-N-(1,1-dimethylpropynyl)benzamide, 3,5-
000129-00-0	Pyrene	*-Benzo(def)phenanthrene
000110-86-1	Pyridine	*-Azobenzene
000091-22-5	Quinoline	*-Benzopyridine
007440-14-4	Radium	
007440-14a4	Radium 226 (radionuclide)	
010043-92-2	Radon	
010043-92a2	Radon 222 (radionuclide)	
000108-46-3	Resorcinol	*-Benzenediol, 1,3-
000299-84-3	Ronnel	*-Dimethyl o-(2,4,5-trichlorophenyl)thiophosphate, o,o-
007782-49-2	Selenium	
000630-10-4	Selenourea	*-Carbamidodselenoic acid
007440-22-4	Silver	
000506-64-9	Silver Cyanide	
007440-23-5	Sodium	
000057-24-9	Strychnine	
000100-42-5	Styrene	*-Vinylbenzene
007664-93-9	Sulfuric acid	
000[illegible]0-1	TB, 2,4,5-	*-Butanoic acid, 4-(2,4,5-trichlorophenoxy)-

Synonyms List
by SCDM Chemical Name

CAS Number	SCDM Name	Synonym Name
001746-01-6	TCDD	*-Tetrachlorodibenzo-p-dioxin, 2,3,7,8-
000095-94-3	Tetrachlorobenzene, 1,2,4,5-	*-Tetrachlorobenzene, s-
000630-20-6	Tetrachloroethane, 1,1,1,2-	
000079-34-5	Tetrachloroethane, 1,1,2,2-	*-Acetylene tetrachloride
000127-18-4	Tetrachloroethene	*-Tetrachloroethylene
000058-90-2	Tetrachlorophenol, 2,3,4,6-	
000078-00-2	Tetraethyl lead	
003689-24-5	Tetraethyldithiopyrophosphate	*-Dithiofos
000109-99-9	Tetrahydrofuran	*-Epoxybutane, 1,4-
007440-28-0	Thallium	
000062-56-6	Thiourea	*-Thio-carbamide
000137-26-8	Thiram	*-Bis(dimethylthiocarbamyl)disulfide
000108-88-3	Toluene	*-Methyl benzene
000584-84-9	Toluene diisocyanate	*-Benzene, 2,4-diisocyano-1-methyl-
008001-35-2	Toxaphene	*-Chlorinated camphene
000093-72-1	TP, 2,4,5-	*-Silvex
000075-25-2	Tribromomethane	*-Bromoform
000076-13-1	Trichloro-1,2,2-Trifluoroethane, 1,1,2-	*-Freon 113
000120-82-1	Trichlorobenzene, 1,2,4-	
000071-55-6	Trichloroethane, 1,1,1-	*-Methyl chloroform
000079-00-5	Trichloroethane, 1,1,2-	*-Vinyl trichloride
000079-01-6	Trichloroethylene	*-Trichloroethene
000075-69-4	Trichlorofluoromethane	*-Freon 11
000933-78-8	Trichlorophenol, 2,3,5-	
000933-75-5	Trichlorophenol, 2,3,6-	
000095-95-4	Trichlorophenol, 2,4,5-	*-TCP
000088-06-2	Trichlorophenol, 2,4,6-	
000609-19-8	Trichlorophenol, 3,4,5-	
000093-76-5	Trichlorophenoxyacetic acid, 2,4,5-	*-2,4,5-T
000096-18-4	Trichloropropane, 1,2,3-	
000102-71-6	Triethanolamine	*-Nitrilotriethanol, 2,2,2-
001582-09-8	Trifluralin	
000099-35-4	Trinitrobenzene, 1,3,5-	

Synonyms List
by SCDM Chemical Name

CAS Number	SCDM Name	Synonym Name
000118-96-7	Trinitrotoluene	*-Methyl-1,3,5-trinitrobenzene, 2-
000126-72-7	Tris (2,3-dibromopropyl) phosphate	
007440-61-1	Uranium	
007440-61a1	Uranium 233 (radionuclide)	
007440-61b1	Uranium 234 (radionuclide)	
007440-61c1	Uranium 235 (radionuclide)	
007440-61d1	Uranium 238 (radionuclide)	
001314-62-1	Vanadium pentoxide	*-Vanadium oxide
000108-05-4	Vinyl acetate	*-Acetic acid, vinyl ester
000075-01-4	Vinyl chloride	*-Chloroethene
000081-81-2	Warfarin	*-Coumafen
000108-38-3	Xylene, m-	*-Dimethyl benzene, 1,3-
000095-47-6	Xylene, o-	*-Methyltoulene, o-
000106-42-3	Xylene, p-	*-Dimethylbenzene, 1,4-
007440-66-6	Zinc	
000557-21-1	Zinc cyanide	
001314-84-7	Zinc phosphide	
007733-02-0	Zinc sulfate	*-Sulfuric acid, zinc salt

Synonyms List
(by Synonym Name)

CAS Number	Synonym Name	SCDM Name
000092-87-5	(1,1'-biphenyl)-4,4'-diamine	Benzidine
000072-43-5	(2,2,2-trichloroethylidiene)bis(4-methoxy-benzene), 1,1'-	Methoxychlor
000330-54-1	(3,4-Dichlorophenyl)-1,1-dimethylurea, 3-	Diuron
001116-54-7	(nitrosoimino) bis-ethanol, 2,2'-	Nitrosodiethanolamine, N-
000111-44-4	1,1'-oxybis(2-chloroethane)	Bis(2-chloroethyl)ether
000085-68-7	1,2-benzenedicarboxylic acid, butyl phenylmethyl ester	Butylbenzyl phthalate
000156-60-5	1,2-dichloroethylene	Dichloroethylene, trans-1,2-
000105-67-9	1-Hydroxy-2,4-dimethylbenzene	Dimethyl phenol, 2,4-
001563-66-2	2,3-dihydro-2,2-dimethyl-7-benzofuranol methylcarbamate	Carbofuran
000093-76-5	2,4,5-T	Trichlorophenoxyacetic acid, 2,4,5-
000094-75-7	2,4- D, acid	Dichlorophenoxyacetic acid, 2,4-
000094-82-6	2,4-DB	Butyric acid, 4-(2,4-dichlorophenoxy)
000606-20-2	2-Methyl-1,3-dinitrobenzene	Dinitrotoluene, 2,6-
000067-64-1	2-Propanone	Acetone
001689-84-5	3,4-dibromo-4-hydroxy-benzonitrile	Bromoxynil
000083-32-9	A	Acenaphthene
000083-32-9	Acenaphthylene, 1,2-dihydro	Acenaphthene
000141-78-6	Acetic acid, ethyl ester	Ethyl acetate
000108-05-4	Acetic acid, vinyl ester	Vinyl acetate
000062-38-4	acetoxyphenylmercury	Phenylmercuric acetate
000098-86-2	Acetylbenzene	Acetophenone
000079-34-5	Acetylene tetrachloride	Tetrachloroethane, 1,1,2,2-
000591-08-2	Acetylthiocarbamide, n-	Acetyl-2-thiourea, 1-
000060-57-1	Aldrin epoxide	Dieldrin
000319-84-6	alpha-BHC	Hexachlorocyclohexane, alpha-
000110-86-1	Azobenzene	Pyridine
000542-62-1	Barium dicyanide	Barium cyanide
000050-32-8	Benz(a)pyrene	Benzo(a)pyrene
000056-55-3	Benzanthrene	Benz(a)anthracene
000584-84-9	Benzene, 2,4-diisocyano-1-methyl-	Toluene diisocyanate
000062-53-3	Benzeneamine	Aniline
000100-01-6	Benzeneamine, 4-nitro-	Nitroaniline, p-
000117-81-7	Benzenedicarboxylic acid, bis (2-ethylhexyl) ester, 1,2-	Bis (2-ethylhexyl) phthalate

Synonyms List
(by Synonym Name)

CAS Number	Synonym Name	SCDM Name
000084-74-2	Benzenedicarboxylic acid, dibutyl ester, 1,2-	Di-n-butyl phthalate
000084-66-2	Benzenedicarboxylic acid, didecyl ester, 1,2-	Diethyl phthalate
000131-11-3	Benzenedicarboxylic acid, dimethyl ester, 1,2-	Dimethyl phthalate
000117-84-0	Benzenedicarboxylic acid, dioctyl ester, 1,2-	Di-n-octyl phthalate
000085-44-9	Benzenedicarboxylic anhydride, 1,2-	Phthalic anhydride
000108-46-3	Benzenediol, 1,3-	Resorcinol
000205-99-2	Benzo(b)fluoranthene	Benzofluoranthene, 3,4-
000129-00-0	Benzo(def)phenanthrene	Pyrene
000065-85-0	Benzoate	Benzoic acid
000218-01-9	Benzophenanthrene, 1,2-	Chrysene
000091-22-5	Benzopyridine	Quinoline
000098-88-4	Benzoyl chloride	Benzene carbonyl chloride
000319-85-7	beta-BHC	Hexachlorocyclohexane, beta-
000319-86-8	BHC-delta	Hexachlorocyclohexane, delta-
000092-52-4	Biphenyl	Biphenyl, 1,1-
000137-26-8	Bis(dimethylthiocarbamyl)disulfide	Thiram
000506-68-3	Bromocyanide	Cyanogen bromide
000075-25-2	Bromoform	Tribromomethane
000106-99-0	Butadiene	Butadiene, 1,3-
000093-80-1	Butanoic acid, 4-(2,4,5-trichlorophenoxy)-	TB, 2,4,5-
000078-93-3	Butanone	Methyl ethyl ketone
000071-36-3	Butyl alcohol	Butanol
000924-16-3	Butyl-n-nitroso-1-butanamine, n-	Nitroso-di-n-butylamine, N-
000630-10-4	Carbamidodselenoic acid	Selenourea
000759-94-4	Carbamothioic acid, dipropyl-, s-ethyl ester	Ethyldipropylthiocarbamate, s-
000786-19-6	Carbofenthion	Carbophenothion
000075-44-5	Carbonic dichloride	Phosgene
000079-22-1	Carbonochloridic acid, methyl ester	Methyl chlorocarbonate
000143-50-0	Chlordecone	Kepone
008001-35-2	Chlorinated camphene	Toxaphene
000106-47-8	Chloro-benzeneamine, 4-	Chloroaniline, p-
000059-50-7	Chloro-m-cresol, p-	Chloro-3-methylphenol, 4-
000076-44-8	Chlorochlordene, 3-	Heptachlor

Synonyms List
(by Synonym Name)

CAS Number	Synonym Name	SCDM Name
000075-00-3	Chloroethane	Ethyl chloride
000075-01-4	Chloroethene	Vinyl chloride
000107-30-2	Chloromethoxy-methane	Chloromethyl methyl ether
000100-44-7	Chloromethyl benzene	Benzyl chloride
000091-58-7	Chloronaphthalene, beta-	Chloronaphthalene, 2-
000106-46-7	Chlorophenyl chloride, p-	Dichlorobenzene, 1,4-
000106-89-8	Chloropropylene oxide, 3-	Chloromethyloxirane, 2-
007440-47-3	Chrome	Chromium
000156-59-2	cis-dichloroethylene	Dichloroethylene, cis-1,2-
000071-43-2	Coal naptha	Benzene
000081-81-2	Coumafen	Warfarin
000056-72-4	Coumafos	Coumaphos
000544-92-3	Cuprous cyanide	Copper cyanide
000506-77-4	Cyanogen chloride	Chlorine cyanide
002385-85-5	Dechlorane	Mirex
000302-01-2	Diamine	Hydrazine
000119-90-4	Diamino-3,3-dimethoxybiphenyl, 4,4-	Dimethoxybenzidine, 3,3-
000053-70-3	Dibenz(a)anthracene, 1,2:5,6-	Dibenz(a,h)anthracene
000207-08-9	Dibenzo(bjk)fluorene	Benzo(k)fluoranthene
023950-58-5	Dichloro-N-(1,1-dimethylpropynyl)benzamide, 3,5-	Pronamide
000095-50-1	Dichlorobenzene, o-	Dichlorobenzene, 1,2-
000091-94-1	Dichlorobenzidine, o,o-	Dichlorobenzidine, 3,3-
000075-27-4	Dichlorobromomethane	Bromodichloromethane
000072-54-8	Dichlorodiphenyl dichloroethane	DDD
000072-55-9	Dichlorodiphenyldichloroethylene, p,p-	DDE
000050-29-3	Dichlorodiphenyltrichloroethane, 4,4-	DDT
000075-35-4	Dichloroethylene, 1,1-	Dichloroethene, 1,1-
000115-32-2	Dichlorokelthane	Dicofol
000075-09-2	Dichloromethane	Methylene chloride
000120-83-2	Dichlorophenol, 4,6-	Dichlorophenol, 2,4-
000542-75-6	Dichloropropylene, 1,3-	Dichloropropene, 1,3-
000056-38-2	Diethyl 4-nitrophenyl phosphorothionate	Parathion, ethyl-
000060-29-7	Diethyl ether	Ethyl ether

Synonyms List
(by Synonym Name)

CAS Number	Synonym Name	SCDM Name
000123-33-1	Dihydro-3,6-pyridazinedione, 1,2-	Maleic hydrazide
000108-38-3	Dimethyl benzene, 1,3-	Xylene, m-
000062-73-7	Dimethyl dichlorovinyl phosphate	Dichlorvos
000299-84-3	Dimethyl o-(2,4,5-trichlorophenyl)thiophosphate, o,o-	Ronnel
000298-00-0	Dimethyl p-nitrophenyl thiophosphate	Parathion, methyl-
000060-51-5	Dimethyl S-(N-methylcarbamoylmethyl) dithiophosphate, o,o-	Dimethoate
000106-42-3	Dimethylbenzene, 1,4-	Xylene, p-
000088-85-7	Dinitro-6-(1-methylpropyl) phenol, 2,4-	Dinoseb
000099-65-0	Dinitrobenzene, 1,2-	Dinitrobenzene, 1,3-
000085-00-7	Diquat dibromide	Diquat
000075-15-0	Dithiocarbonic anhydride	Carbon disulfide
003689-24-5	Dithiofos	Tetraethyldithiopyrophosphate
002921-88-2	Dursban	Chlorpyrifos
002104-64-5	EPN	Phosphorodithioc acid,phenyl-o-ethyl-o-(4-nitrophenyl)ester
000109-99-9	Epoxybutane, 1,4-	Tetrahydrofuran
001024-57-3	Epoxyheptachlor	Heptachlor epoxide
000107-21-1	Ethanediol, 1,2-	Ethylene glycol
016752-77-5	Ethanimidothioic acid, n-	Methomyl
000110-80-5	Ethoxy-ethanol, 2-	Ethylene glycol monoethyl ether
000075-07-0	Ethyl aldehyde	Acetaldehyde
002642-71-9	Ethyl guthion	Azinphos- ethyl
000055-18-5	Ethyl-n-nitroso-ethanamine, n-	Nitrosodiethylamine, N-
000107-06-2	Ethylene chloride	Dichloroethane, 1,2-
000106-93-4	Ethylene dibromide (EDB)	Dibromoethane, 1,2-
000151-56-4	Ethylenimine	Aziridine
000075-34-3	Ethylidene chloride	Dichloroethane, 1,1-
000206-44-0	Fluoranthene	Benzo(j,k)fluorene
007782-41-4	Fluorine-19	Fluorine
000075-69-4	Freon 11	Trichlorofluoromethane
000076-13-1	Freon 113	Trichloro-1,2,2-Trifluoroethane, 1,1,2-
000075-71-8	Freon 12	Dichlorodifluoromethane
000098-01-1	Furancarboxaldehyde, 2-	Furfural
000108-31-6	Furandione, 2,5-	Maleic anhydride

Synonyms List
(by Synonym Name)

CAS Number	Synonym Name	SCDM Name
000058-89-9	Hexachlorocyclohexane- gamma	Lindane
000110-82-7	Hexahydrobenzene	Cyclohexane
000124-04-9	Hexanedioic acid	Adipic acid
000122-66-7	Hydrazodibenzene	Diphenylhydrazine, 1,2-
000057-12-5	Hydrocyanic acid	Cyanide
000074-90-8	Hydrocyanic acid	Hydrogen cyanide
007697-37-2	Hydrogen nitrate	Nitric acid
007803-51-2	Hydrogen phosphide	Phosphine
007783-06-4	Hydrosulfuric acid	Hydrogen sulfide
000051-28-5	Hydroxy-2,4-dinitrobenzene, 1-	Dinitrophenol, 2,4-
001689-83-4	Hydroxy-3,5-diiodo-benzonitrile, 4-	Ioxynil
000095-57-8	Hydroxychlorobenzene, 2-	Chlorophenol, 2-
000100-02-7	Hydroxynitrobenzene, 4-	Nitrophenol, 4-
000078-83-1	Isobutyl alcohol	Isobutanol
000064-18-6	Methanoic acid	Formic acid
001918-00-9	Methoxy-3,6-dichlorobenzoic acid, 2-	Dicamba
000067-56-1	Methyl alcohol	Methanol
000108-88-3	Methyl benzene	Toluene
000074-87-3	Methyl chloride	Chloromethane
000071-55-6	Methyl chloroform	Trichloroethane, 1,1,1-
000075-05-8	Methyl cyanide	Acetonitrile
000086-50-0	Methyl guthion	Azinphos- methyl
000108-39-4	Methyl phenol, 3-	Cresol, m-
000106-44-5	Methyl phenol, 4-	Cresol, p-
000118-96-7	Methyl-1,3,5-trinitrobenzene, 2-	Trinitrotoluene
000121-14-2	Methyl-2,4-dinitrobenzene, 1-	Dinitrotoluene, 2,4-
000108-10-1	Methyl-2-pentanone, 4-	Methyl isobutyl ketone
000126-98-7	Methyl-2-propanenitrile, 2-	Methacrylonitrile
000080-62-6	Methyl-2-propenoic acid, methyl ester, 2-	Methyl methacrylate
000062-75-9	Methyl-n-nitroso-methanomine, n-	Nitrosodimethylamine, N-
000074-83-9	Methylbromide	Bromomethane
000063-25-2	Methylcarbamate-1-naphthalenol	Carbaryl
000101-14-4	Methylene bis (2-chloro-benzeneamine), 4,4'-	Methylene bis (2-chloroaniline), 4,4-

Synonyms List
(by Synonym Name)

CAS Number	Synonym Name	SCDM Name
000070-30-4	Methylene bis (3,4,6-trichlorophenol), 2,2-	Hexachlorophene
000050-00-0	Methylene oxide	Formaldehyde
000086-73-7	Methylenebiphenyl, 2,2-	Fluorene
000098-82-8	Methylethylbenzene, 1-	Cumene
000099-99-0	Methylnitrobenzene, p-	Nitrotoluene, 4-
000615-53-2	Methylnitroso-carbamic acid, ethyl ester	Nitroso-di-n-methylurethane, N-
000095-47-6	Methyltoulene, o-	Xylene, o-
007647-01-0	Muriatic acid	Hydrochloric acid
008001-58-9	Naphthalene oil	Creosote
000096-12-8	Nemazon	Dibromo-3-chloropropane, 1,2-
000102-71-6	Nitrilotriethanol, 2,2,2-	Triethanolamine
000098-95-3	Nitrobenzol	Nitrobenzene
010102-43-9	Nitrogen oxide	Nitric oxide
010102-44-0	Nitrogen oxide	Nitrogen dioxide
000086-30-6	Nitrosophenylbenzeneamine, n-	Nitrosodiphenylamine, N-
000930-55-2	Nitrosopyrrolidine, 1-	Nitrosopyrrolidine, N-
000057-74-9	Octachloro-4,7-methanotetrahydroindane	Chlordane
000110-00-9	Oxacyclopentadiene	Furan
000460-19-5	Oxalonitrile	Cyanogen
000765-34-4	Oxiranecarboxaldehyde	Glycidylaldehyde
000542-88-1	Oxybis(chloromethane)	Bis(chloromethyl)ether
000111-46-6	Oxybis-ethanol, 2,2-	Diethylene glycol
000120-12-7	Paranaphthalene	Anthracene
000076-01-7	Pentalin	Pentachloroethane
000118-74-1	Perchlorobenzene	Hexachlorobenzene
000087-68-3	Perchlorobutadiene	Hexachlorobutadiene
000077-47-4	Perchlorocyclopentadiene	Hexachlorocyclopentadiene
000067-72-1	Perchloroethane	Hexachloroethane
000085-01-8	Phenanthren	Phenanthrene
000131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt	Ammonium picrate
000108-95-2	Phenyl alcohol	Phenol
000108-90-7	Phenyl chloride	Chlorobenzene
000100-47-0	Phenyl cyanide	Benzonitrile

Synonyms List
(by Synonym Name)

CAS Number	Synonym Name	SCDM Name
000541-73-1	Phenylene dichloride, m-	Dichlorobenzene, 1,3-
000100-41-4	Phenylethane	Ethyl benzene
000055-38-9	Phosphorothioic acid, o,o-dimethyl	Fenethion
007723-14-0	Phosphorous, white	Phosphorous (elemental)
020859-73-8	Phostoxin	Aluminum phosphide
000145-73-3	Phthalic acid, hexahydro-3,6-endo-oxy-	Endothall
000108-94-1	Pimelic ketone	Cyclohexanone
001336-36-3	Polychlorinated biphenyls	PCBs
000506-61-6	Potassium dicyanoargentate	Potassium silver cyanide
000055-63-0	Propanetriol, trinitrate, 1,2,3-	Nitroglycerine
000107-02-8	Propenal	Acrolein
000079-06-1	Propenamide	Acrylamide
000079-10-7	Propenoic acid	Acrylic acid
000107-18-6	Propenol, 2-	Allyl alcohol
000078-87-5	Propylene chloride	Dichloropropane, 1,2-
000093-72-1	Silvex	TP, 2,4,5-
007773-06-0	Sulfamic acid, monoammonium salt	Ammonium sulfamate
007720-78-7	Sulfuric acid iron salt (1:1)	Ferrous sulfate
000077-78-1	Sulfuric acid, dimethyl ester	Dimethyl sulfate
007733-02-0	Sulfuric acid, zinc salt	Zinc sulfate
000091-20-3	Tar camphor	Naphthalene
000095-95-4	TCP	Trichlorophenol, 2,4,5-
000095-94-3	Tetrachlorobenzene, s-	Tetrachlorobenzene, 1,2,4,5-
001746-01-6	Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	TCDD
000127-18-4	Tetrachloroethylene	Tetrachloroethene
000056-23-5	Tetrachloromethane	Carbon Tetrachloride
000563-12-2	Tetraethyl S,S'-methylenebisphosphorithioate, o,o,o',o'-	Ethion
000123-91-1	Tetrahydro-1,4-dioxin	Dioxane, 1,4-
000062-56-6	Thio-carbamide	Thiourea
001031-07-8	Thiodan sulfate	Endosulfan sulfate
000078-48-8	Tributyl phosphorotrithioate, s,s,s-	DEF
000067-66-3	Trichlormethane	Chloroform
000075-87-6	Trichloroacetaldehyde	Chloral

Synonyms List
(by Synonym Name)

CAS Number	Synonym Name	SCDM Name
000079-01-6	Trichloroethene	Trichloroethylene
000078-59-1	Trimethyl-2-cyclohexen-1-one, 3,5,5-	Isophorone
001314-62-1	Vanadium oxide	Vanadium pentoxide
000107-13-1	Vinyl cyanide	Acrylonitrile
000079-00-5	Vinyl trichloride	Trichloroethane, 1,1,2-
000100-42-5	Vinylbenzene	Styrene

CONTAMINATION ASSESSMENT REPORT

for the

CHEVRON CHEMICAL COMPANY SITE
ORLANDO, FLORIDA

(USEPA Docket No. 90-37-C)

December 1990

TABLE OF CONTENTS

			Page
CHAPTER 1.0	INTRODUCTION		
	1.1	Site Location	1-1
	1.2	Site History	1-1
	1.3	Previous Investigations	1-11
	1.4	Scope of Contamination Assessment	1-12
CHAPTER 2.0	ENVIRONMENTAL SETTING		
	2.1	Physiography	2-1
	2.2	Land Use	2-3
	2.3	Climate	2-3
	2.4	Surface Hydrology	2-5
	2.5	Geology	2-5
		2.5.1 Site Geology	2-7
	2.6	Hydrogeology	2-7
	2.7	Water Quality	2-11
CHAPTER 3.0	FIELD INVESTIGATION METHODS		
	3.1	Site Clearing	3-1
	3.2	Ground Penetrating Radar Survey	3-1
	3.3	Groundwater Monitor Well Installation and Sampling	3-2
	3.4	Soil Sampling	3-9
	3.5	Aquifer Testing	3-15
CHAPTER 4.0	DATA PRESENTATION		
	4.1	Site Hydrogeology	4-1
		4.1.1 Water Table Elevations	4-1
		4.1.2 Aquifer Testing and Analysis	4-1
	4.2	Soil Sample Analytical Results	4-5
		4.2.1 Shallow Composite Samples	4-10
		4.2.2 Deep Soil Samples	4-12
		4.2.3 Rail Spur Area	4-14
	4.3	Sediment Sample Results	4-16
	4.4	Groundwater Sample Results	4-17

TABLE OF CONTENTS

			Page
CHAPTER 5.0	DATA EVALUATION		
	5.1	Site Hydrogeology	5-1
	5.2	Soil Sampling Data Evaluation	5-2
		5.2.1 Volatile Organics Distribution	5-2
		5.2.2 Semivolatile Organics Distribution	5-4
		5.2.3 Organochlorine Pesticides	5-4
		5.2.4 Organophosphate Pesticides	5-4
		5.2.5 Chlorinated Herbicides	5-4
		5.2.6 Heavy Metals	5-7
	5.3	Groundwater Data Evaluation	5-7
		5.3.1 Volatile Organics Distribution	5-7
		5.3.2 Semivolatile Organics Distribution	5-11
		5.3.3 Organochlorine Pesticide Distribution	5-11
		5.3.4 Organophosphate Pesticide Distribution	5-11
		5.3.5 Metals Distribution	5-16
CHAPTER 6.0	RECOMMENDATIONS		
	6.1	Introduction	6-1
	6.2	Risk Assessment	6-1
	6.3	Groundwater Investigation	6-2
REFERENCES			R-1

LIST OF TABLES

TABLE 2-1	Temperature and Precipitation	2-4
TABLE 3-1	Soil Sampling Depths	3-13
TABLE 4-1	Chevron-Orlando Water Table Elevations	4-2
TABLE 4-2	Summary of Hydrologic Conductivity Calculations	4-9
TABLE 4-3	Shallow Soil Sample Analytical Results	4-11
TABLE 4-4	Deep Soil Sample Analytical Results	4-13
TABLE 4-5	Railspur Area Soil Sample Analytical Results	4-15
TABLE 4-6	Groundwater Sample Analytical Results	4-18

TABLE OF CONTENTS

Page

LIST OF FIGURES

FIGURE 1-1	Site Location Map	1-2
FIGURE 1-2	Vicinity Map	1-3
FIGURE 1-3	Site Layout	1-5
FIGURE 1-4	Detail of Building "B"	1-6
FIGURE 1-5	Site Layout - Uttal Operations	1-9
FIGURE 2-1	Physiographic Map of Central Florida	2-2
FIGURE 2-2	Site Drainage	2-6
FIGURE 2-3	Location of Lithologic Cross Sections	2-8
FIGURE 2-4	Lithologic Profile	2-9
FIGURE 2-5	Potentiometric Surface of the Upper Floridan Aquifer	2-10
FIGURE 3-1	Ground Penetrating Radar Survey Map	3-3
FIGURE 3-2	Groundwater Monitoring Well Locations	3-4
FIGURE 3-3	Well Completion Log	3-7
FIGURE 3-4	Soil Sampling Locations on Northern & Western Portions of Site	3-11
FIGURE 3-5	Soil Sampling Locations	3-12
FIGURE 4-1	Water Level Elevation, 7-17 Foot Screen Interval	4-3
FIGURE 4-2	Water Level Elevation, 22-33 Foot Screen Interval	4-4
FIGURE 4-3	Time Versus Recovery in Well MW-O	4-6
FIGURE 4-4	Time Versus Recovery in Well MW-L	4-7
FIGURE 4-5	Time Versus Recovery in Well MW-K	4-8
FIGURE 5-1	Distribution of Volatile Organic Compounds in Soils	5-3
FIGURE 5-2	Distribution of Organochlorine Pesticides in Soils	5-4
FIGURE 5-3	Distribution of Organophosphate Pesticides in Soils	5-5
FIGURE 5-4	Distribution of Metals in Soils	5-8
FIGURE 5-5	Total Volatile Organic Compound Concentrations in Shallow Wells	5-9
FIGURE 5-6	Total Volatile Organic Compound Concentrations in Deep Wells	5-10
FIGURE 5-7	Total Semivolatile Organic Concentrations in Shallow Wells	5-12
FIGURE 5-8	Total Organochlorine Pesticide Concentrations in Shallow Wells	5-13
FIGURE 5-9	Total Organochlorine Pesticide Concentrations in Deep Wells	5-14
FIGURE 5-10	Total Organophosphate Concentrations in Shallow Wells	5-15

APPENDICES

APPENDIX A	Soil Boring and Well Completion Logs
APPENDIX B	Ground Penetrating Radar Survey Report
APPENDIX C	Quality Assurance Analysis and Laboratory

CHAPTER 1.0

INTRODUCTION

This report presents the results, conclusions, and recommendations of the contamination assessment of the Chevron Chemical Company site in Orlando, Florida. The assessment was performed in accordance with the Site Cleanup Workplan (July 1990) which was prepared in accordance with the Administrative Order on Consent with Chevron Chemical Company and Mr. Robert R. Uttal (EPA Docket No. 90-37-C). Mr. Uttal is the current owner of the site, and Chevron Chemical Company is the former site owner.

The assessment involved the collection and analysis of soil and groundwater samples from the site. In addition, a sediment sample was collected from an offsite stormwater retention pond that receives drainage from the site.

1.1 SITE LOCATION AND DESCRIPTION

See Figures 1-1 and 1-2

The Chevron Chemical Company site (site) is located in the 3100 block of North Orange Blossom Trail (Highway 441) in Orlando, Florida (Figures 1-1 and 1-2). The site is bordered to the east by Orange Blossom Trail, which serves as the main access to the site, to the west by industrial facilities, to the south by railroad tracks, and to the north by a mobile home park. Lake Fairview is located approximately 1,000 feet northeast of the property. The total area of the site is 4.39 acres (EPA, 1990).

The majority of the site is paved. There is an office building on the east side of the site and a warehouse along the southern boundary. A rail spur runs within the south property line. A large, inactive elevated water tower is located towards the west end of the property.

1.2 SITE HISTORY

Between the years 1950 to 1976, Chevron Chemical Company utilized the site for the formulation of pesticides and crop sprays. Prior to Chevron's use, the site was undeveloped and forested with cypress trees (Dames & Moore, 1983, and Patry, 1987).

The facility formulated a variety of liquid and powdered pesticides, citric sprays, and "nutritional" sprays. The majority of the active pesticide ingredients were delivered in drums by trailer trucks. Bulk liquids, usually carrier solvents, were delivered by tanker trucks and very occasionally by tank railroad car. Finished packaged goods were shipped by truck. No rail shipment of finished goods occurred due to the local nature of the business.

Chemicals used in pesticide formulation included xylene, kerosene, mineral oil, and aromatic naphtha. Pesticides formulated in large volumes consisted of parathion, chlordane,

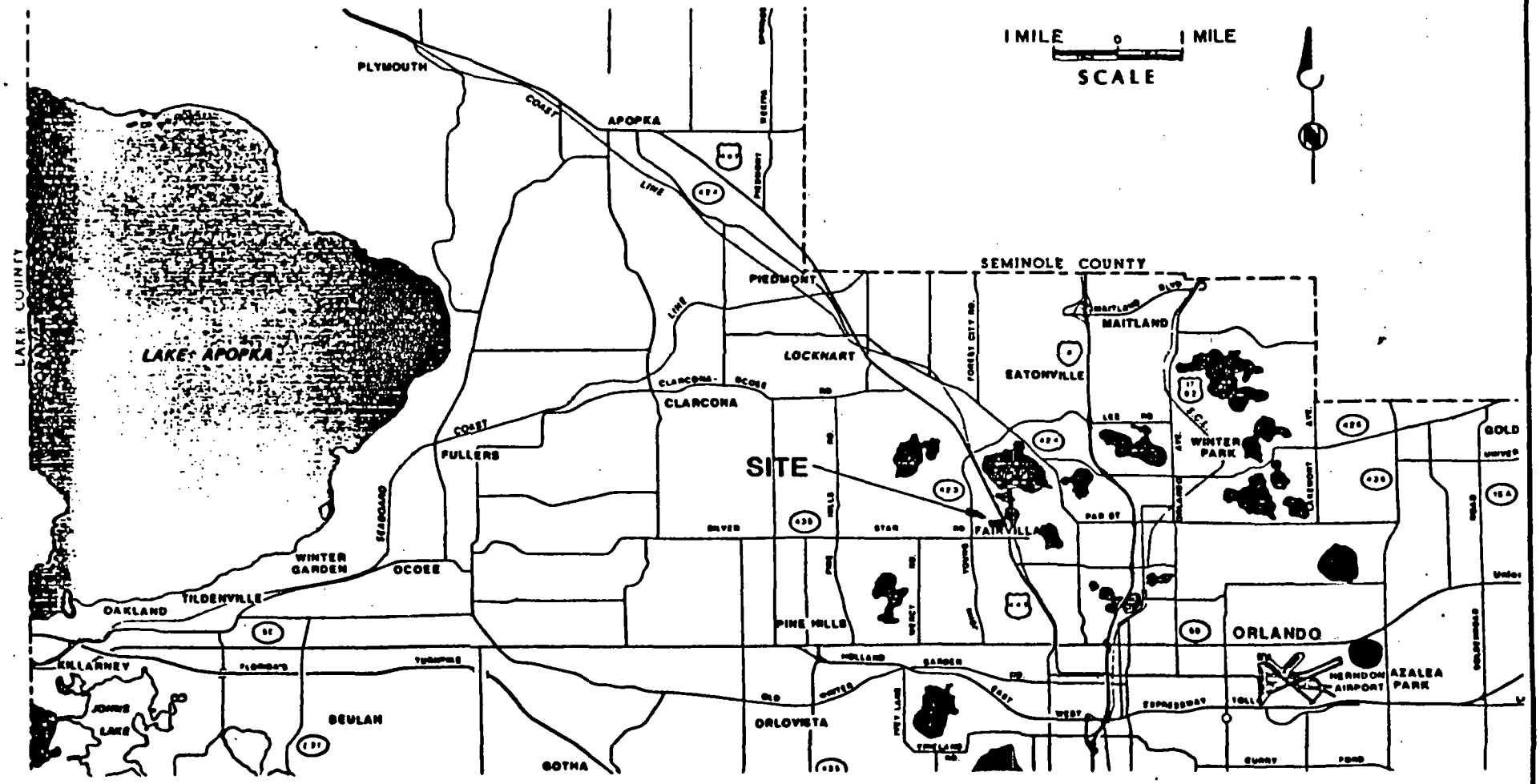

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Figure 1–1. Site Location Map

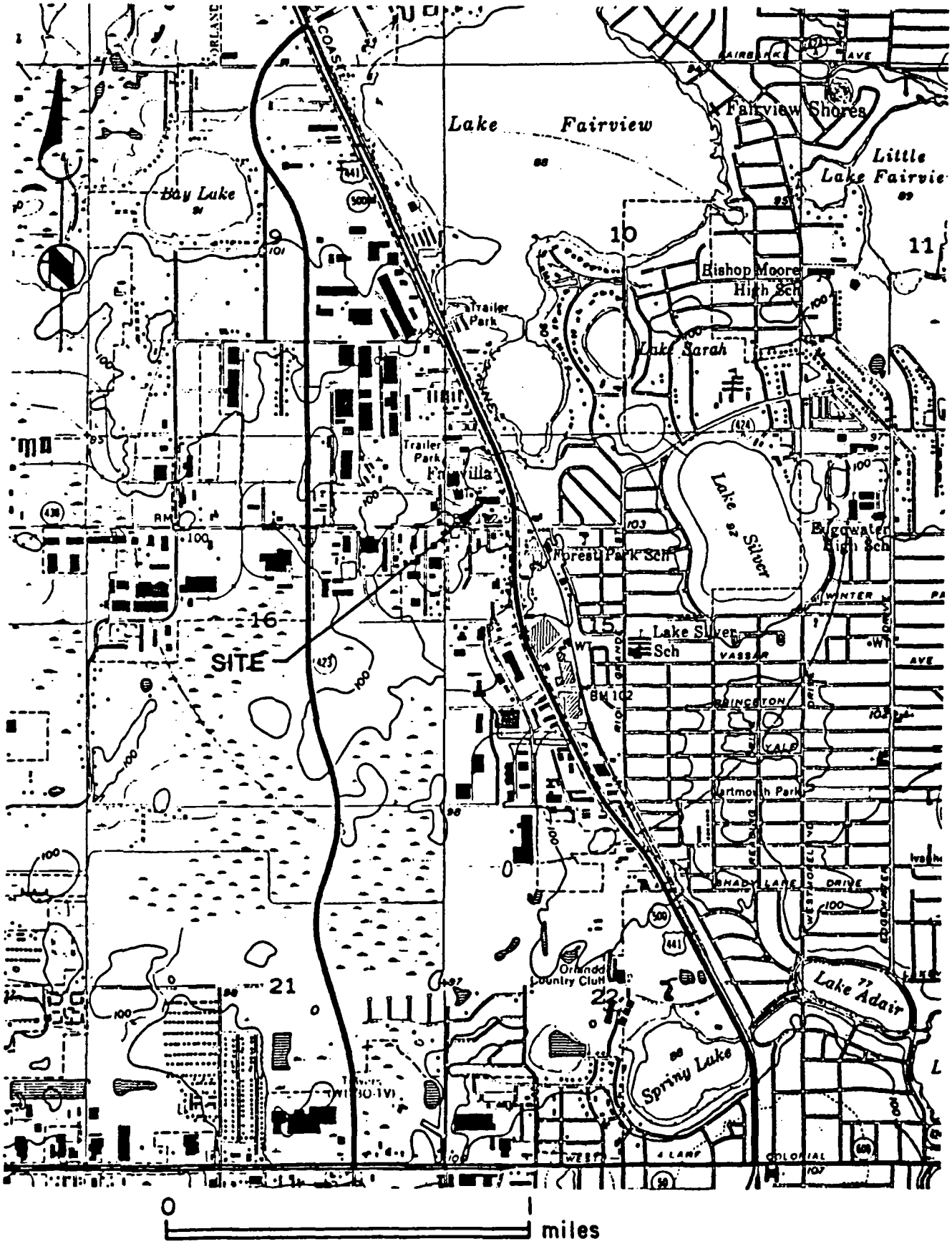

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Figure 1–2. Vicinity Map

phaltan, captan, malathion, and paraquat. Pesticides formulated in smaller volumes consisted of DDT, difolatan, BHC-lindane, dieldrin, aldrin, dibromamine, and "nutritional" sprays (aqueous solutions of copper, zinc, manganese, sulfur, and boron) (Patry, 1987).

The main features of the former pesticide formulating facility, as illustrated in Figure 1-3, consisted of seven above ground bulk liquid storage tanks, a barrel storage area, a barrel rinse area, two pesticide rinsate ponds, three septic tank drain fields, an underground storage tank, a large building which housed the dry and liquid pesticide formulating and warehousing operations, and an office building.

See Figure 1-3

The underground storage tank was used to store diesel fuel which was used primarily to refuel forklifts.

The rinsate ponds were unlined and used for the collection and disposal of pesticide formulating rinse water, barrel rinse water, floor washdown water, and storm water by evaporation and percolation. Prior to 1970, any rinsate that was not collected and reused for subsequent pesticide formulations was discharged to the two rinsate ponds, which were connected in series. After 1970, the pesticide formulating rinsate that was not reused in subsequent pesticide formulations was collected and disposed of offsite (Patry, 1987).

The rinsate ponds were constructed in the western portion of the site by excavation of the sandy soil found at the site. Rinsate Pond A was approximately 90 feet long by 45 feet wide, and Rinsate Pond B was approximately 70 feet long by 20 feet wide. Both ponds were approximately 3 feet deep (Dames & Moore, 1983). Following Chevron's sale of the site in 1978, the ponds were filled in with concrete, scrap metal, and soil (Starosciak, et al, 1990).

The warehouse/formulating plant floor is a continuous 4-inch cement slab. A floor drain was located in the liquid formulating area, and the drain discharged through an opening in the southern sidewall of the building onto the ground surface adjacent to the rail spur (Figure 1-4). Pipelines from the seven bulk liquid storage tanks entered the building through this opening in the building sidewall (Patry, 1987).

See Figure 1-4

The area adjacent to the buildings to the north, east and west is paved and was used for temporary storage of drums and packaged goods. The remainder of the facility, including the area near the rinsate ponds, was not paved. It was reported by former Chevron plant personnel that the area designated as the barrel storage area was never used by Chevron for storage due to poor drainage in the area.

According to former Chevron plant personnel, incidental spills or leaks of pesticides and carrier solvents were promptly cleaned up. However, the following occurrences present potential sources of site contamination.

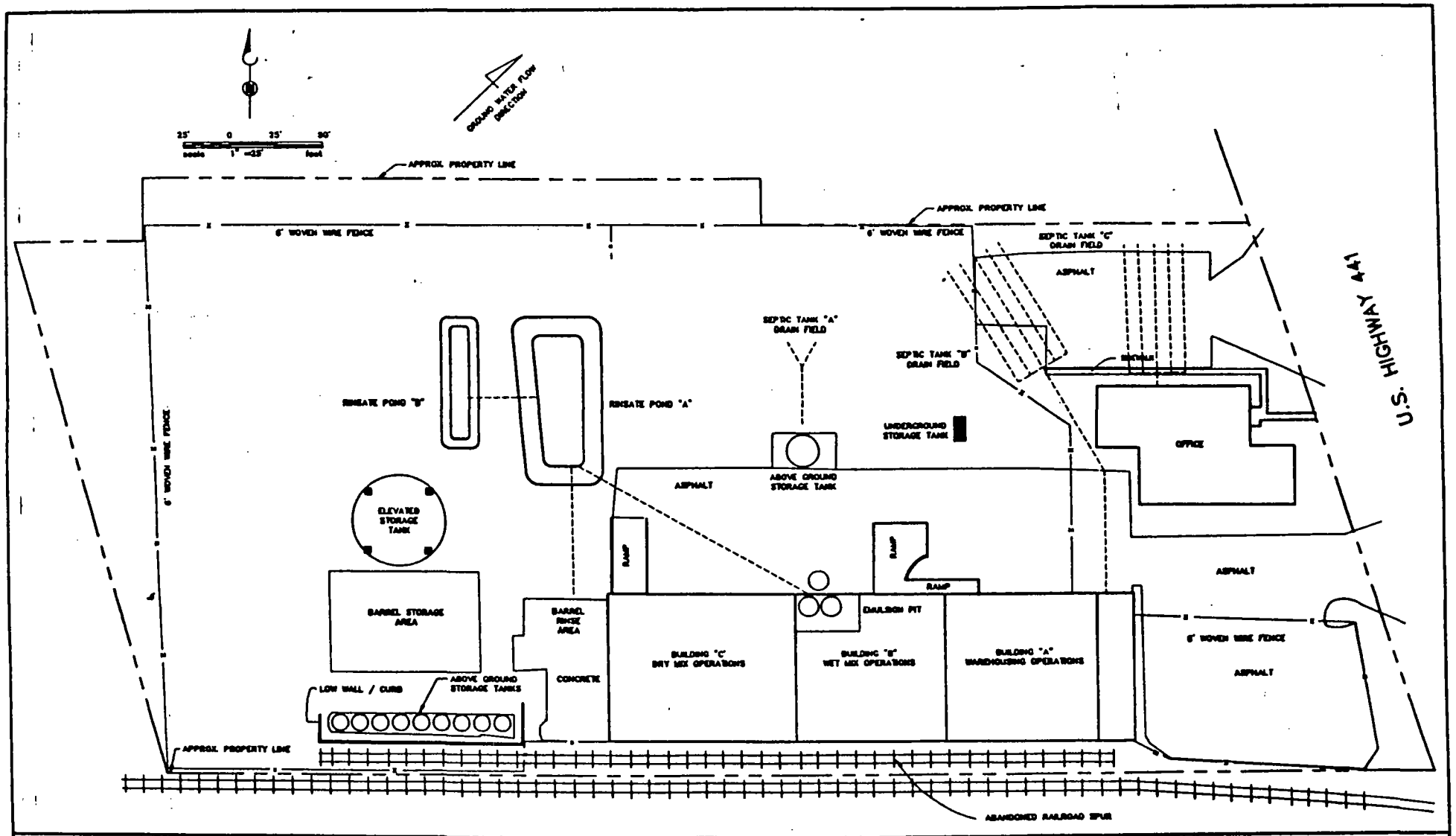

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Figure 1-3. Site Layout-Chevron Operations

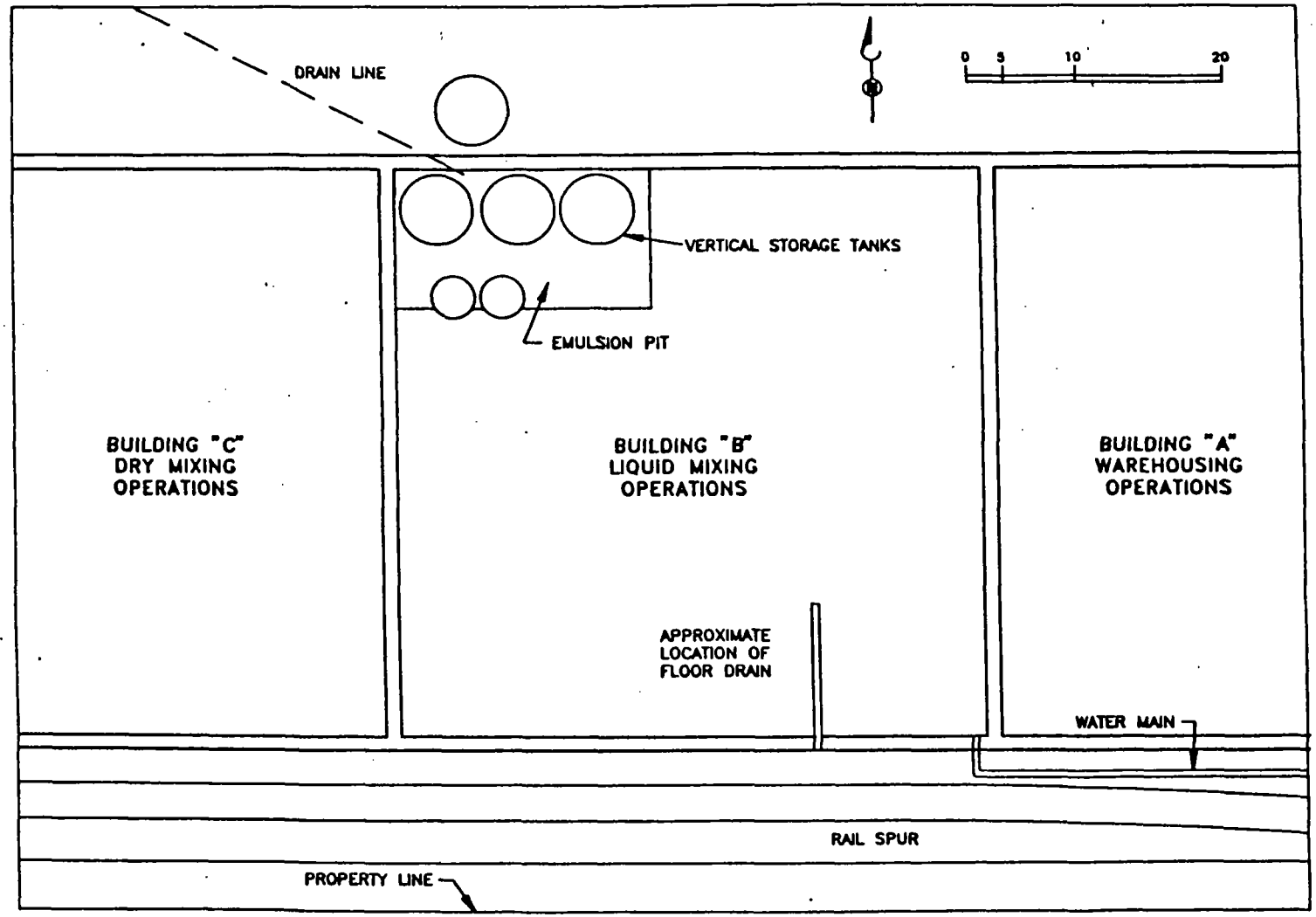

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Figure 1-4. Detail of Building "B"

- Difolatan Burial. In the 1960s, several tons of an off-specification batch of difolatan were generated. The gelatinous difolatan was placed in the eastern rinsate pond (Rinsate Pond A), and subsequently buried during later backfilling of the pond.

- Parathion Leakage. In the early 1960s several pallets of parathion (5-gallon pails) were stored behind the office building. Upon later inspection, they were found to be empty and had drained onto the ground. No cleanup actions were performed.

- Rail Spur Area. A spill of a chlorinated carrier solvent occurred in the liquid pesticide formulating area. The solvent entered the floor drain and discharged onto the ground surface between the sidewall of the building and the railroad tracks. The volume of the spill is unknown but was reportedly restricted to a small area between the building and the railroad tracks.

In 1976, Chevron ceased pesticide formulating operations at the site. The remaining inventories were removed from the site, although storage of small quantities of pesticides may have occurred at the site prior to sale of the site in 1978 to Mr. Robert R. Uttal. Following discontinuance of formulating activities in 1976, Chevron drained all equipment and lines, and washed down the formulating areas with water. The rinsate ponds were backfilled with soil between 1976 and 1978.

In 1978, the site was purchased with an "as is, where is" contractual condition by Mr. Uttal, who leased the site as Central Florida Mack Trucks Company, a truck sales and service facility (EPA, 1990). Prior to leasing the property, Mr. Uttal modified the site as described below.

The pesticide formulating equipment, including the dust mill and liquid formulating facilities were sold and removed from the site. Prior to removing the dust mill, all dust was drummed and moved to the barrel storage area. According to Mr. Uttal, this area was also used to store 20 to 25 drums (30- and 55-gallon capacity) that were partially filled with liquid pesticides including paraquat. The drums were ultimately removed for offsite disposal by an independent firm. The concrete sump beneath the dust mill was filled with sand, then concrete and brought up to grade (Patry, 1987, and Starosciak, et al, 1990).

Following removal of the plant equipment, Mr. Uttal washed the entire interior of the building to remove remaining pesticide dust with water followed by a soapy water rinse. The floor was then rinsed with mineral spirits. No attempt was made to collect the rinsate. After rinsing was completed, the drain lines in the buildings were filled with sand and capped with concrete (Starosciak, et al, 1990). Mr. Uttal reported that he replaced some of the metal siding on the building and discovered pesticide residue within the wall space. This material was also washed out with water and the rinsate was allowed to run onto the ground (Patry, 1987).

After cleaning the building, Mr. Uttal poured a 50-foot by 120-foot concrete slab adjoining the north side of the building and constructed four truck service bays over the slab (Figure 1-5). The slab was poured directly over the existing asphalt pavement.

See Figure 1-5

Mr. Uttal filled the underground storage tank located north of the paved area with concrete to provide a firmer surface for truck traffic. The tank may not have been completely filled with concrete (Patry, 1987, and Starosciak, et al, 1990).

Mr. Uttal reported that the rinsate pond area would not support the weight of trucks, and he established an agreement with Rinker Concrete to pour waste loads of concrete over the area to stabilize it. He reported that scrap metal was also disposed of in the rinsate ponds (Starosciak, et al, 1990). In addition, Rinker poured waste loads of concrete across the northwest area of the site.

As Central Florida Mack Trucks Service Center, Mr. Uttal's operations included truck servicing and truck parts sales. All servicing operations including general truck repairs were conducted inside of the four service bays. Minor maintenance was performed in the yard (Starosciak, et al, 1990). A visual inspection of the outside operations area suggested that maintenance operations were performed in this area.

Truck servicing operations were conducted from 1978 to 1986. These operations consisted of overhauling engines, starters, generators and front/rear ends. A vertical degreaser was used to clean engine parts. The degreasing operations produced about three 55-gallon drums of spent degreasing agent per year; when the agent was spent, it was transferred to a 55-gallon drum which was collected by a contracted hauler (Starosciak, et al, 1990). No information is available concerning the type of degreasing agent that was used.

A 500-gallon skid mounted tank of kerosene was stored inside the service bays. Two skid mounted tanks located in the outside operations area were used to store virgin oil. Waste oil was stored in an above ground cylindrical storage tank located to the west of the buildings in one of the seven original storage tanks used previously by Chevron. The waste oil was periodically picked up by an oil recycling firm.

Mr. Uttal operated a paint shop in the western truck servicing bay. The painting operation consisted of mixing Dupont Ameron (polyurethane base) with an accelerator and spray applying the paint by air compressor. Unused paint was allowed to harden in the can and was thrown into the dumpster for offsite disposal (Starosciak, et al, 1990).

A concrete pad located at the northwest corner of the site was constructed in late 1984 for use as a helicopter landing pad. The pad has water sprayheads at each corner which were used to wet the pad area to minimize dust during helicopter operation. The pad was used as a landing site for Mr. Uttal's private helicopter (Starosciak, et al, 1990).

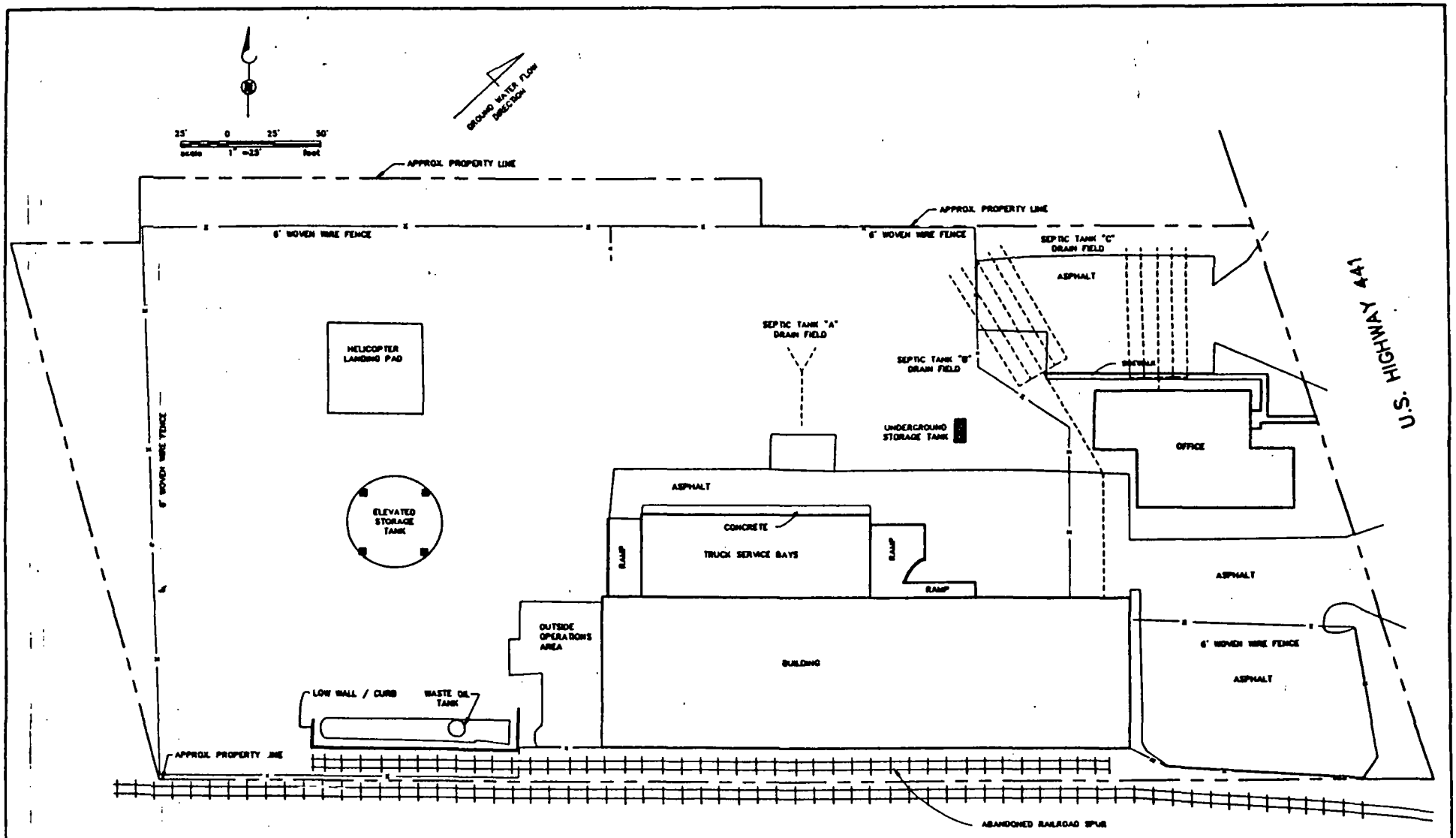

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Figure 1-5. Site Layout-Uttal Operations

In March 1984, a tanker truck owned by Waste Management filled with 3% hydrochloric acid and an unknown amount of nitric acid, was taken to the site for repair. The tank apparently leaked in the vicinity of the former western rinsate pond, resulting in an explosion. An estimated 3,000 to 6,000 gallons of acid were released. The local fire department was called to contain the spill. Waste Management excavated the contaminated soil to a depth of 9 to 10 feet in the spill area (100 feet by 100 feet), and shipped the contaminated soil to the Chemical Waste Management secure landfill in Emelle, Alabama for disposal. The excavation was then backfilled with clean fill (Patry, 1987, and Starosciak, et al, 1990).

Mr. Uttal closed down his operations on November 2, 1986, selling all plant equipment on-site except for the two skid mounted oil tanks and the waste oil tank located at the southwest end of the site. In 1987, Mr. Uttal leased the property to Mr. Richard Keating (Starosciak, et al, 1990).

On June 2, 1987, Chevron inspected the site, and reported the following:

1. General - The facility was closed and for lease. The buildings appeared empty with all equipment and chemicals removed although a thorough inspection was not made. The grounds are generally free from debris with the following exceptions:

    a. Southwest - several truck bodies, trailers, etc., were abandoned in this area.

    b. Warehouse - the dynamometer located at west end of warehouse was partially disassembled with pieces of equipment lying on the ground.

    c. Drums - perhaps 5 to 8 drums were lying in bare ground in the northern portion of the property. The condition and contents (if any) of these drums were not determined.

2. Contamination - Obvious surface soil contamination was observed in two areas: the rail spur and the southwest end of the outside operations area.

    a. Rail Spur - obvious oil and grease contamination was present along the base of the outside operations area near the rail spur and along the length of the foundation. Free liquid oil was not observed.

    b. Southwest of Outside Operations Area - a 50-foot by 100-foot area of oily dirt was found southwest of the outside operations area. The composition of the oily material could not be determined but a distinct petroleum odor was noted.

Brown and Caldwell inspected the site on May 9 and June 7, 1990, and observed the following:

1. The site was abandoned, and the roof in the westernmost portion of the warehouse (Building C) had collapsed.

2. Oil staining was visible on the concrete in the outside operations area, and directly south and southwest of this area near the rail spur.

3. Various types of debris consisting of an empty car body, car batteries, pieces of truck bodies, construction debris, and empty drums were strewn over the northern and western portions of the site.

4. A faint pesticide odor was detectable between the building and the rail spur in the vicinity of the floor drain outfall.

5. Approximately 30 empty drums which previously contained sodium silicate were being stored directly on the ground surface northwest of the service bays.

6. With the exception of the rail spur area, the site was secured by a 6-foot high chain link fence topped with barbed wire.

1.3 PREVIOUS INVESTIGATIONS

At the request of Chevron Chemical Company, Dames & Moore conducted an investigation to determine the extent of soil and groundwater contamination at the site from the prior chemical facility operation. The investigation was conducted in the summers of 1981 and 1982. The final report was issued in January 1983. Laboratory analysis of soil samples for pesticides indicated the presence of chlordane and lindane. Laboratory analysis of groundwater samples for pesticides and metals indicated that concentrations of arsenic and lindane exceeded primary drinking water standards. Chlordane, DDD-o,p, and DDD-p,p were found in concentrations exceeding EPA guidelines found in Quality Criteria for Water, 1976. Dames & Moore concluded that the soil and groundwater contamination was mainly attributable to the past use of the pesticide rinsate ponds. It was also concluded that pesticides are not likely migrating offsite in the groundwater, but that arsenic could potentially migrate offsite in the groundwater in concentrations exceeding the primary drinking water standard (EPA, 1990).

In January 1987, Southeastern Investment Properties, Inc., considering the purchase of the site, retained Jammal & Associates to investigate the site. Analysis of groundwater samples for benzene, toluene, xylene and EPA 601 compounds (synthetic and volatile organic compounds) indicated the presence of several types of synthetic and organic compounds (benzene, xylene, trichloroethane, 1-1-dichloroethane, 1,2-dichloroethane, methylene chloride, and chlorobenzene) above State of Florida maximum contaminant levels for drinking water and groundwater guidance concentrations for assessing contamination. These compounds were

detected in the groundwater in the vicinity of the former rinsate ponds, near the rail spur, and in the southwest corner of the site. This second investigation did not include analysis for pesticides.

In May 1989, NUS Corporation (a contractor for EPA) conducted a site screening inspection under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). NUS collected surface and subsurface soil, and groundwater samples from the site (EPA, 1990). The analytical results for the soil samples indicate the presence of pesticides, benzene, toluene, xylene, naphthalene compounds, and metals along the rail spur adjacent to the floor drain outfall. Chlordane was detected in the southwest corner of the site. In the vicinity of the former rinsate ponds, pesticides, metals, benzene, toluene, xylene, and naphthalene compounds were detected.

In the groundwater samples, metals, benzene, toluene, and xylene were detected in the rail spur area near the floor drain outfall. In the vicinity of the rinsate ponds, metals, pesticides, xylene, benzene, trichloroethylene, and chlorobenzene were detected.

1.4 SCOPE OF CONTAMINATION ASSESSMENT

As described in the Site Cleanup Workplan (July 1990), the contamination assessment includes the following activities.

1. Clearing of the northern and western portions of the site to remove inert debris and dense vegetation.

2. Ground penetrating radar (GPR) survey of the site.

3. Installation of sixteen groundwater monitor wells.

4. Groundwater sampling and analysis.

5. The collection and analysis of 26 discrete and 14 composite soil samples.

6. The collection and analysis of one sediment sample from the stormwater retention pond located west of the site. This pond receives drainage from the rail spur area of the site.

7. Soil gas investigation of underground storage tank (UST) area using an organic vapor analyzer (OVA).

The contaminant assessment was performed in accordance with the Site Cleanup Workplan with the following exceptions:

- Fourteen rather than sixteen groundwater monitor wells were installed and sampled. This was because two of the sixteen wells were to be installed adjacent to the collapsed section of the warehouse, but were not because of the safety hazard posed by the unstable warehouse wall still standing adjacent to the two planned well locations. Demolition of this wall to remove the safety hazard is in the process of being contracted by Mr. Robert Uttal, and the demolition work will likely be performed in December 1990.

- Three of the thirteen discrete soil samples to be collected from the rail spur area were not collected because the sampling location for these three samples is in the area adjacent to the unstable warehouse wall described above.

- During the soil gas investigation of the UST area, the OVA malfunctioned. As an alternate approach, two soil samples were collected (one from each end of the UST) for total petroleum hydrocarbon analysis.

- A sample of the sludge contained in the sump in the above ground storage tank area was collected for analysis.

The scope of the contamination assessment is further described in Chapter 3, and the environmental setting of the site is discussed in Chapter 2. The results of the site investigation are presented in Chapter 4 and an evaluation of the results is presented in Chapter 5. Chapter 6 presents the conclusions and recommendations.

CHAPTER 2.0

ENVIRONMENTAL SETTING

This chapter describes the general environmental conditions at the site and in the surrounding area, including physiographical, climatological, geological and hydrological characteristics.

2.1 PHYSIOGRAPHY

W.W. White has divided Florida into three geomorphic zones (White, 1970). These zones are the northern, or proximal zone; the central, or midpeninsular zone; and the southern, or distal zone. Orange County is in the central zone (or midpeninsular highland) which is formed by subparallel fossil beach ridges formed during higher stands of sea level (Pleistcene age). The ridges roughly parallel the present coastline, as depicted by W. A. White (Figure 2-1), and are separated by broad valleys or plains. The subject site is located within the Osceola Plain, between the Orlando and Mount Dora Ridges, as shown in Figure 2-1.

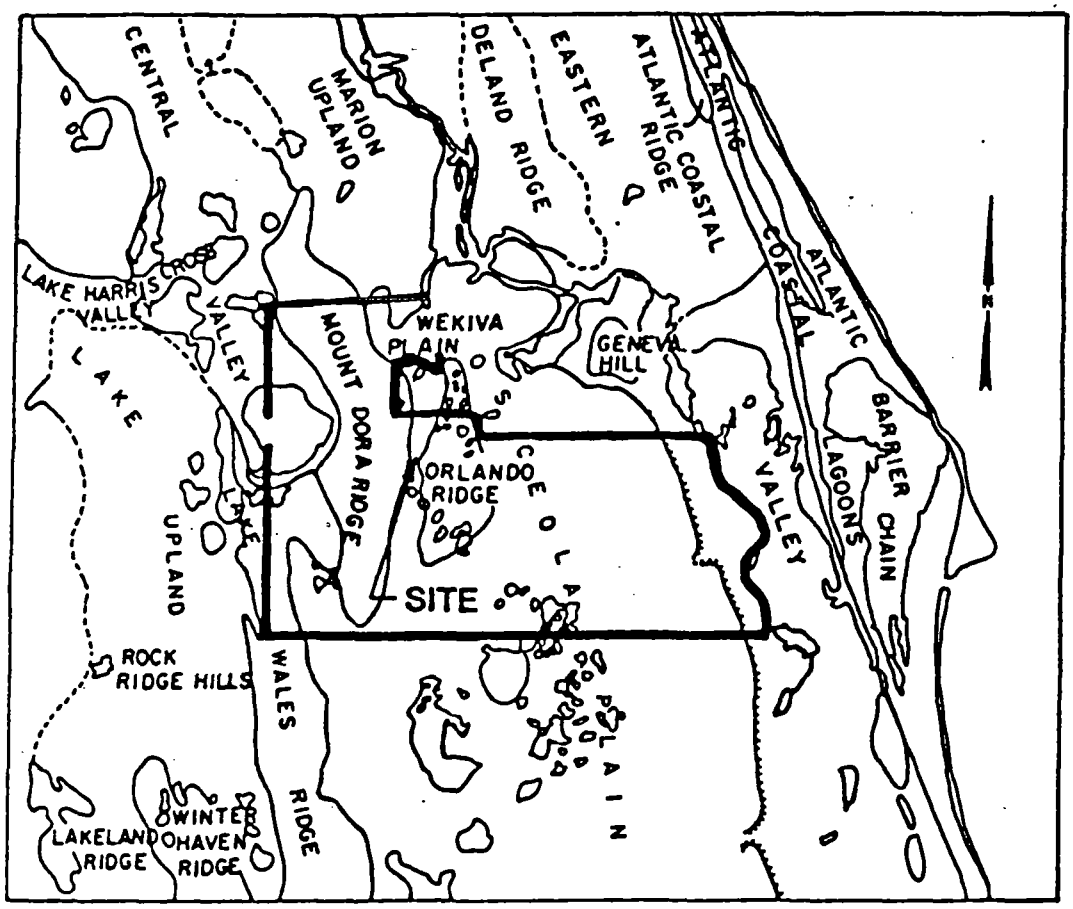
See Figure 2-1

The Osceola Plain is generally nearly level. There are a few very gently sloping low ridges; but over large areas, the changes in elevation are so gradual as to be barely perceptible. The Osceola Plain has many intermittent ponds, swamps, and marshes, and a few permanent lakes. Most of the areas are connected by sluggish streams or by wide, shallow sloughs.

North and west of the Osceola Plain are the nearly level to rolling Marion Upland, Mount Dora Ridge, Orlando Ridge, and Lake Wales Ridge. Most soils in this part of county have slopes that are between 0 and 8 percent, but in some areas that are near sinkholes, the soils have slopes of nearly 25 percent.

The ridges may represent erosional remnants of the "Hawthorn Delta." The elevation of the ridge areas ranges from 50 feet to 310 feet. These ridges represent a relatively mature karst surface that has a wide range in elevation, has numerous lakes, but has only a few continuous streams. Most of the drainage water seeps into the lakes. Rock Springs and Wekiva Springs, in the northwestern part of the county, form the source of one branch of the Wekiva River, a tributary of the St. Johns River. Lake Apopka, which lies along the western boundary of the county, drains into a branch of the Ocklawaha River, which is also a tributary of the St. Johns River (Doolittle, 1989).

The topography of the subject site is relatively flat, with onsite elevations estimated to be approximately +100 feet mean sea level (MSL), as interpreted from the U.S. Geological Survey (USGS) Orlando West quadrangle map. The site is located in a well developed area



0 10 20 MILES

APPROXIMATE SCALE

Brown and Caldwell Consultants

Figure 2–1. Physiographic Map of Central Florida; Orange County, Florida, and the Surrounding Area

with buildings, cement foundations, and asphalt pavement covering approximately 60 percent of the site (Jammal & Associates, 1987).

2.2 LAND USE

Immediately north of the site is a residential trailer park and an automobile interior refurbishing shop. U.S. Highway 441 forms the east boundary of the site. East of this highway is commercial office space of the Orlando Commercial Center, a Union Oil Company warehouse, and Tropical Plant Products.

Southeast of the site is a McDonald's restaurant. Directly southeast is an abandoned service station. Next to the service station and directly south of the site is Hubbard Construction Company. This facility has an equipment yard, shop, and a steam cleaning operation.

An insulation company and wood products firm are located just west of the site. An underground tank is present at the insulation company (Patry, 1987).

2.3 CLIMATE

The climate of Orange County is subtropical. Relative humidities remain high due to the proximity to the Atlantic ocean and the area's many lakes and swamps. Thundershowers are frequent during the summer afternoons. Winters are short and mild; many of the days are bright and sunny, and there is little precipitation. Cold spells accompanied by cold winds can be expected only a few times during the year and last only a few days. Generally the cold spells are preceded by rain.

Average temperature and rainfall data, based on records from 1951 to 1980 for Orange County are summarized in Table 2-1. This information was compiled from records at the Weather Service Office, Orlando Jetport at McCoy International Airport.

See Table 2-1

The average annual temperature is 71.8 degrees Fahrenheit (°F). In winter the average temperature is 61.1 °F, and in summer it is 81.1° F. The temperature rarely exceeds 95° F. Frosts have occurred as late as March 23rd and as early as November 10th. The average frost-free season lasts for 314 days, or from February 3rd to December 14th. The most recent lowest temperature recorded in Orlando was 20° F on December 26, 1983, but a reading of 19° F was recorded in Zellwood to the north of Orlando in February, 1947. Generally, the temperature drops to below freezing for only a few hours before dawn.

Rainfall is fairly abundant. The rainy season extends from June through September. About 57 percent of the precipitation falls during this period. During the rest of the year, the rainfall is distributed fairly uniformly. Most of the precipitation occurs in summer. During this

TABLE 2-1. Temperature and Precipitation

Month	Temperature			Precipitation	
	Normal daily mean °F	Normal daily maximum °F	Normal °F	Normal total 1951-1980 In	Prevailing direction of winds
January	60.5	71.7	49.3	2.10	NNE
February	61.5	72.9	50.0	2.83	S
March	66.8	78.3	55.3	3.20	S
April	72.0	83.6	60.3	2.19	SE
May	77.3	88.3	66.2	3.96	SE
June	80.9	90.6	71.2	7.39	SW
July	82.4	91.7	73.0	7.78	S
August	82.5	91.6	73.4	6.32	S
September	81.1	89.7	72.5	5.62	ENE
October	74.9	84.4	65.4	2.82	N
November	67.5	78.2	56.8	1.78	N
December	62.0	73.1	50.9	1.83	NNE
Average/ Total	72.4	82.8	62.0	47.83	S

season, the precipitation comes mainly in the form of thunderstorms that occur on the average of every other day and generally last for only 1 or 2 hours. Moderately high winds, which occasionally accompany the thunderstorms, occur for short periods.

Between August and November, tropical storms occasionally sweep across the county. Most of these develop over the Caribbean Sea near the West Indies. The heavy rains that accompany such storms are generally more damaging to crops than the wind, but the wind may destroy buildings, tall vegetation, and the fruit on citrus trees. Generally, the damage is confined to a storm path that is between 40 and 75 miles wide (Doolittle, 1989).

2.4 SURFACE HYDROLOGY

Figure 2-2 shows the site drainage. As shown, most of the site drains to the north and west via a swale which is approximately 2 feet deep. The swale terminates in the northwestern corner of the site where the swale is approximately 20 feet wide and 5 feet deep. During most rainfalls, it is likely that stormwater collecting in the swale percolates and evaporates, and does not run off the site.

See Figure 2-2

The eastern portion of the site drains to the east into the storm drain system along Orange Blossom Trail. Drainage from the southern portion of the site and the southwestern corner of the site flows westward along the railroad tracks into a stormwater retention pond located on the west side of the North Brothers Insulation Company building.

2.5 GEOLOGY

Orange County is underlain mostly by marine limestone, dolomite, shale, sand and anhydrite to about 6,500 feet at which depth granite and other crystalline rocks of the basement complex occur. Overlying the crystalline basement in succession are the Eocene age lake City limestone (> 700 feet thick) and the Avon Park limestone (400-600 feet thick). Overlying the Avon Park is the Ocala limestone (0-125 feet thick) which may be highly eroded or missing in some parts of Orange County. Together these formations comprise the Floridan aquifer.

Overlying the Eocene age formations is the Miocene age Hawthorn formation (0-200 feet thick) consisting of fine sand, clayey sand, silt and clay. The contact of the Hawthorn formation with the overlying deposits is gradational. The undifferentiated sediments above the Hawthorn formation may include the Caloosahatchee marl; thick deposits of red clayey sand; and marine terrace deposits. The marine terrace deposits consist mostly of loose unsorted quartz sand with varying amounts of organic matter and occasional seams of clay.

The undifferentiated sediments are 0-200 feet thick. The uppermost unconsolidated sediments consist of Pleistocene to recent age sand deposits which comprise the upper 40 feet of the soil profile.

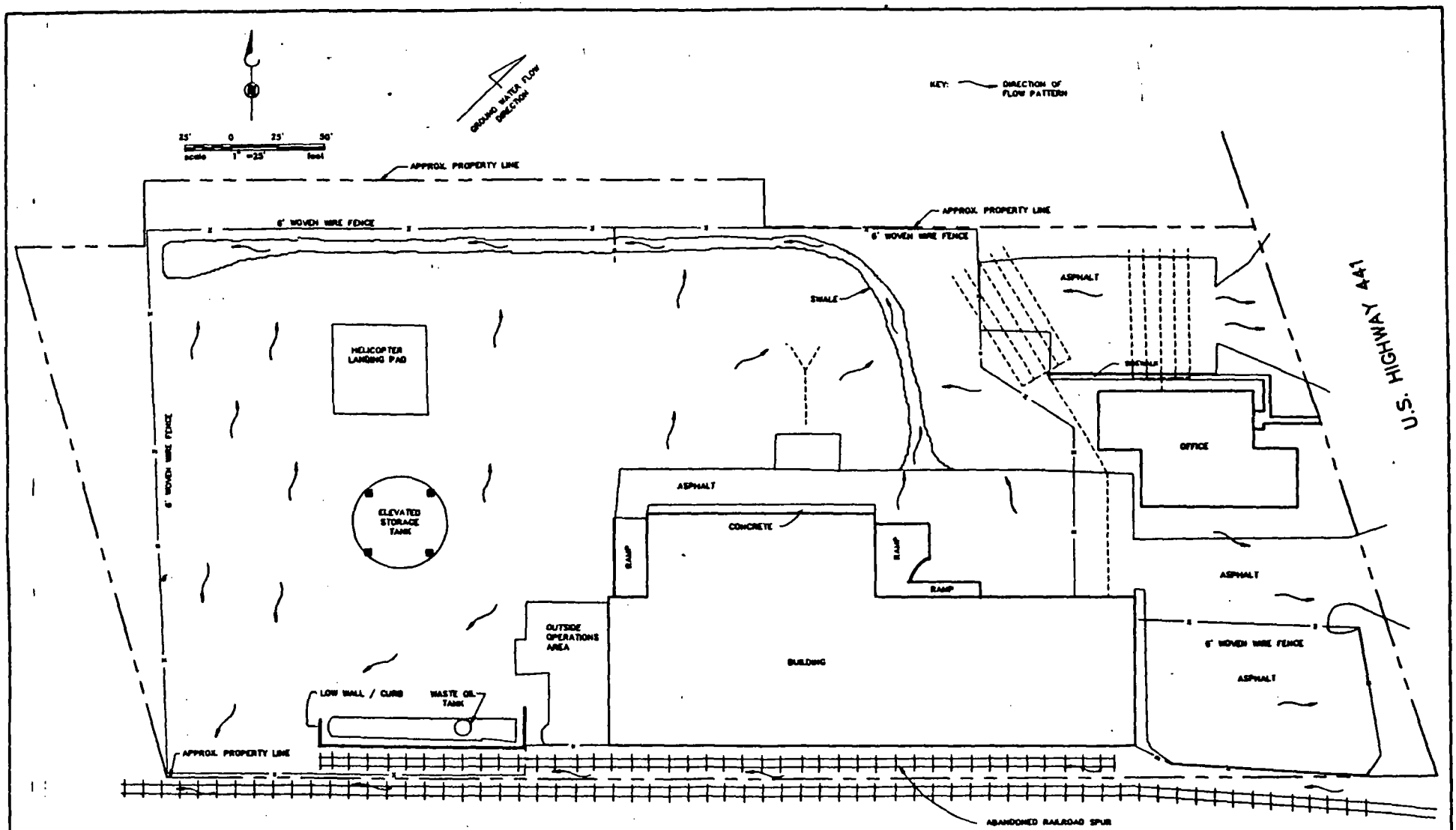


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Figure 2-2. Site Drainage

2.5.1 Site Geology

See Figures 2-3 and 2-4

As shown on the soil boring logs and monitor well construction logs from the contamination assessment (Appendix A), the surficial geology is relatively uniform throughout the site. Surficial soils consist of disturbed local deposits and in some places, a white or black sandy fill is present. This fill extends to approximately 3 feet below land surface. Below the surficial fill, subsurface materials consist of tan to very dark brown, fine to very fine, sometimes silty, well sorted, moderately well rounded quartz sands. At approximately 33 feet a medium grey clay or silty clay is encountered. This clay bed is considered to underlie the entire site. Figure 2-3 indicates the location of the lithologic profile. The lithologic profile is provided as Figure 2-4.

2.6 HYDROGEOLOGY

See Figure 2-5

The groundwater regime within Orange County consists of an unconfined aquifer, extending from near land surface to a depth of approximately 40 feet, and the deeper and more extensive Floridan aquifer. The unconfined aquifer is separated from the Floridan aquifer by a thick confining layer of clays, clayey sands, and silty sands. Within the central Florida area the confining layer usually consists of the Hawthorn formation. Occasional minor aquifers may occur in relatively clean sand zones within the confining layer. The majority of the water wells that have been constructed into the unconfined aquifer in the Orange county area are of small diameter, but generally provide water sufficient for domestic purposes. In general, these wells may average 5 to 10 gallons per minute (gpm). The groundwater surface occurs at shallow depths in the vicinity of the site, and is usually located within 5 feet of the ground surface. The potentiometric surface in both the unconfined aquifer and deeper aquifer fluctuates seasonally, generally varying less than 5 feet for the unconfined aquifer and in excess of 5 feet for the Floridan aquifer. Regional groundwater flow directions are to the northeast and east (Figure 2-5).

The Floridan aquifer is highly permeable and extensive in area. It is the principle potable water producing zone for Orange County. The Floridan aquifer is primarily composed of limestone (Eocene age) and is generally between 1,500 and 2,000 feet thick. Most all of the industrial wells in the vicinity have been constructed into the Floridan aquifer. The top of the Floridan aquifer is over 150 feet deep in the vicinity of the site.

The primary source of recharge for the unconfined aquifer is rainfall which permeates the near-surface sands. The Floridan aquifer in Orange County receives most of its recharge by percolation of surface water and rainfall in the western highlands where the confining beds are locally rather thin and semipermeable.

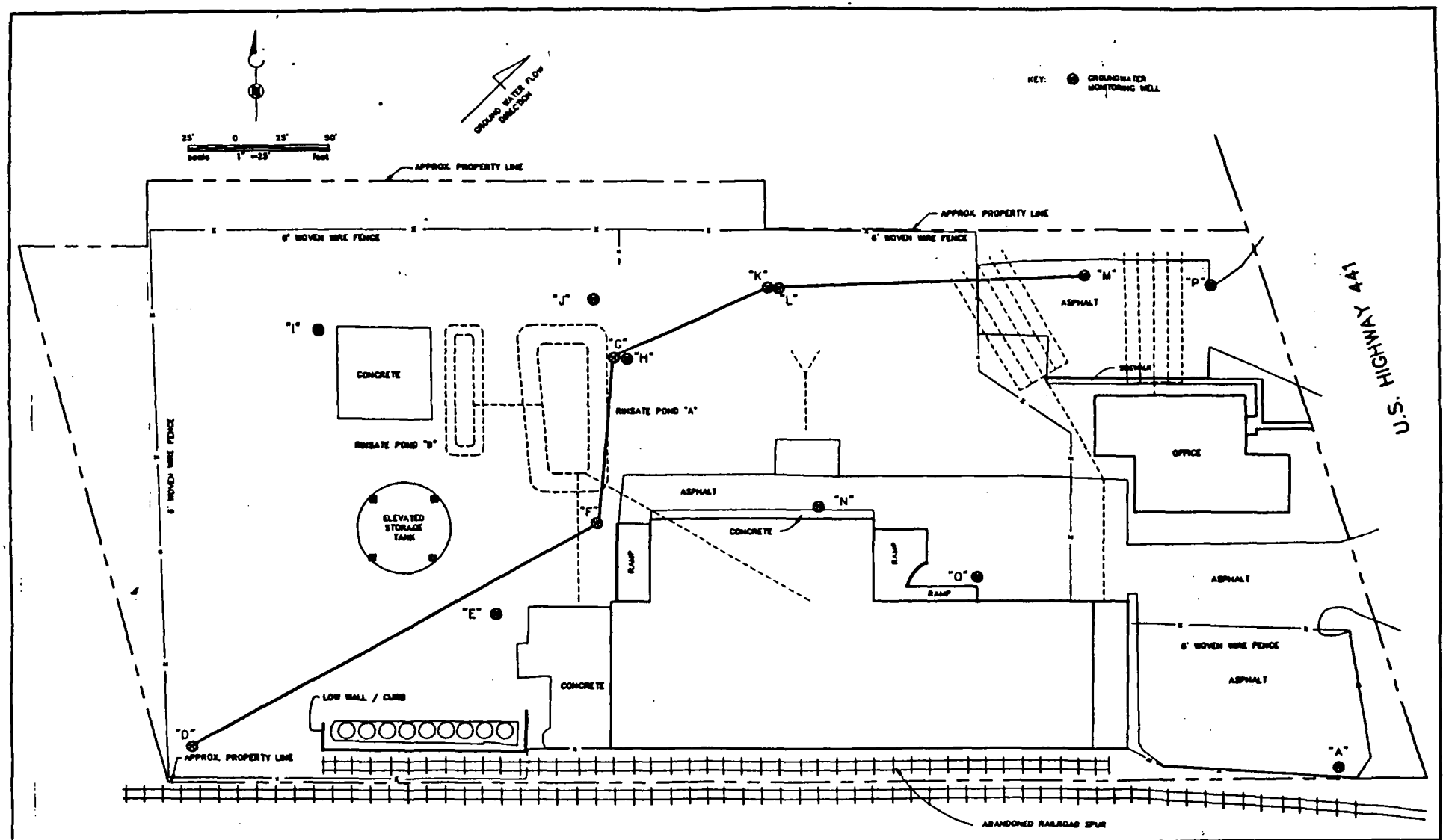

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Figure 2-3. Location of Lithologic Cross Section

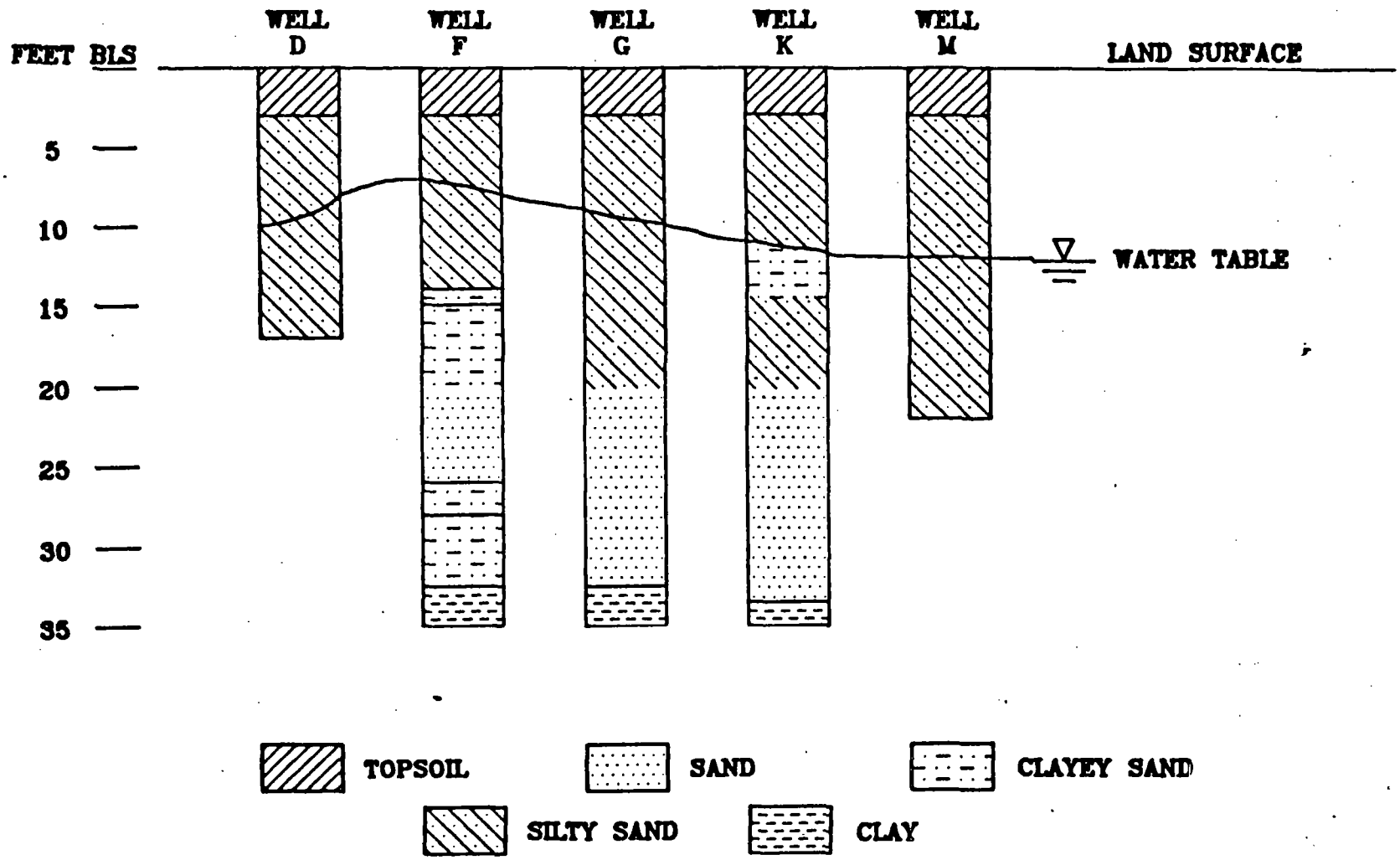
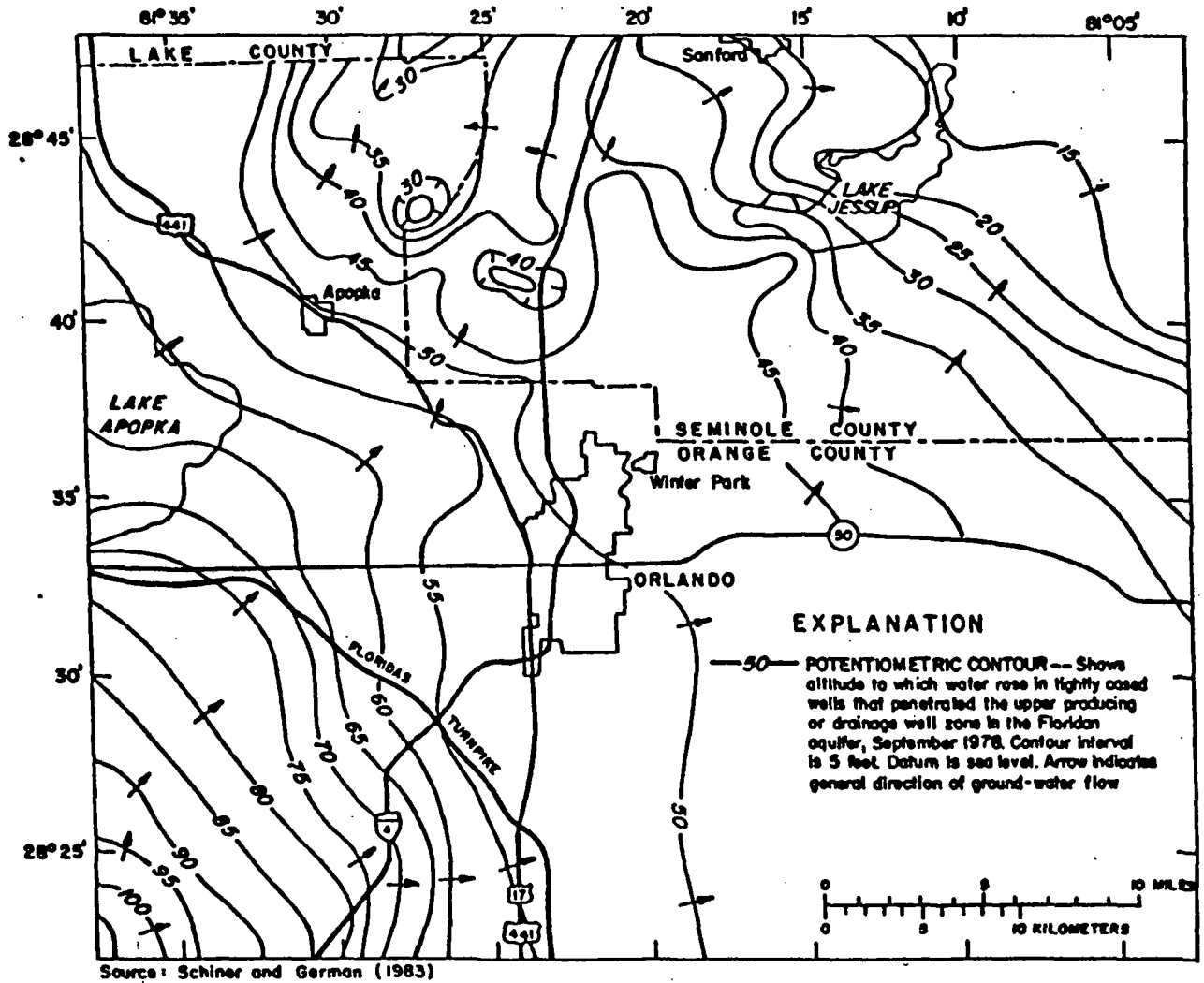


Figure 2-4. Lithologic Profile

Brown and Caldwell Consultants



Source: Schiner and German (1983)

Brown and Caldwell Consultants

Figure 2-5. Potentiometric Surface of the Upper Floridan Aquifer

2.7 WATER QUALITY

The quality of groundwater in the unconfined aquifer can exhibit considerable variation depending on a number of factors, including the composition of the aquifer, shallow soil conditions, and proximity to sources of surface contamination (i.e., farmland fertilizers, irrigation canals, effluent disposal, septic tanks, industrial waste disposal, etc.) Normally, the unconfined aquifer in this area is not used for potable water supply. However the unconfined aquifer is classified as G-II groundwater and, therefore, discharges to the aquifer must meet water quality criteria for a potable water supply source.

CHAPTER 3.0

FIELD INVESTIGATION METHODS

Field investigation methods were designed to provide data necessary to determine the degree and extent of soil and groundwater contamination at the site, and to assess the hydrogeology of the site. The activities conducted at the site included site clearing, a ground penetrating radar survey, groundwater monitor well installation and sampling, soil and sediment sampling, and aquifer testing. Each method is described in the following sections.

3.1 SITE CLEARING

Site clearing activities were conducted from August 20 to August 25, 1990. The objective of the site clearing operation was to remove inert debris and dense vegetation from the northern and western portions of the site to facilitate subsequent field investigation activities. OHM Corporation was contracted to complete this phase of the project. A Brown and Caldwell representative was present on site during all of the clearing operations.

A decontamination area was constructed on the concrete helicopter pad, located in the northwest area of the facility. A 490D track hoe and bobcat loader were utilized to sort and stage site debris prior to decontamination. Decontamination consisted of using a steam cleaner to remove any dirt or residue from the surface of the debris. Specific site debris included scrap wood, fencing, telephone poles, machine parts, scrap metal, and automobile parts. Drums present on the site containing free liquid were placed on visqueen in the truck service bays for temporary storage. In addition, wastewater generated by the decontamination operation was collected in drums which were also moved to the truck service bays for temporary storage. All empty drums found on site were decontaminated with a high pressure steam cleaner, crushed and then loaded into 20-yard roll-off containers with the other site debris and shipped for offsite disposal at the Orange County landfill. A total of five roll-off containers were filled and sent for disposal. A bushhog, equipped with a water spray attachment to minimize fugitive dust emissions, was then used to cut the vegetation (shrubs, weeds, grass, etc.) present on the site.

3.2 GROUND PENETRATING RADAR SURVEY

A ground penetrating radar (GPR) survey was completed at the site using the services of Detection Sciences, Inc., of Boston, Massachusetts. The survey took place over two days (September 6 - 7, 1990).

The GPR system is an echo-location system which emits a brief impulse of radio energy lasting only a few nanoseconds. The length of time it takes for the radar echoes to return to the antenna corresponds to the depth below the surface the radar wave has travelled. By recording these depth dependent echoes on a scanning time-based chart recorder, a vertical

profile of the ground is generated. This vertical profile shows the longitudinal distribution of subsurface strata and other features over which the radar antenna has passed.

At the interface of two materials, the radar impulse undergoes an abrupt change in velocity. It is this change in velocity which allows the identification of subsurface strata and other buried materials.

The field procedure involves establishing a grid over which the radar antenna is towed. The grid is spaced to give maximum coverage of the site. The antenna is towed by a survey van which is equipped with a strip-chart recorder, tape recorder and electronic controls. A fifth wheel odometer at the back of the van automatically logs the distance travelled.

Grid lines were established using previously surveyed north/south and east/west lines. The grid was marked with 10-foot centers. Occasional deviations from the grid lines were necessary to avoid objects that would impede the GPR antenna. The portion of the site incorporating the rinsate ponds was run on a 5-foot grid to give 100 percent coverage.

The strip chart records and the tape recorded data were evaluated by Detection Sciences, Inc., and submitted in a report to Brown and Caldwell. A subsurface map was generated (Figure 3-1) to aid in selection of the location of several soil borings. The GPR report is contained in Appendix B.

See Figure 3-1

3.3 GROUNDWATER MONITOR WELL INSTALLATION AND SAMPLING

Fourteen groundwater monitor wells were installed at the site to determine the degree and extent of groundwater contamination. Of the fourteen monitor wells, nine are 17-feet deep, wells M and P are 22-feet deep, and F, G, ad K are 33-feet deep. Locations of wells are given on Figure 3-2. The drilling was performed by a licensed well drilling contractor (Groundwater Protection, Inc. of Orlando, FL) under the supervision of a Brown and Caldwell geologist.

See Figure 3-2

Prior to drilling, the exclusion zone was delineated with yellow caution tape and areas were set aside for staging, support and decontamination. All drilling was conducted under level 'C' personal protective equipment and work and break schedules were established to reduce the possibility of heat stress. During drilling, the work zone and drill cuttings were continuously monitored with an OVA to detect volatile organics in the area.

Drilling began on September 10, 1990. Each monitor well was logged and described by the onsite Brown and Caldwell geologist as it was being drilled. Data included in the well drilling log is as follows:

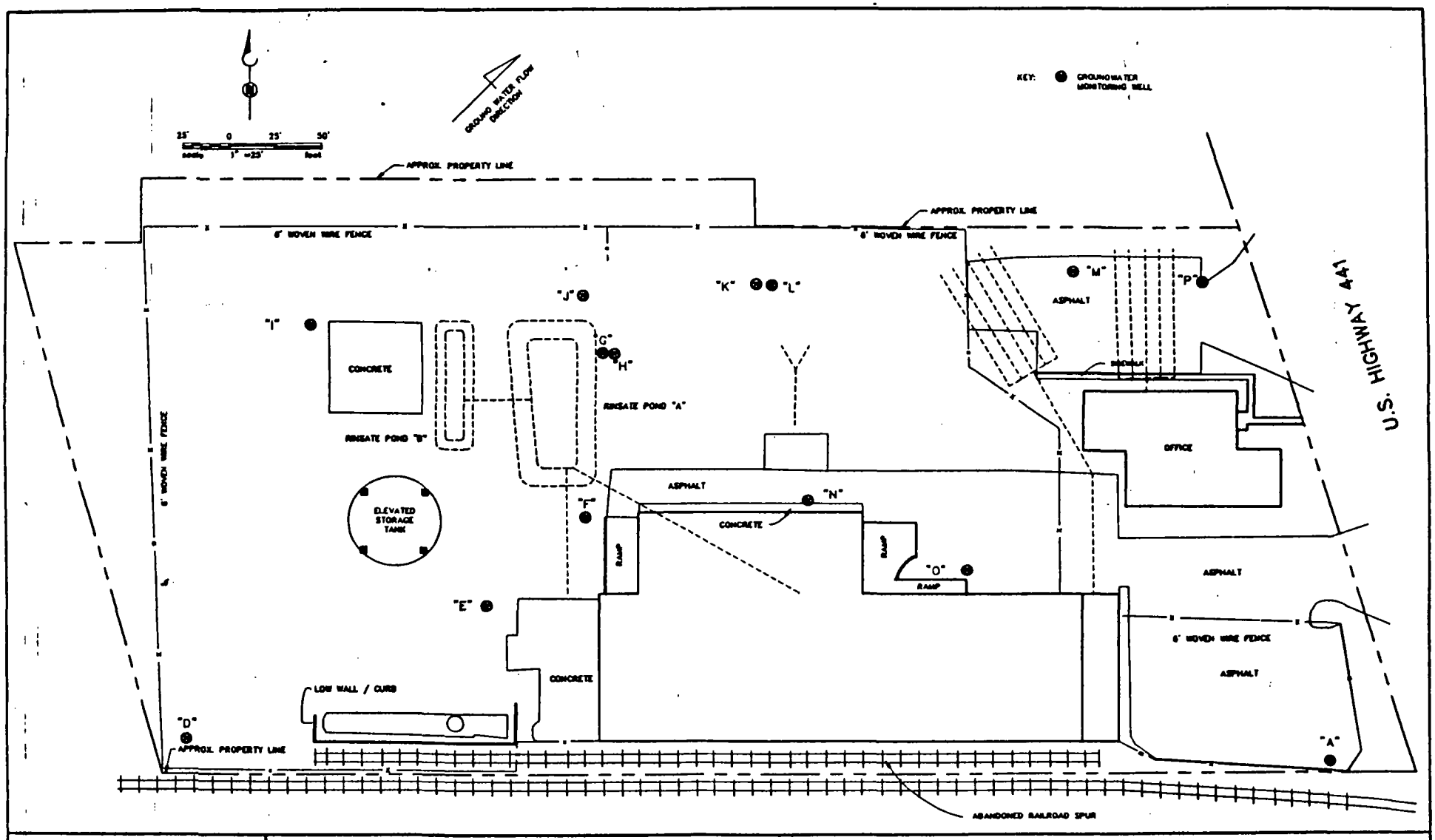


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Figure 3-2. Groundwater Monitoring Well Locations

1. depth intervals in feet and tenths of feet;

2. drill cutting descriptions including soil/rock classification, secondary components and estimated percentage, color, plasticity, and estimate of relative moisture content;

3. depth to water as it was first encountered during drilling;

4. drilling equipment used;

5. drilling sequence;

6. special problems;

7. dates for start and completion of each well;

8. lithologic contacts; and

9. blow counts for each split spoon sample taken.

Drilling logs are included in Appendix A.

All wells were installed using hollow stem auger drilling techniques. Two-foot split spoon samples were collected at 5-foot intervals for logging and description. The deep wells were drilled with a continuous flight auger which allowed for a lithologic description of the entire depth of the well. In well locations that were covered with concrete, the concrete was first cut out with a concrete saw to prevent damage to the auger head and to prevent transport of contaminants from the surface down into the hole.

The wells were constructed using 2-inch diameter Schedule 40 polyvinyl chloride (PVC) monitor well casing and 2-inch diameter .010 slot size, Schedule 40 mill slotted PVC screen. All PVC casing had mill-threaded flush joints; no glue or heat welded joints were used.

The annular zone around the monitor well casing was filled with 20/30 Silica sand to 2 feet above the screen. A 1 -to-2-foot bentonite seal was tremmied into the annular space above the sand pack. One gallon of deionized water was poured over the pellets for hydration. The pellets were allowed to hydrate a minimum of eight hours before the remaining annulus was cement-grouted to the land surface.

A 2-foot by 2-foot by 4-inch concrete pad was installed to prevent percolation. A 6-inch square locking steel protective casing was installed at land surface to prevent unauthorized access to the well. Weepholes were drilled at the bottom of the protective casing. Each well was labeled with indelible ink on the PVC casing riser inside the locking steel cover for identification. An example well completion log is shown in Figure 3-3. Well completion logs are presented in Appendix A.

See Figure 3-3

All drilling equipment was thoroughly decontaminated between each borehole. Decontamination procedures include:

1. Steam cleaning and wire brushing to remove particulate matter and surface films.
2. Clean with tap water and laboratory detergent.
3. Rinse with tap water.
4. Rinse with deionized water.
5. Rinse with pesticide grade isopropanol.
6. Rinse with organic free deionized water and allow to air dry as long as possible.
7. Wrap with aluminum foil if equipment must be stored or transported.

All PVC materials were ink-free and decontaminated in the same manner minus the isopropanol rinse. Latex gloves were used when handling all decontaminated material.

Well Development. After allowing the cement pad around each well to cure overnight, the wells were developed using a centrifugal pump until the water was clean and sediment free, or until temperature, pH and specific conductivity stabilized. Dedicated suction hoses were used for each well and the development water was disposed of onsite. Several wells had pungent odors and would not clear on development. The water from these wells was contained in 55-gallon drums and stored in the truck service bays onsite.

The following information was recorded in the log book for each well:

1. Well designation
2. Date of installation
3. Date of development
4. Static water level
5. Specific conductance, temperature and pH taken during development
6. Depth of well from top of casing
7. Screen length
8. Characteristics of water removed - odor, color, turbidity
9. Description of surge technique
10. Quantity of water removed

WELL COMPLETION LOG

PROJECT: _____

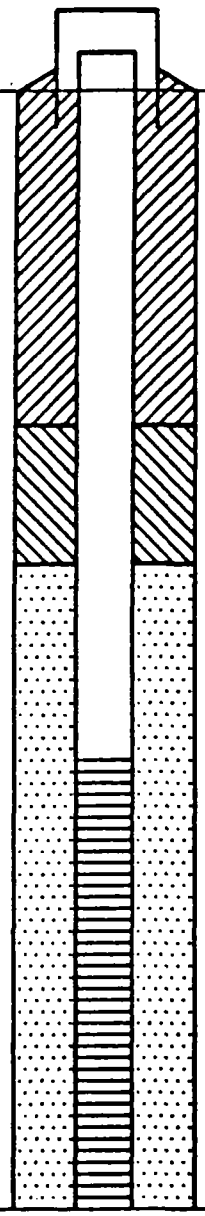
WELL NUMBER: _____

DRILLING METHOD: _____

PROTECTIVE CASING HEIGHT

_____ (FEET ALS) _____

LAND SURFACE



CASING: _____

GROUT: _____

MATERIALS USED:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ TOP OF BENTONITE

(FEET BLS) _____

_____ TOP OF SAND PACK

(FEET BLS) _____

_____ TOP OF SCREEN

(FEET BLS) _____

SCREEN: _____

SLOT: _____

SAND: _____

TOTAL DEPTH

(FEET BLS) _____

COMPLETION DATE: _____

LOGGED BY: _____

Brown and Caldwell Consultants

Figure 3-3. Well Completion Log

Groundwater Sampling. The groundwater monitor wells were sampled to determine the degree and extent of groundwater contamination at the site. Sampling took place after the wells had reached equilibrium (at least 5 days after development). Standard operating procedures as specified in Standard Operating Procedures and Quality Assurance Manual, USEPA, Region IV, were implemented.

Groundwater sampling began on October 15, 1990. Well depths from top of casing and depths to water from top of casing were measured and recorded. Casing volume was calculated using the equation:

$$V = .041d^2h$$

V = volume of casing in gallons
d = diameter of well in inches
h = depth of water in well in feet

Three to five well volumes of water were purged from each well using a dedicated suction hose and a peristaltic pump. A decontaminated stainless steel bailer was used to sample the well and separate disposable gloves were used for each well. Sampling equipment was decontaminated by the following procedure:

1. Clean with tap water and detergent, steam clean if necessary.
2. Rinse thoroughly with deionized water.
3. Rinse with the pesticide grade isopropanol.
4. Rinse with organic free deionized water and allow to air dry as long as possible.
5. Wrap with aluminum foil if equipment is to be stored or transported.

Sampling and purging equipment was prevented from ground contact after decontamination by wrapping in aluminum foil or placing on polyethylene sheeting until use.

Temperature, pH and specific conductance were measured during purging of the well. Instruments were calibrated using laboratory standards. Samples were collected from wells suspected of being free of contamination before sampling wells suspected or known to contain contaminants.

Data collected during sampling included:

1. well designation
2. date and time of sampling
3. well depth and static water level
4. pumping rate and volume of water removed
5. water quality measurements
6. sample tag numbers and laboratory analysis to be performed.

Samples to be analyzed for metals were preserved with nitric acid and the pH was measured by pouring a small amount of sample over the pH paper. pH was adjusted with nitric acid to < 2.0.

Quality assurance/quality control (QA/QC) samples were collected and sent to the laboratory. One trip blank accompanied each cooler of samples. One equipment blank, one field blank and three duplicate samples were taken. The equipment blank was taken by pouring deionized organic free water through a decontaminated bailer into the sample jars. The field blank was taken by pouring deionized organic free water directly into the sample jars. The duplicate samples were taken by alternating bottle filling for each analyte.

Sample jars were tagged with Brown and Caldwell labels, taped if appropriate, sealed with a custody seal, and finally taped in plastic bags and logged on a chain-of-custody form. Samples were stored in coolers at 4 degrees Celsius (on ice) and shipped overnight via Federal Express to the laboratory.

Spikes and blanks provided by the EPA's Technical Assistance Team (TAT) representative were included for laboratory analysis.

3.4 SOIL SAMPLING

A total of 40 soil samples and one pond sediment sample were taken to determine location, degree and extent of soil contamination. Samples were taken using a stainless steel spoon, a stainless steel hand auger or a drill rig and split spoon sampler, depending on depth of the sample. Staging, support and decontamination areas were set up prior to sampling. Areas covered by concrete were cut using an air hammer to allow access to the soil underneath.

Soil sampling techniques followed standard operating procedures as specified in Standard Operating Procedures and Quality Assurance Manual, USEPA, Region IV. When soil samples were taken from an auger, the top third of the bucket contents were discarded prior to collecting the sample from the auger. The VOA sample fraction was placed directly into the sample container without mixing. The soil removed from the bucket was placed in a decontaminated pyrex pan and mixed using the quarter-mix method. Composite samples were taken using one auger and all contents placed in one pan and mixed together before placing in sample jars. The VOA fractions was taken from each auger bucket before the soil was placed in the pan for mixing. Sampling equipment was decontaminated between samples by the following procedure:

1. Clean with tap water and detergent, steam clean if necessary.
2. Rinse thoroughly with deionized water.
3. Rinse with the pesticide grade isopropanol.
4. Rinse with organic free deionized water and allow to air dry as long as possible.
5. Wrap with aluminum foil if equipment is to be stored or transported.

Sampling procedures and data were recorded in the field logbook. Data collected at the time of sampling included:

1. Sample site number and location;

2. Date and time;

3. Pertinent sample and boring observations, including depth, odor, soil composition, penetration rate of auger, etc.; and

4. Ambient air quality readings measured by an OVA.

Soil boring locations are shown on Figures 3-4 and 3-5. Two sample locations were modified from those specified in the Work Plan (Brown and Caldwell, July, 1990). Sample location 16 was moved northward due to the location of the helicopter pad, and sample location 14-4 was moved into line with 14-1 since it was possible to sample under the water tower.

See Figures 3-4 and 3-5

Depth intervals for each boring are shown in Table 3-1. Borings with more than one sample interval were made using one split spoon and both samples were taken before moving to the next location. The drill rig was decontaminated between each boring location by the procedure described in Section 3.3.

See Table 3-1

Soil sampling began on October 3, 1990. Hand-augering was performed by Brown and Caldwell personnel. Split spoon sampling was conducted by a licensed well drilling contractor under the supervision of a Brown and Caldwell geologist.

Five samples were collected in addition to those specified in the Work Plan (Brown and Caldwell, July, 1990). A sample of a sludge-like material was taken from the sump around the above ground storage tank pad. Six soil borings were constructed around a possible underground storage tank to ten feet below land surface with each boring logged and monitored by an OVA. Two discreet samples were taken from this area for analysis.

A sediment sample was taken from the stormwater retention pond located adjacent to the site at North Brothers Insulation Company, west of the site. This sample was a composite of four locations within the pond. A fifth additional sample was taken at the far southwest corner of the site beside the rail spur.

QA/QC blanks and duplicates were taken in accordance with the work plan. Equipment blanks were taken by pouring deionized water through a decontaminated auger into sample jars. Field blanks were taken by pouring deionized water directly from the water tank into the sample jars. Duplicate samples were taken by alternating bottle filling for each analyte.

Table 3-1. Soil Sampling Depths

Sampling Location	Sampling Depth, feet BLS
1	0 - 0.5
2	0 - 0.5
4A	0 - 0.5
4B	1.5 - 2.0
5A	0 - 0.5
5B	1.5 - 2.0
6	0 - 0.5
7	0 - 0.5
8	0 - 0.5
9[a]	0 - 0.5
10[a]	1.5 - 2.0
11[a]	1.5 - 2.0
12[a]	1.5 - 2.0
13[a]	1.5 - 2.0
14[a]	1.5 - 2.0
15[a]	1.5 - 2.0
16[a]	1.5 - 2.0
17A	4.5 - 5
17B	7.5 - 8
18A	4.5 - 5

Table 3-1. Soil Sampling Depths (Cont.)

Sampling Location	Sampling Depth, feet BLS
18B	7.5 - 8
19	4.5 - 5
20	4.5 - 5
21	4.5 - 5
22A	4.5 - 5
22B	7.5 - 8
23A	4.5 - 5
23B	7.5 - 8
24[a]	1.5 - 2.0
25[a]	1.5 - 2.0
26[a]	1.5 - 2.0
27	4.5 - 5
28[a]	1.5 - 2.0
29[b]	4.5 - 5
30	0 - 0.5
31[b]	4.5 - 5
35	0 - 0.5

[a] Composite sample comprised of four subsamples as shown on Figures 3-4 and 3-5.

[b] Composite sample comprised of two subsamples as shown on Figure 3-5.

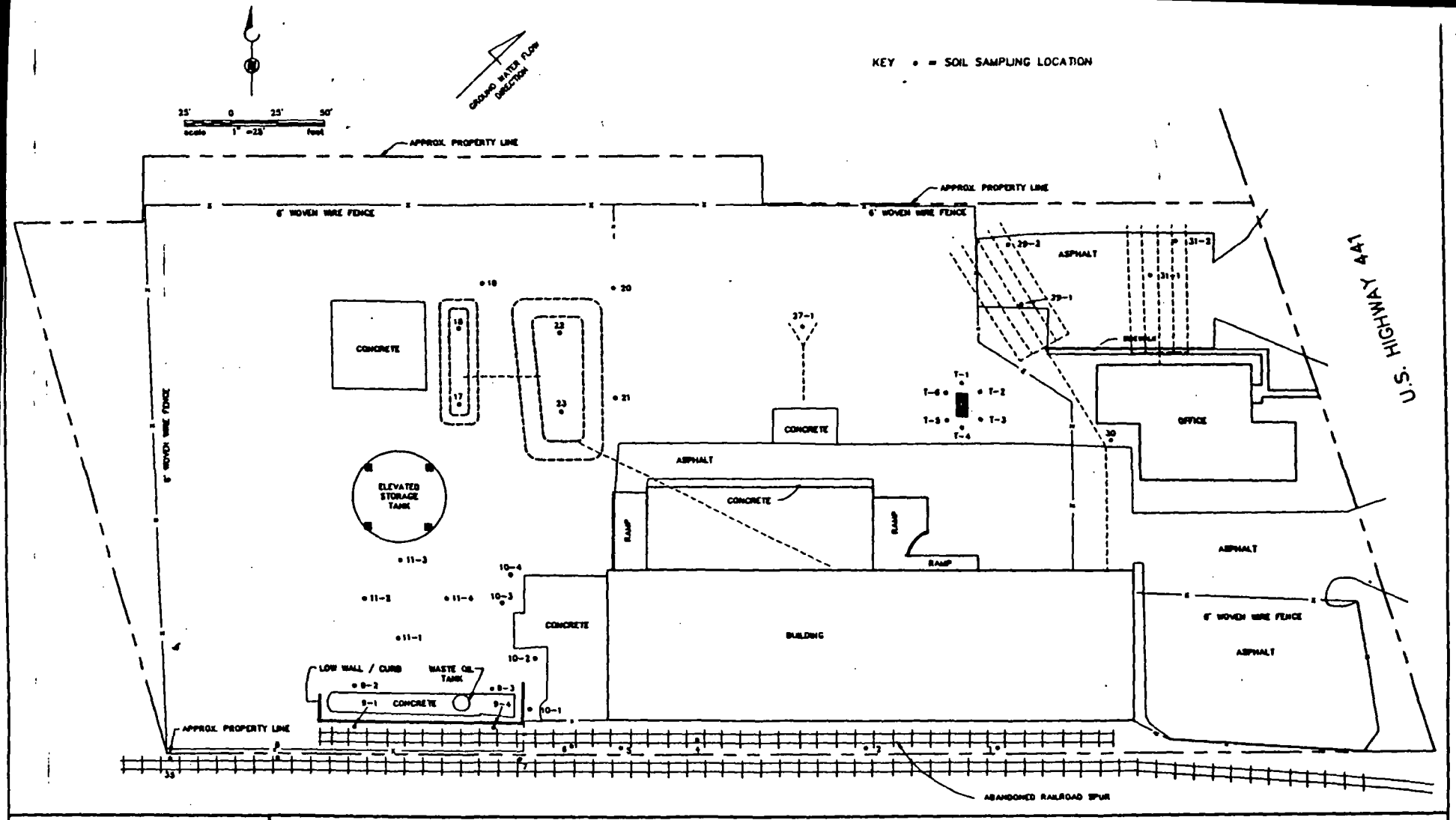


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Figure 3-5. Soil Sampling Locations

Sample jars were tagged with Brown and Caldwell labels, taped if appropriate, sealed with a custody seal and finally taped inside plastic bags and logged on a chain-of-custody form. Samples were stored in coolers at 4 degrees Celsius (on ice) and shipped overnight via Federal Express to the laboratory.

Spikes and blanks provided by EPA's TAT representative were included for analysis.

3.5 AQUIFER TESTING

To develop estimates of aquifer characteristics, slug testing was performed on monitor wells O, K and L. The slug test is a method for determining the hydraulic conductivity of formation material near a test well.

The slug test was conducted by creating an instantaneous change in water level in the well and recording the rate of recovery to the initial level. The slug was made using hollow PVC pipe filled with 20/30 silica sand and capped on both ends. The PVC pipe was decontaminated and had all ink removed. The slug length was 10.05 feet and the diameter was 0.16 feet.

Water level and depth of well measurements were made before introducing the slug into the well. After putting the slug in the well, the water level was allowed to stabilize and the slug was then removed from the well. Water level measurements were made until the well had recovered 90 percent of its static water level. Water level measurements were made using a standard water level indicator tape and time for each measurement was recorded.

CHAPTER 4.0

DATA PRESENTATION

4.1 SITE HYDROGEOLOGY

Information gathered during the September and October 1990 field investigations indicates that the site is underlain by fine to very fine quartz sands to a depth of approximately 33 feet. This sand horizon becomes saturated with water between 5 and 15 feet below land surface, forming an unconfined groundwater aquifer. Water table elevation contours suggest a northeasterly groundwater flow direction for the shallow portion of the aquifer beneath the site.

4.1.1 Water Table Elevations

All monitor wells were surveyed following installation to provide vertical elevation data accurate to 0.01 feet above mean sea level (MSL). Water level data collected during the October 15, 1990 monitor well sampling were correlated to this survey data to evaluate groundwater gradients and potential direction of migration. Surveyed elevation and water levels are presented in Table 4-1.

See Table 4-1

Water table elevation in the 7 to 17-foot screened zone appears to change by approximately 2 feet across the site in a predominantly northeastern direction, with a high point of approximately 95 feet MSL in the vicinity of monitor well D (MW-D). Potentiometric surface elevations in the 23- to 33-foot screened zone change by approximately 3.5 feet in a predominantly northern direction with a high point of approximately 97 feet MSL in the vicinity of monitor well F (MW-F). Water table and potentiometric surface elevation contours are presented on Figures 4-1 an 4-2.

See Figures 4-1 and 4-2

4.1.2 Aquifer Testing and Analysis

Permeability (slug) testing was performed on three monitor wells located on the site to determine the hydraulic conductivity of the saturated aquifer in the vicinity of each monitor well. The slug test is performed by quickly withdrawing a volume of water from each well and measuring the subsequent rate of rise of the water table elevation in each well.

Slug tests were performed on monitor wells O and L, which are 17 feet deep, and well K, which is 33 feet deep. The recovery (in feet) versus the time (in seconds) are plotted on semilogarithmic paper, and a straight line is drawn through the major portion of the plotted

TABLE 4-1. CHEVRON-ORLANDO WATER TABLE ELEVATIONS OCTOBER 15, 1990

WELL ID	SURVEYED ELEVATION	MEASURED WATER LEVEL	WATER LEVEL (referenced to MSL)
A	104.92	11.18	93.74
D	102.46	7.50	94.96
E	103.26	8.47	94.79
F	103.41	6.00	97.41
G	102.66	9.18	93.48
H	102.54	8.37	94.17
I	102.06	7.72	94.34
J	102.28	8.10	94.18
K	102.32	8.60	93.72
L	102.36	8.66	93.70
M	103.58	11.16	92.42
N	102.72	8.61	94.11
O	103.92	10.12	93.80
P	103.86	12.41	91.45

CONTOUR INTERVAL = 0.1 FOOT

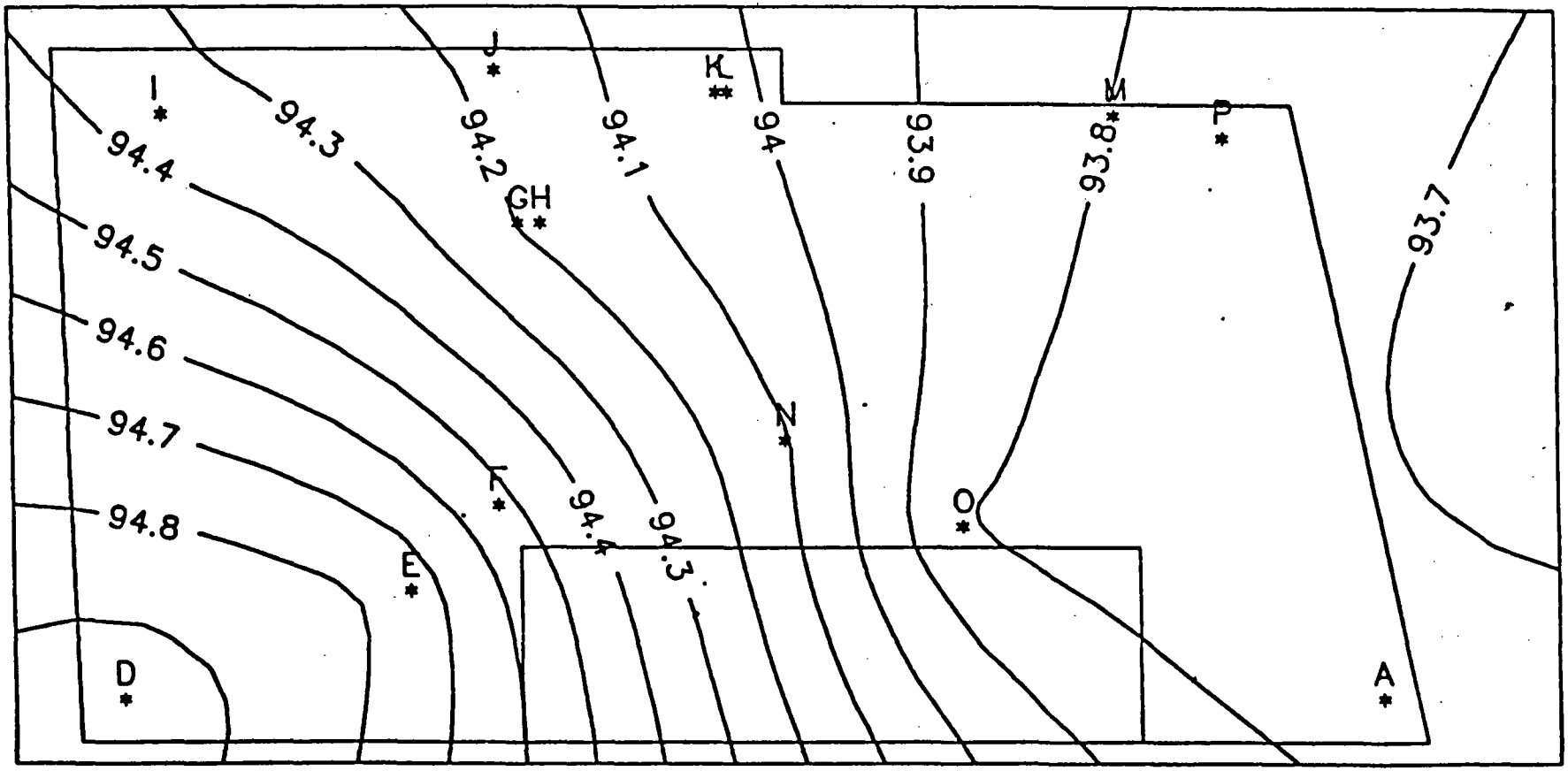

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Figure 4–1. Water Level Elevation, 7–17 Foot Screen Interval

CONTOUR INTERVAL = 1 FOOT

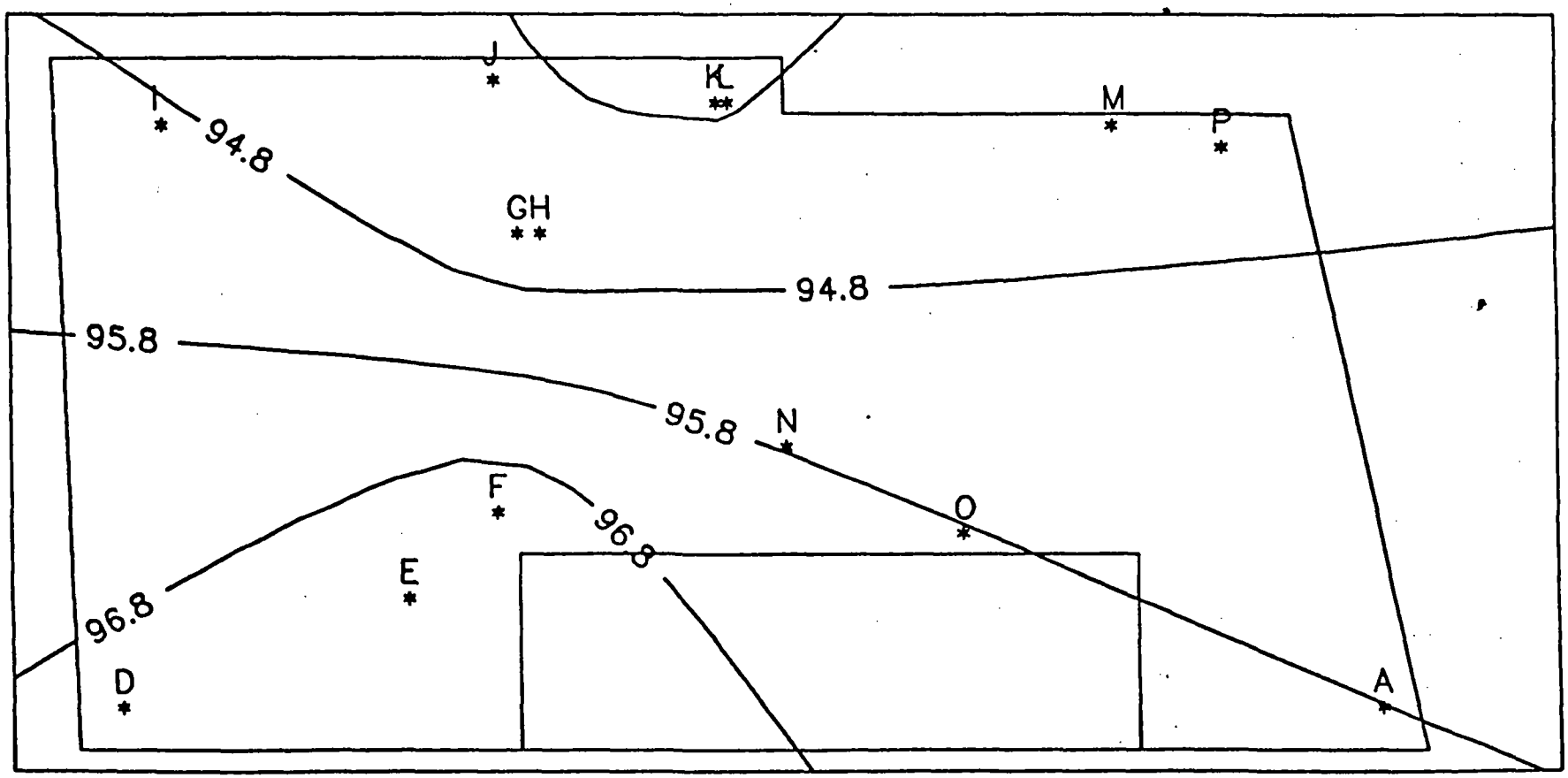

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Figure 4–2. Water Level Elevation, 23–33 Foot Screen Interval

curve. The Bower and Rice (1976) equation is then used to calculate hydraulic conductivity (k), as follows:

$$k = \left(\frac{r_c^2 \ln (R_e/r_w)}{2L_e} \right) \left(\frac{1}{t} \right) \left(\ln \frac{Y_0}{Y_t} \right)$$

where R_e = effective radial distance over which the head difference Y is dissipated,

r_w = radial distance between well center and undisturbed aquifer

L_e = height of screened section of the well through which groundwater enters,

Y_0 = water level at time zero,

Y_t = water level at time t, and

t = time since Y_0.

The time versus recovery plots for wells O, L, and K, and shown on Figures 4-3, 4-4, and 4-5, respectively. The calculated values of hydraulic conductivity are summarized in Table 4-2. The average value of hydraulic conductivity for the site is 3 feet per day. This value is typical for fine to medium grained silty sand.

See Figures 4-3, 4-4, & 4-5 and Table 4-2

4.2 SOIL SAMPLE ANALYTICAL RESULTS

Soil samples were collected to determine the degree and extent of soil contamination in potential contaminant source areas (e.g., rinsate pond area), and to screen the northern and western portions of the site for contamination. These samples were collected and analyzed for combinations of volatile and semivolatile organic compounds, organochlorine and organophosphate pesticides, polychlorinated biphenyls (PCBs), chlorinated herbicides, arsenic, chromium, and zinc, depending on location and suspected activity.

Soil samples can be generally categorized into four groups:

- shallow (1.5 - 2.0 ft. depth) composite samples collected by the hand-auger method to generally characterize the northern and western portions of the site, including the above ground storage tank area, outside operations area, and barrel storage area,

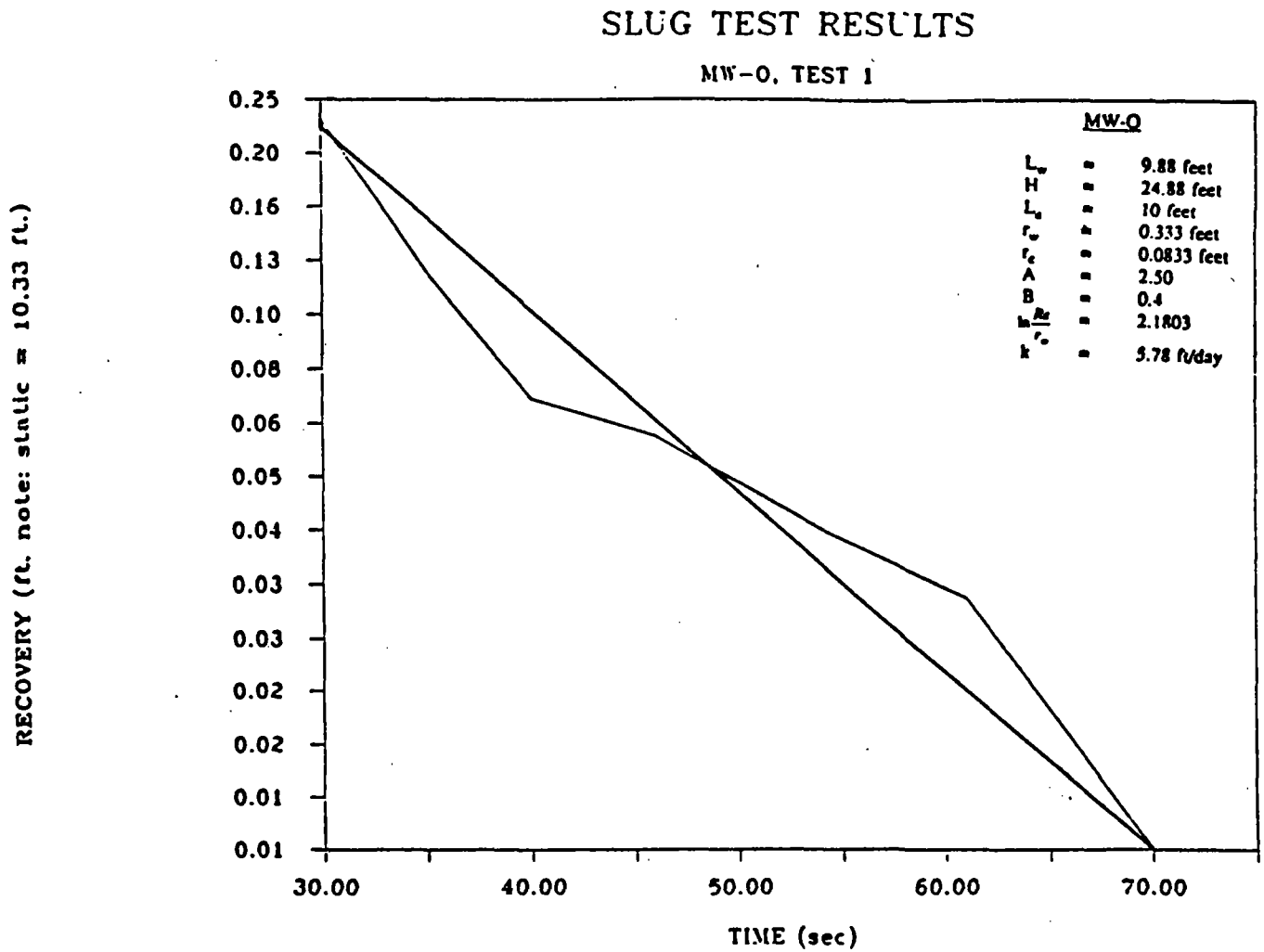

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Figure 4-3. Time Versus Recovery in Well MW-O

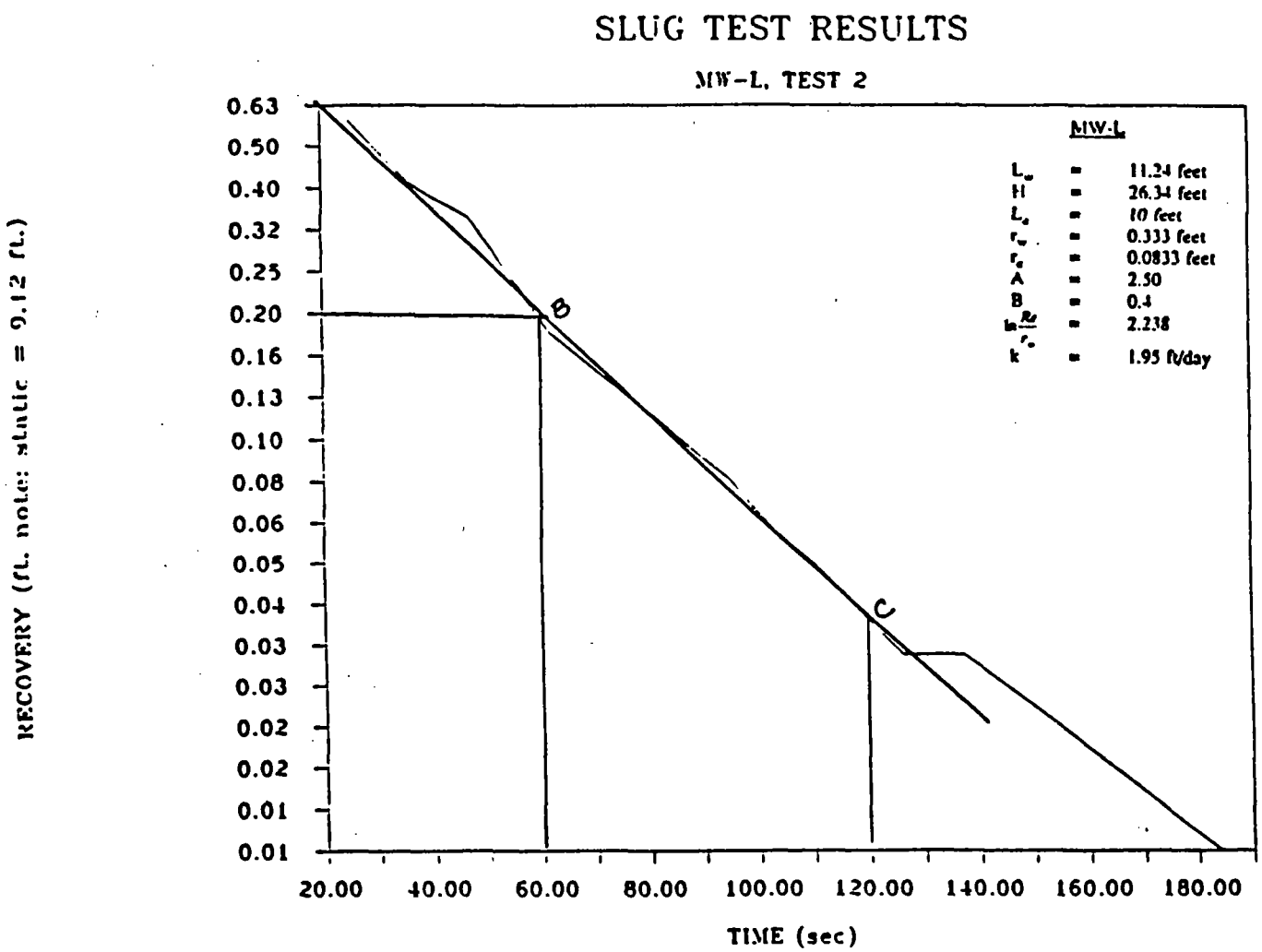

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Figure 4-4. Time Versus Recovery in Well MW-L

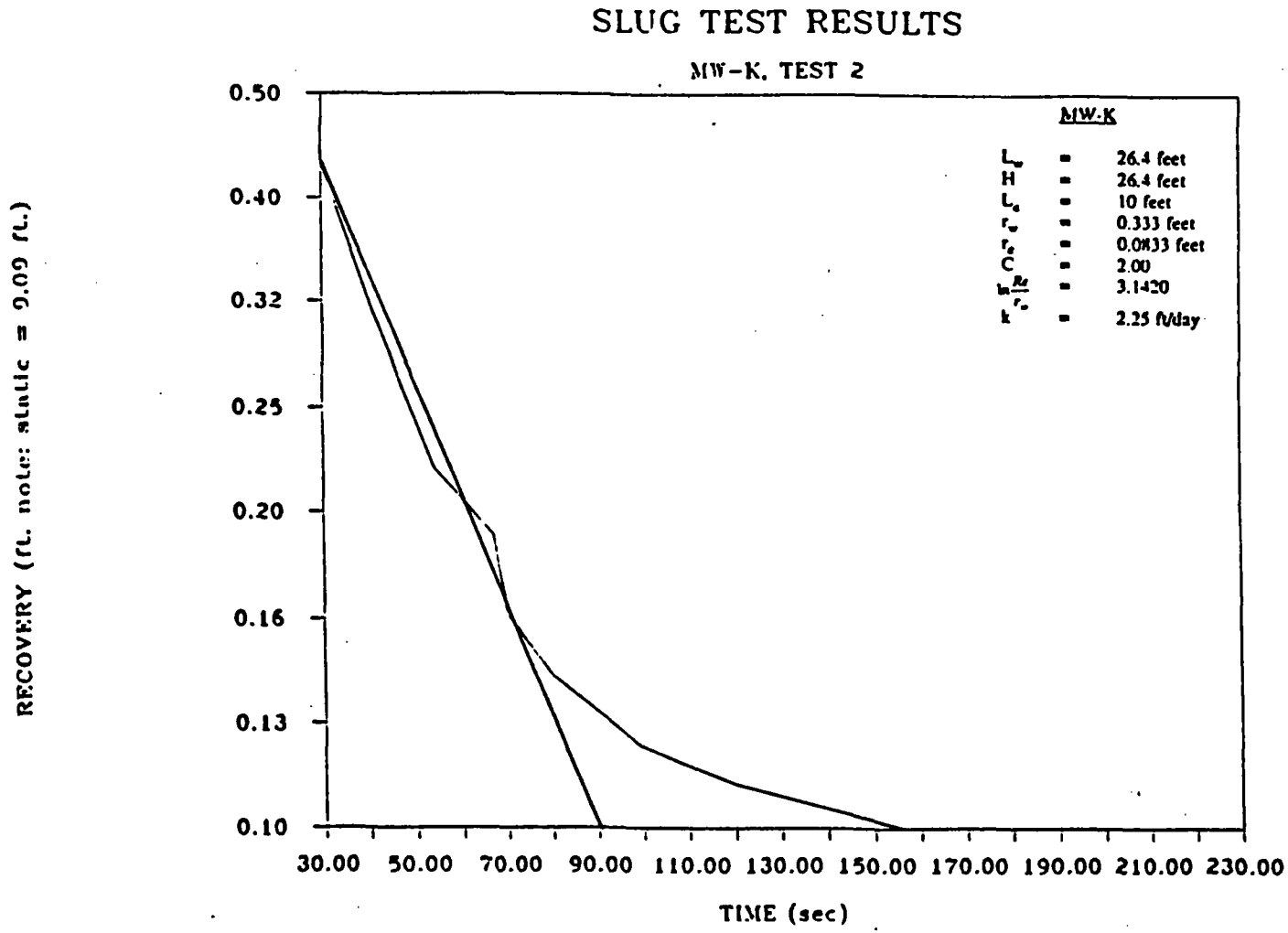

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Figure 4-5. Time Versus Recovery in Well MW-K

TABLE 4-2

WELL NUMBER	HYDRAULIC CONDUCTIVITY (feet/day)
O	5.78
L	1.95
K	2.25

Arithmetic Mean	3.33
Geometric Mean	2.94

- deep (4.5 - 5.0 ft and 7.5 - 8.0 ft depth) samples collected with split-spoon samplers to generally characterize the area in and around the rinsate pond and septic tank drainfields.

- samples collected at various depths by the hand-auger method to characterize the rail spur area.

- samples collected around the underground storage tank to investigate possible petroleum contamination.

4.2.1 Shallow Composite Samples

Shallow composite sample SB-09 (above ground storage tank area) and an additional sample of sludge taken from the inside the sump around the storage tanks were analyzed for purgeable organics (Methods 8010 and 8020) and semivolatile organics, organochlorine pesticides, and PCB's (Method 8270). Samples SB-10 (outside operations area) and SB-11 (barrel storage area) were analyzed for purgeable organics, semivolatile organics, organophosphate pesticides (Method 8140), chlorinated herbicides (Method 8150), arsenic (Method 7060), chromium and zinc (Method 6010).

Samples SB-12 through SB-16, -24, -25, -26, and -28 were analyzed for semivolatile organics, organophosphate pesticides, and chlorinated herbicides.

See Table 4-3

Although not a composite sample, SB-30, from a suspected parathion spill area is included with this sample grouping. SB-30 was analyzed for organophosphate pesticides only. The results of analysis for this group of samples are given in Table 4-3. All laboratory data are presented in Appendix C.

Volatile constituents ethylbenzene, toluene, xylene, and chlorinated benzenes were detected in SB-10, 11, and 26. The highest levels were detected in SB-26 at 19,700 micrograms per kilogram (µg/kg) total volatiles, predominantly xylene at 14,000 µg/kg, with chlorobenzene at 2400 µg/kg and lesser concentration of ethylbenzene, 1,4-dichlorobenzene and toluene. Volatile constituents may also be present in the sludge sample collected from the sump around the storage tanks. The laboratory reported that this sample was grossly contaminated with a suite of organic components, but was unable to identify specific compounds due to the high concentrations.

Organochlorine pesticides, predominantly chlordane, were detected in SB-12, 13, 15, 16, and 24 through 28. The highest level of chlordane was detected in SB-16 at 1,100,000 µg/kg. In addition to chlordane, SB-28 contained dieldrin (760 µg/kg), 4,4'-DDE (390 µg/kg), and 4,4'-DDT (980 µg/kg). SB-15 did not contain chlordane, but did contain heptachlor, dieldrin, 4,4'-DDE, 4,4'-DDT, and endrin for a total organochlorine pesticide content of 8,160 µg/kg. 4,4'-DDT was also detected in SB-13 at 410 µg/kg. 4,4'-DDD was detected at 51,000 µg/kg

Table 4-3. Chevron Orlando Site Assessment
Shallow Soil Sample Analytical Results
September, 1990

Parameter	Units	Sample Number Sludge	SB-09	SB-10	SB-11	SB-12	SB-13	SB-14	SB-15	SB-16	SB-24	SB-25	SB-26	DUP-26	SB-28	SB-30
Depth	Ft.	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0
Type (Composite or Grab)	--	C	C	C	C	C	C	C	C	C	C	C	C	C	C	G
Chlorobenzene	ug/kg	*	BDL	140	BDL	NA	NA	NA	NA	NA	NA	NA	2400	NA	NA	NA
1,3-Dichlorobenzene	ug/kg	*	BDL	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,4-Dichlorobenzene	ug/kg	*	BDL	200	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	970	BDL	BDL	BDL
Ethylbenzene	ug/kg	*	BDL	51	390	NA	NA	NA	NA	NA	NA	NA	1400	NA	NA	NA
Toluene	ug/kg	*	BDL	81	BDL	NA	NA	NA	NA	NA	NA	NA	930	NA	NA	NA
Xylenes	ug/kg	*	BDL	130	3300	NA	NA	NA	NA	NA	NA	NA	14000	NA	NA	NA
Heptachlor	ug/kg	*	*	BDL	*	BDL	BDL	BDL	460	*	*	*	*	*	BDL	BDL
Endosulfan I	ug/kg	*	*	BDL	*	BDL	BDL	BDL	BDL	117000	*	*	*	*	BDL	BDL
Dieldrin	ug/kg	*	*	BDL	*	BDL	BDL	BDL	1200	*	*	*	*	*	760	BDL
4,4'-DDE	ug/kg	*	*	BDL	*	BDL	BDL	BDL	1100	*	*	*	*	*	390	BDL
4,4'-DDD	ug/kg	*	*	BDL	*	BDL	BDL	BDL	BDL	*	*	*	*	51000	BDL	BDL
4,4'-DDT	ug/kg	*	*	BDL	*	BDL	410	BDL	4200	*	*	*	*	*	980	BDL
Endrin	ug/kg	*	*	BDL	*	BDL	BDL	BDL	1200	*	*	*	*	*	BDL	BDL
Chlordane	ug/kg	NA	NA	1300	*	4600	73000	BDL	BDL	1100000	760000	100000	87000	*	13000	BDL
Demeton-S	ug/kg	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL	420	BDL	BDL	BDL	BDL	BDL
Ethion	ug/kg	NA	NA	400	28	BDL	BDL	BDL	BDL	190000	54000	31	75	52	BDL	BDL
Arsenic	mg/kg	NA	NA	2.8	BDL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	mg/kg	NA	NA	4.6	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	mg/kg	NA	NA	6.9	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

BDL = below detectable limits
NA = not analyzed
* = detection limit extremely elevated due to matrix interference

in a duplicate sample of SB-26, but not in the original. Endosulfan I was found in SB-16 at 117,000 µg/kg.

No other compounds normally detected in Method 8270 were detected in this group of samples. In SB-09, 11, 16, and 24 through 26, detection limits were elevated by many orders of magnitude due to "matrix interference" that may mask the presence of other compounds.

Organophosphate pesticides were detected in SB-10, 11, 16, and 24 through 26, with the highest in SB-16 at 190,000 µg/kg. Ethion, not normally an analyte in Method 8140, accounted for all detected organophosphates with the exception of demeton-S detected in SB-24 at 420 µg/kg.

Detection limits for many of the organophosphates included in Method 8140 were elevated by several orders of magnitude. This, as indicated by the laboratory performing the analysis, may have been due to interference by the presence in the samples of high levels of other organophosphates (e.g. malathion, guthion, etc.) that are not included in Method 8140. Chlorinated herbicides were not detected.

Arsenic, chromium and zinc were detected in SB-10 at 2.8, 4.6, and 6.9 milligrams per kilogram (mg/kg) dry weight, respectively. SB-11 contained chromium and zinc at 1.3 and 3.9 mg/kg, respectively.

4.2.2 Deep Soil Samples

Samples collected at sample locations SB-17 through SB-23 (rinsate pond area) were analyzed for total volatile organics (Method 8010/8020), semivolatile organics, chlorinated pesticides, and PCB's (Method 8270), organophosphate pesticides (Method 8140), chlorinated herbicides (Method 8150), arsenic (Method 7060), chromium and zinc (Method 6010). SB-17 and 18, and SB-22 and 23 were sampled at two depth intervals: 4.5 - 5.0 feet, and 7.5 - 8.0 feet.

SB-27 (septic tank A area), SB-29 (septic tank B area) and SB-31 (septic tank C area) were sampled at a single depth interval of 4.5 - 5.0 feet. SB-29 and 31 were analyzed for total volatile organics, semivolatile organics, chlorinated pesticides, PCB's, arsenic, chromium, and zinc. SB-27 was analyzed for arsenic only. The results of sample analysis for this group of soil samples is given in Table 4-4. Laboratory data are presented in Appendix C.

See Table 4-4

All rinsate pond area samples contained petroleum-type volatile organics (ethylbenzene, toluene, and xylene). SB-17A, 17B, 18A, 19, 21, 22A, and 22B also contained volatile organics. Boring locations 22 and 23 contain total volatiles two to three orders of magnitude above the others. The highest level detected was SB-23B which contained xylene at 1,900,000 µg/kg. Low levels of xylene were also found in a duplicate sample of SB-29 (septic tank B area, 24 µg/kg) and SB-31 (septic tank C area, 56 µg/kg).

Table 4-4. Chevron Orlando Site Assessment
Deep Soil Sample Analytical Results
September, 1990

Parameter	Units	Sample Number SB-17A	SB-17B	SB-18A	SB-18B	SB-19	SB-20	SB-21	SB-22A	SB-22B	SB-23A	SB-23B	SB-27	SB-29	DUP-29	SB-31
Depth	Ft.	4.5-5.0	7.5-8.0	4.5-5.0	7.5-8.0	4.5-5.0	4.5-5.0	4.5-5.0	4.5-5.0	7.5-8.0	4.5-5.0	7.5-8.0	4.5-5.0	4.5-5.0	4.5-5.0	4.5-5.0
Type (Composite or Grab)	--	G	G	G	G	G	G	G	G	G	G	G	G	C	C	C
Chlorobenzene	ug/kg	710	900	610	BDL	760	BDL	1800	130	300	BDL	*	NA	BDL	BDL	BDL
1,3-Dichlorobenzene	ug/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	*	NA	BDL	BDL	BDL
1,4-Dichlorobenzene	ug/kg	3200	3800	BDL	BDL	BDL	BDL	3600	BDL	BDL	BDL	*	NA	BDL	BDL	BDL
Ethylbenzene	ug/kg	2300	360	2100	510	BDL	BDL	1500	2200	64000	14000	*	NA	BDL	BDL	BDL
Toluene	ug/kg	480	220	BDL	BDL	690	BDL	720	380	490	620	*	NA	BDL	BDL	BDL
Xylenes	ug/kg	1600	4200	10000	3500	19000	26	6200	190000	470000	100000	1900000	NA	BDL	24	56
4,4'-DDD	ug/kg	68000	48000	17000	21000	180000	*	51000	*	40000	120000	92000	NA	BDL	BDL	BDL
Chlordane	ug/kg	*	*	26000	*	170000	*	*	170000	250000	*	470000	NA	BDL	BDL	BDL
2-Methylnaphthalene	ug/kg	*	*	*	*	*	*	*	*	16000	41000	*	NA	BDL	BDL	BDL
bis(2-Ethylhexyl) phthalate	ug/kg	*	*	*	*	*	*	*	*	*	*	*	NA	BDL	BDL	76000
Chlorpyrifos	ug/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1300	NA	NA	NA	NA
Demeton-O	ug/kg	62	82	170	170	210	BDL	BDL	220	200	490	1500	NA	NA	NA	NA
Demeton-S	ug/kg	200	220	57	57	1400	BDL	BDL	230	BDL	1100	210	NA	NA	NA	NA
Ethoprop	ug/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	23	NA	NA	NA	NA
Naled	ug/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	50	BDL	680	NA	NA	NA	NA
Phorate	ug/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	28	58	NA	NA	NA	NA
Arsenic	mg/kg	BDL	1.1	BDL	1.6	3.5	BDL	BDL	1.2	1.7	BDL	BDL	1.4	1.3	1.1	BDL
Chromium	mg/kg	6.7	12	4.2	10	13	6.1	3.6	2.9	14	2.7	13	NA	5.4	5	1.4
Zinc	mg/kg	16	3	2.6	4.3	BDL	BDL	BDL	13	52	7.8	7.4	NA	2.8	2.6	BDL

BDL = below detectable limits
NA = not analyzed
* = detection limit extremely elevated due to matrix interference

With the exception of SB-20, all samples from the rinsate pond area contained significant levels of chlorinated pesticides. SB-17A, 17B, 18A, 18B, 19, 21, 22B, 23A, and 23B all contained 4,4'-DDD with the highest detected level in SB-19 (180,000 µg/kg), and the lowest in SB-18A (17,000 µg/kg). Chlordane was detected in SB-18A, 19, 22A, 22B, and 23B. SB-23B exhibited the highest detected level of chlordane (470,000 µg/kg), while SB-18A was lowest (26,000 µg/kg). Other chlorinated pesticides may have been present, but were below elevated detection limits imposed by matrix interference. No chlorinated pesticides were detected in the septic tank areas.

Rinsate pond area samples exhibited elevated detection limits for all Method 8270 analytes, and the presence of semivolatile organics may be masked by matrix interference in this area. 2-Methylnaphthalene was detected in SB-22B (16,000 µg/kg) and SB-23A (41,000 µg/kg). SB-31 (septic tank C area) contained bis(2-ethylhexyl) phthalate at 76,000 µg/kg.

Organophosphate pesticides were detected in all rinsate pond area samples except SB-20 and 21. Demeton-O and demeton-S were detected in all samples with detected organophosphates, with highest detections in SB-19 (demeton-S, 1,400 µg/kg) and SB-23B (demeton-O, 1,500 µg/kg). Naled was detected in SB-22B (50 µg/kg) and SB-23B (680 µg/kg). Phorate was detected in SB-23A (28 µg/kg) and SB-23B (58 µg/kg).

SB-23B also contained chlorpyrifos (1,300 µg/kg) and ethoprop (23 µg/kg). The laboratory performing the analysis indicated that additional organophosphates not included in Method 8140, predominantly ethion, were also present in the rinsate pond area samples.

Chlorinated herbicides were not detected.

Arsenic was detected in SB-17B, 18B, 19, 22A, 22B, 27, and 29 with the highest level detected in SB-19 (3.5 mg/kg). Chromium was detected in all samples, with a maximum of 14 mg/kg in SB-22B. Zinc was detected in all samples except SB-19, 20, 21, and 31. SB-17 contained 16 mg/kg, the highest level detected.

4.2.3 Rail Spur Area

See Table 4-5

Samples collected in the rail spur area, SB-1, SB-2, SB-4 through SB-8, and SB-35, were analyzed for total volatile organics (Method 8010/8020), semivolatile organics (Method 8270), organochlorine pesticides and PCB's (Method 8080) organophosphate pesticides (Method 8140), arsenic (Method 7060), chromium, and zinc (Method 6010). SB-1, 2, 6, 7, and 8 were sampled from a depth interval of 0.0 - 0.5 feet. SB-4 and 5 were sampled from two depth intervals, 0.0 - 0.5 feet and 1.5 - 2.0 feet. SB-3 was not sampled for reasons described in Chapter 1. The results of this sampling are given in Table 4-5. Laboratory data are presented Appendix C.

Table 4-5. Chevron Orlando Site Assessment
Rail Spur Area Soil Sample Analytical Results
September, 1990

Parameter	Units	Sample Number SB-01	SB-02	SB-04A	SB-04B	SB-05A	SB-05B	SB-06	SB-07	SB-08	SB-35
Depth	Ft.	0-0.5	0-0.5	0-0.5	1.5-2	0-0.5	1.5-2	0-0.5	0-0.5	0-0.5	0-0.5
Type (Composite or Grab)	--	G	G	G	G	G	G	G	G	G	G
Chlorobenzene	ug/kg	BDL	1400	BDL	580	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichlorobenzene	ug/kg	BDL	12000	570	970	BDL	BDL	BDL	BDL	BDL	BDL
1,3-Dichlorobenzene	ug/kg	BDL	840	120	140	BDL	BDL	BDL	BDL	BDL	BDL
1,4-Dichlorobenzene	ug/kg	BDL	28000	1500	2800	BDL	380	BDL	BDL	BDL	BDL
Ethylbenzene	ug/kg	BDL	BDL	7.7	1500	BDL	BDL	BDL	BDL	BDL	BDL
Xylenes	ug/kg	BDL	57000	7.7	1100	BDL	BDL	BDL	BDL	BDL	BDL
bis(2-Ethylhexyl)phthalate	ug/kg	BDL	610	*	*	*	350	*	*	*	BDL
gamma-BHC	ug/kg	550	BDL	76000	*	*	BDL	*	*	*	BDL
delta-BHC	ug/kg	10000	2500	130000	*	*	BDL	*	320000	*	BDL
beta-BHC	ug/kg	11000	1700	48000	*	*	BDL	*	81000	*	BDL
alpha-BHC	ug/kg	420	BDL	2100000	*	*	BDL	*	72000	*	BDL
Heptachlor	ug/kg	BDL	580	*	*	*	BDL	*	*	*	BDL
Aldrin	ug/kg	BDL	BDL	*	*	5100	BDL	*	*	*	BDL
Dieldrin	ug/kg	BDL	1400	*	*	3500	BDL	*	*	*	380
4,4'-DDE	ug/kg	1400	2300	40000	*	7700	BDL	14000	160000	*	BDL
4,4'-DDD	ug/kg	2200	1400	490000	56000	15000	BDL	18000	1600000	*	BDL
4,4'-DDT	ug/kg	4800	10000	*	*	*	BDL	13000	1800000	*	BDL
Chlordane	ug/kg	8200	13000	1400000	*	18000	BDL	*	160000	5100	43000
Ethion	ug/kg	BDL	BDL	140	650	BDL	BDL	BDL	BDL	BDL	BDL
Arsenic	mg/kg	13	6.3	11	27	38	31	22	86	BDL	BDL
Chromium	mg/kg	2.3	2	16	2.4	14	2.6	18	26	6.4	1.5
Zinc	mg/kg	15	BDL	410	3.7	38	3.1	9.7	200	58	8.1

BDL = below detectable limits
* = detection limit extremely elevated due to matrix interference

Xylene, and chlorinated aromatics were detected in SB-2 and both depth intervals at SB-4. The highest concentrations were detected in SB-2 with xylene at 57,000 µg/kg, chlorobenzene at 1,400 µg/kg, and dichlorobenzenes at a total of 40,840 µg/kg. Both depth intervals for SB-4 were lower by at least one order of magnitude. Ethylbenzene was also detected in both depth intervals of SB-4.

Organochlorine pesticides were detected in all rail spur area samples. BHC isomers were detected in SB-1 (21,970 µg/kg total), SB-2 (4,200 µg/kg total), SB-4, 0.0 - 0.5 foot interval (2,354,000 µg/kg total), and SB-7 (473,000 µg/kg total). Heptachlor was detected in SB-2 (580 µg/kg). Aldrin was detected in SB-5, 0.0 - 0.5 foot interval, (5,100 µg/kg). Dieldrin was detected in SB-2 (1,400 µg/kg), SB-5, 0.0 - 0.5 foot interval (3,500 µg/kg), and SB-35 (380 µg/kg). 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT were detected in SB-1 (1,400, 2,200, and 8,200 µg/kg), SB-2 (2,300, 1,400, and 10,000 µg/kg), SB-6 (14,000, 18,000, and 13,000 µg/kg), and SB-7 (160,000, 1,600,000, and 1,800,000 µg/kg). 4,4'-DDE and 4,4'-DDD were also detected in SB-4, 0.0 - 0.5 foot interval (40,000 and 490,000 µg/kg), and SB-5, 0.0 - 0.5 foot interval (7,700 and 15,000 µg/kg).

The only organochlorine pesticide detected in the 1.5 - 2.0 foot interval was 4,4'-DDD in SB-4 (56,000 µg/kg), however, matrix interference may have confounded detection of other compounds in this boring and in SB-5, 6, 7, and 8.

Ethion was the only organophosphate pesticide detected in this area, and was detected in SB-4 only at both depth intervals (140 µg/kg at 0.0 - 0.5 foot interval and 650 µg/kg at 1.5 - 2.0 foot interval). The laboratory has indicated that other organophosphates not analyzed in Method 8140 may also be present.

4.2.4 Underground Storage Tank

Six split spoon borings (TT-1 through TT-6) were constructed to a depth of ten feet around the underground storage tank. These borings were to be screened for organic vapor using an OVA. However, the OVA was not functioning properly, so two samples were selected (one from each end of the tank) for analysis as an alternate approach to investigating for possible petroleum hydrocarbon contamination. The two samples were analyzed for volatile aromatic hydrocarbons (Method 8020) and total petroleum hydrocarbons (Method 418.1). No analytes were detected in either sample.

4.3 SEDIMENT SAMPLE RESULTS

One composite sample of sediment was collected from the stormwater retention pond located on property adjacent to the western boundary of the site and approximately 150 feet north of the rail road spur. Four subsamples were collected on a transect across the long axis of the pond, and analyzed for volatile organic compounds (Method 8010/8020), organophosphate pesticides (Method 8140), chlorinated herbicides (Method 8150), arsenic (Method 7060), chromium and zinc (Method 6010). 2,4,5-TP (Silvex) was detected at 25 ug/kg.

Chromium and zinc were detected at 4.9 and 4.1 mg/kg. All other analytes were below detectable limits.

4.4 GROUNDWATER SAMPLE RESULTS

See Table 4-6

All wells were sampled and analyzed for volatile organic compounds (Method 8010/8020), semivolatile organic compounds (Method 8270), organochlorine pesticides and PCB's (Method 8080), organophosphate pesticides (Method 8140), chlorinated herbicides (Method 8150), arsenic (Method 7060), chromium and zinc (Method 6010). Analytical results are given in Table 4-6. Laboratory data are presented in Appendix C.

Volatile organic compounds, predominantly xylene, were detected in monitor wells E, F, G, H, I, J, K, L, N, and O. Wells F, H, J, L, and N contained chlorinated volatiles. Highest concentrations of total volatiles were detected in monitor well L (6,479 micrograms per liter - ug/l). Monitor wells H and J contained benzene concentrations (97 and 62 ug/l, respectively), and 1,1-dichloroethene concentrations (48 and 120 ug/l respectively) in excess of Florida drinking water standards. Monitor well J also contained 1,2-dichloroethane at 56 ug/l, exceeding Florida drinking water standards.

Naphthalene was detected in MW-E (26 ug/l). Isopherone was detected in MW-H (56 ug/l), MW-J (44 ug/l), and MW-L (56 ug/l). 2,4-dimethylphenol was detected in MW-H (47 ug/l), and phenol was detected in MW-H and L at 46 ug/l for each.

With the exception of samples collected from MW-A and K, organochlorine pesticides, predominantly BHC isomers, were detected in all groundwater samples. Maximum total concentrations were detected in MW-O at 111 ug/l. MW-J and O contained concentrations of gamma-BHC (lindane) in excess of Florida drinking water standards (18 and 17 ug/l, respectively). Endrin was also detected in excess of these standards in MW-H (1.5 ug/l) and MW-J (1.1 ug/l).

Demeton-O, an organophosphate pesticide, was detected in seven of the fourteen monitor wells, at concentrations ranging from 1.1 ug/l to 130 ug/l. Parathion and methyl parathion were detected in MW-P, at 110 ug/l and 0.16 ug/l, respectively.

Chlorinated herbicides were not detected in any samples.

Arsenic concentrations exceeded Florida drinking water standards in MW-H (0.092 mg/l) and MW-L (0.082 mg/l). Chromium concentrations were in excess of these standards in MW-G (0.17 mg/l), MW-H (0.051 mg/l), and MW-P (0.059 mg/l). Total metals concentrations were highest in samples collected from MW-G at 0.19 mg/l.

Table 4-6. Chevron Orlando Site Assessment
Groundwater Sample Analytical Results
September, 1990

Parameter	Units	Well Identification MW-A	DUP-A	MW-D	DUP-D	MW-E	MW-F	MW-G	MW-H	DUP-H	MW-I	MW-J	MW-K	MW-L	MW-M	MW-N	MW-O	MW-P
Screen Interval	Ft. BLS	7-17	--	7-17	--	7-17	22-32	23-33	7-17	--	7-17	7-17	23-33	7-17	12-22	7-17	7-17	12-22
pH	units	5.83	NA	6.42	NA	5.78	5.58	5.76	7.69	NA	6.08	7.03	5.4	6.99	6.15	6.12	5.52	4.99
Conductivity	umohs	195	NA	140	NA	485	150	260	2600	NA	130	1750	260	1650	850	190	330	185
Temperature	Celsius	29.2	NA	26.3	NA	28.3	26.6	26.6	27.8	NA	27.7	27.3	26.2	26.3	27.8	27.1	26.9	27
Benzene	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	97	54	BDL	62	BDL	BDL	BDL	BDL	BDL	BDL
Toluene	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	76	54	BDL	88	BDL	BDL	BDL	BDL	BDL	BDL
Xylene	ug/l	BDL	BDL	BDL	BDL	2500	15	920	1300	640	730	750	89	5500	BDL	BDL	420	BDL
Ethylbenzene	ug/l	BDL	BDL	BDL	BDL	BDL	5.7	180	220	130	350	140	39	930	BDL	1.5	BDL	BDL
Chlorobenzene	ug/l	BDL	BDL	BDL	BDL	BDL	5.1	BDL	130	120	BDL	130	BDL	BDL	BDL	2.7	BDL	BDL
Chloroform	ug/l	BDL	BDL	BDL	BDL	BDL	2.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,4-Dichlorobenzene	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	72	80	BDL	150	BDL	49	BDL	1.5	BDL	BDL
1,1-Dichloroethane	ug/l	BDL	BDL	BDL	BDL	BDL	1.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichloroethane	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	56	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethene	ug/l	BDL	BDL	BDL	BDL	BDL	1.8	BDL	48	55	BDL	120	BDL	BDL	BDL	BDL	BDL	BDL
Methylene Chloride	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	290	68	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	220	39	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Aldrin	ug/l	BDL	BDL	0.014	0.014	*	*	*	*	*	*	*	*	1.7	BDL	*	BDL	13
a-BHC	ug/l	BDL	BDL	BDL	BDL	*	5.1	0.37	2.4	2.8	*	*	*	2.1	0.027	3.6	21	4.5
b-BHC	ug/l	BDL	BDL	BDL	BDL	0.86	2.1	0.14	7.7	8.2	0.36	*	*	1.4	0.096	2.9	52	22
d-BHC	ug/l	BDL	BDL	BDL	BDL	*	4.2	0.29	*	*	0.23	*	*	*	0.02	5.8	21	5.9
g-BHC	ug/l	BDL	BDL	BDL	BDL	*	0.44	0.18	1.7	1.7	*	*	*	*	0.044	0.82	17	1.5
4,4'-DDD	ug/l	BDL	BDL	BDL	BDL	*	*	*	2.6	5.5	*	*	*	*	*	*	*	*
Dieldrin	ug/l	BDL	BDL	BDL	BDL	*	0.67	*	*	*	0.57	*	*	*	0.071	*	*	*
Endrin	ug/l	BDL	BDL	BDL	BDL	*	*	*	*	*	*	*	*	*	0.021	*	*	*
Endosulfan I	ug/l	BDL	BDL	BDL	0.025	*	0.15	0.3	*	1.5	*	*	*	*	*	*	*	*
Heptachlor	ug/l	BDL	BDL	BDL	BDL	*	0.26	*	*	*	*	*	*	*	*	0.13	*	*

BDL = below detectable limits
NA = not analyzed
* = detection limit extremely elevated due to matrix interference

Table 4-6. Chevron Orlando Site Assessment
Groundwater Sample Analytical Results (Continued)
September, 1990

Parameter	Units	Well Identification MW-A	DUP-A	MW-D	DUP-D	MW-E	MW-F	MW-G	MW-H	DUP-H	MW-I	MW-J	MW-K	MW-L	MW-M	MW-N	MW-O	MW-P
Naphthalene	ug/l	BDL	BDL	BDL	BDL	26	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Isophorone	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	56	55	BDL	44	BDL	56	BDL	BDL	BDL	BDL
2,4-Dimethylphenol	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	47	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Phenol	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	46	46	BDL	BDL	BDL	46	BDL	BDL	BDL	BDL
Demeton-O	ug/l	BDL	BDL	BDL	BDL	2.5	BDL	BDL	130	22	BDL	46	BDL	21	BDL	BDL	1.1	BDL
Ethyl Parathion	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	110
Methyl Parathion	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.16
Arsenic	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.03	0.092	BDL	0.025	BDL	0.082	BDL	BDL	BDL	BDL
Chromium	mg/l	0.1	0.043	0.011	0.011	0.015	BDL	0.17	0.011	0.051	BDL	0.031	BDL	0.038	BDL	BDL	BDL	0.059
Zinc	mg/l	0.054	0.12	0.035	0.052	0.025	BDL	0.02	BDL	0.027	BDL	0.041	0.024	BDL	0.027	0.042	0.044	0.053

BDL = below detectable limits
NA = not analyzed
* = detection limit extremely elevated due to matrix interference

CHAPTER 5.0

DATA EVALUATION

5.1 SITE HYDROGEOLOGY

As presented in Chapter 4, the hydrogeologic characteristics of the site were investigated to provide the data necessary to evaluate contaminant transport mechanisms. This investigation included characterization of site geology, determination of water level elevations, and characterization of aquifer hydraulic conductivities.

Based on the water level elevations measured in each well, the surficial aquifer unit on site appears to represent a shallow unconfined aquifer and a deeper semi-confined unit (probably the top of the Hawthorn formation). The groundwater flow direction in the unconfined unit is in a northeasterly direction, with a gradient of approximately 0.006. Groundwater flow in the semi-confined unit appears to be in a northerly direction. However, additional water level elevation data for this unit are required to thoroughly characterize the groundwater flow regime.

Using the Darcy equation, the linear groundwater flow velocity may be calculated from the average measured hydraulic conductivity (3 feet per day), the average gradient (0.006) and literature values for effective porosity (0.20), as follows:

$$V = \frac{ki}{n}$$

where V = velocity in feet per day
k = hydraulic conductivity in feet per day
i = gradient (unitless), and
n = porosity (unitless).

Substituting the values presented above, the average value of groundwater flow velocity beneath the site is 0.09 feet per day, or approximately 33 feet per year.

The groundwater gradient in the deeper unit is approximately 0.02. Using the same values for hydraulic conductivity and effective porosity, the average groundwater flow velocity in the deeper unit is 0.3 feet per day, or 109.5 feet per year. As previously mentioned, additional data are required to fully characterize the groundwater flow regime in this unit.

5.2 SOIL SAMPLING DATA EVALUATION

Soil sampling analytical results and contaminant distributions were evaluated and are discussed by contaminant type. These broad categories of contaminant type are:

- Volatile Organics,
- Semivolatile Organics,
- Organochlorine Pesticides,
- Organophosphate Pesticides,
- Chlorinated Herbicides, and
- Heavy Metals.

5.2.1 Volatile Organics Distribution

The distribution of volatile organic compound contamination in the soil at the site is presented on Figure 5-1. Volatile organics were detected in the area of the rinsate ponds, the area adjacent to and east of the rinsate ponds, the rail spur area, and barrel storage area. Low levels of xylene were also detected in septic tank drainfields B and C.

See Figure 5-1

Volatile organic contamination in the rinsate pond area was predominantly from xylene. Ethylbenzene, toluene, chlorobenzene, and 1,4-dichlorobenzene were also present. Concentrations of contaminants generally increased by an order of magnitude with depth in the eastern portion of the pond area.

The area adjacent and to the east of the rinsate pond exhibited a pattern of volatile organic contamination similar to the rinsate pond area. This area corresponds to a zone of high non-ionic contamination detected in the GPR survey, and is the location of a vertical above-ground storage tank that can be seen in aerial photographs taken in 1969 and 1973.

Volatile organic contaminants in the rail spur area were predominantly xylene and the chlorobenzenes, and appear to increase with depth. Sample locations that did not show volatile organic contamination at the surface may have elevated concentrations at depth.

Volatile organic contamination in the barrel storage area displayed a distribution pattern similar to the rinsate pond and adjacent area.

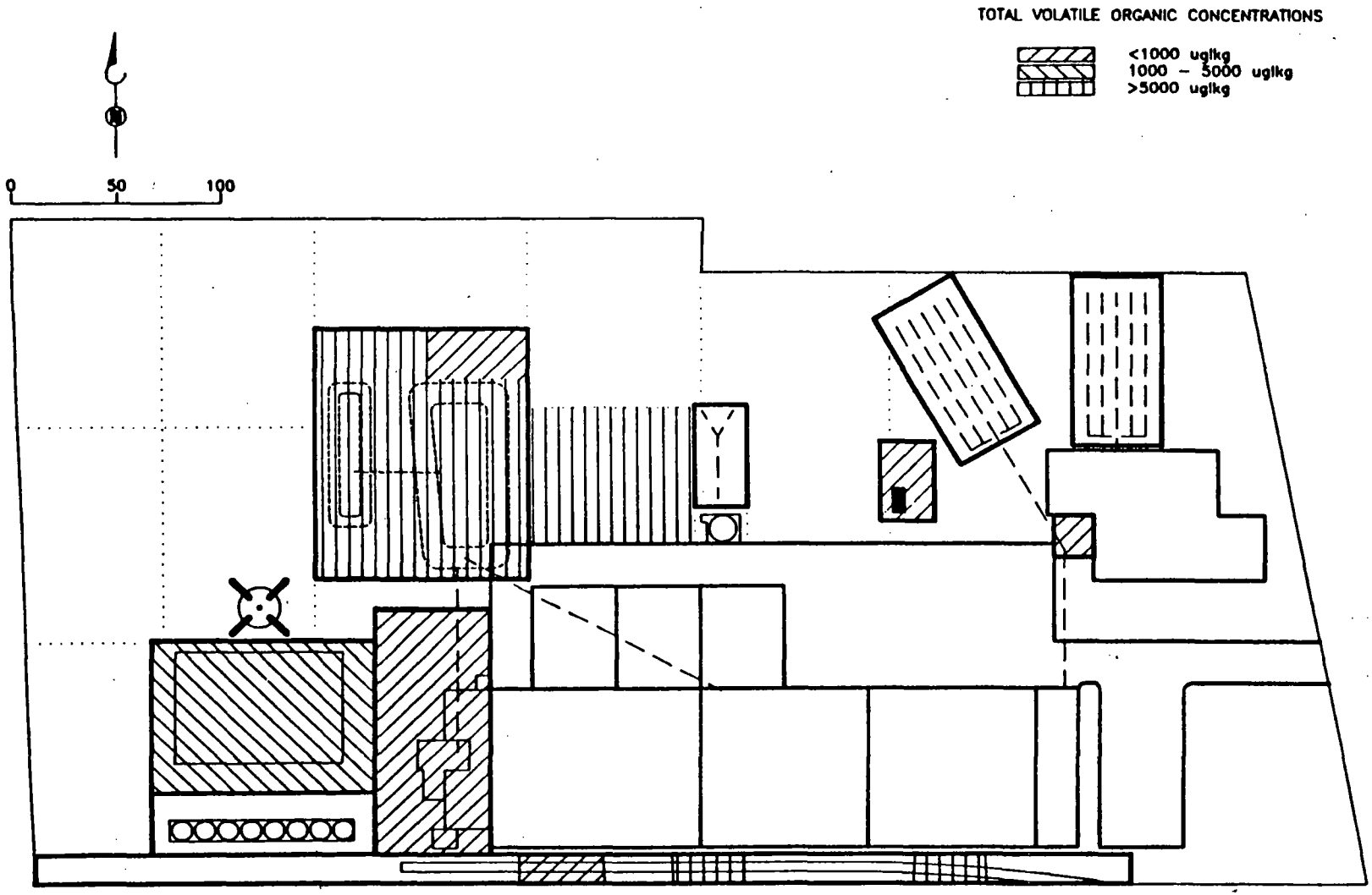

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Figure 5–1. Distribution of Volatile Organic Compounds in Soils

5.2.2 Semivolatile Organics Distribution

Semivolatile organics were not detected in soils throughout the site. Elevated detection limits caused by matrix interference may have affected determination of these contaminants. Methylnaphthalene was detected in two samples from the rinsate pond area in moderately high concentrations. These samples may reflect a localized spill of kerosene fuel or other petroleum product. Bis(2-ethylhexyl)phthalate was detected in septic tank drainfield C and at two locations in the rail spur area.

5.2.3 Organochlorine Pesticides

Organochlorine pesticide distribution is shown on Figure 5-2. Organochlorine pesticides, predominantly chlordane and gamma-BHC, were found to be widespread throughout the western and northern sections of the site and along the rail spur. High concentrations were found in and around the rinsate pond area and adjacent to the floor drain outlet along the rail spur. Other organochlorines detected in these areas of the site were heptachlor, endosulfan I, dieldrin, DDT, DDD, DDE, and endrin. Organochlorines were also high in the rail spur area with additional detection of alpha-, beta-, delta-, and gamma-BHC. Aldrin was also detected at less significant concentrations.

See Figure 5-2

5.2.4 Organophosphate Pesticides

Organophosphate pesticide distribution is shown of Figure 5-3. Although the organophosphates are not as widely distributed as the organochlorine pesticides, high concentrations of organophosphate pesticides were found in and around the rinsate pond area. Less significant levels were detected in the rail spur and barrel storage area.

See Figure 5-3

Communications with the contracted laboratory indicate that organophosphate pesticides not included in Method 8140, such as ethion and malathion, exist in estimated concentrations as high as 10,000 µg/kg. Ethion concentrations were calculated by the laboratory for the shallow composite samples and the rail spur area, and ethion appeared to be the predominant organophosphate contaminant.

5.2.5 Chlorinated Herbicides

Chlorinated herbicides were not detected at the site. Matrix interference elevated detection limits in all samples analyzed by Method 8150. A single sediment sample collected from a retention pond that receives runoff from the site contained silvex at 25 µg/kg.

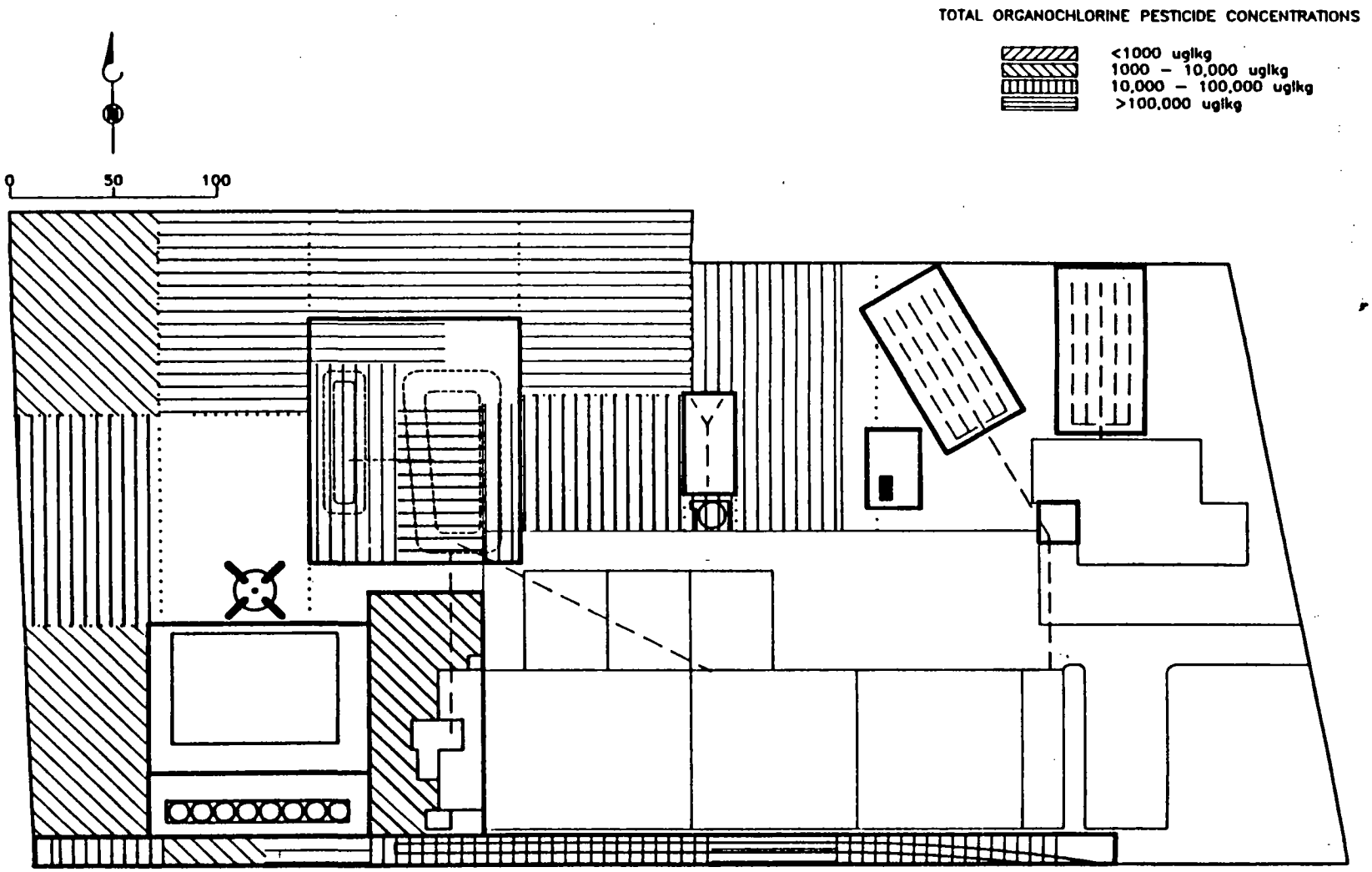

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Figure 5–2. Distribution of Organochlorine Pesticides in Soils

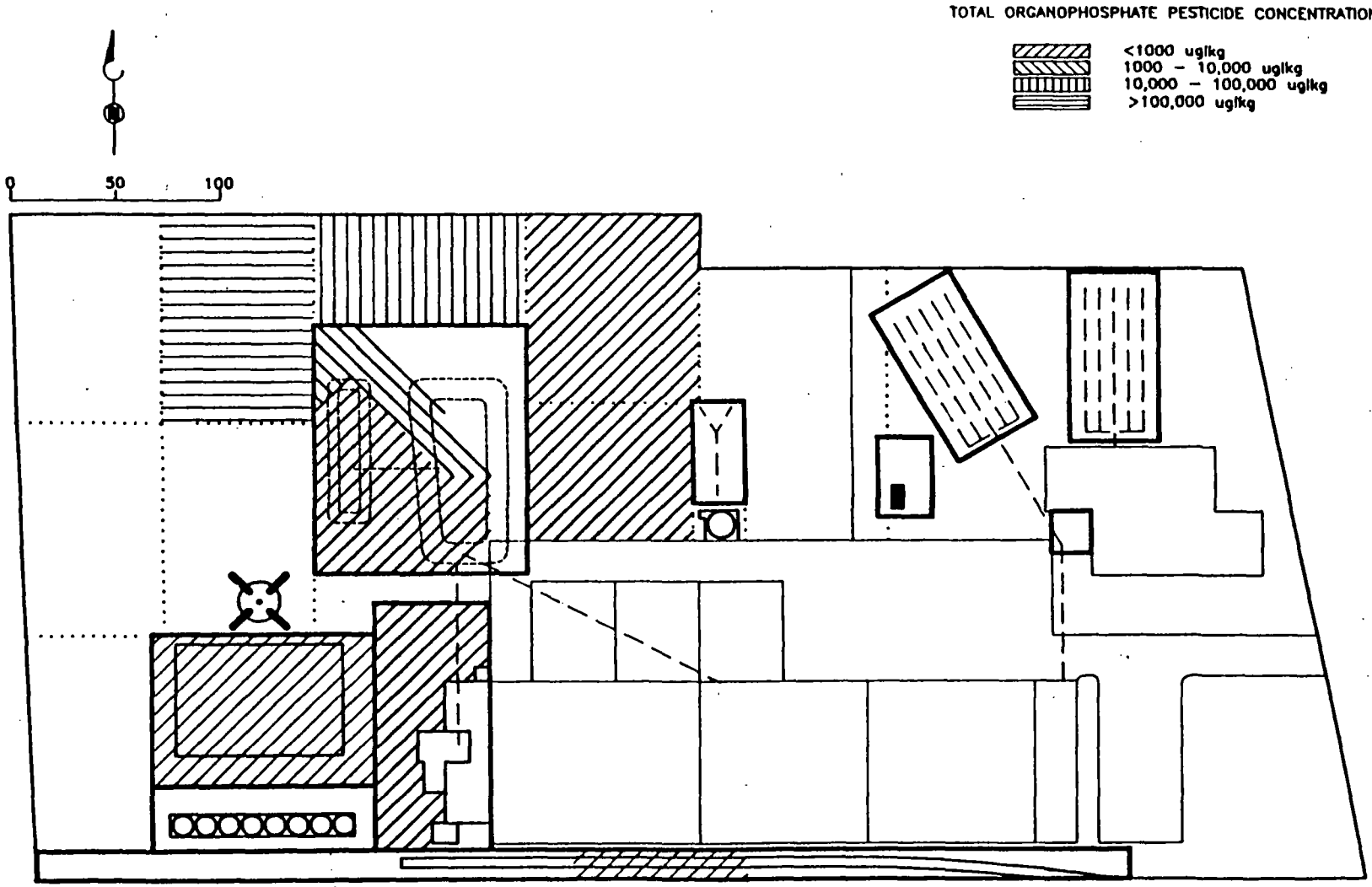

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Figure 5–3. Distribution of Organophosphate Pesticides in Soils

5.2.6 Heavy Metals

Metals analysis was performed on a limited number of samples restricted to the rinsate pond area, septic tank drainfields, barrel storage area, and rail spur area. With the exception of two sample points in the rail spur area and one sample point in the rinsate pond, total metals were below 50 mg/kg, with zinc being the predominant metal contaminant. Metals distribution is presented on Figure 5-4.

See Figure 5-4

5.3 GROUNDWATER DATA EVALUATION

Groundwater analytical results and contaminant distributions were evaluated separately for the shallow wells (monitor wells A, D, E, H, I, J, L, M, N, O, and P), and the deep wells (wells F, G, and K). The contaminants were evaluated using the same analytical categories as used for soil data evaluation.

5.3.1 Volatile Organics Distribution

Volatile organic compounds were detected in the surficial aquifer beneath the central and western portions of the site (Figures 5-5 and 5-6). The distribution and composition of the volatile organics suggests three potential contaminant release scenarios. The predominant volatile contaminant in the groundwater is xylene, with the highest concentrations in MW-L (5500 µg/kg) and MW-E (2500 µg/kg). MW-L is downgradient from the aboveground storage tank identified in aerial photographs, and corresponds with an area of high non-ionic response in the GPR survey. MW-E is adjacent to the drum storage area. MW-K, the deep well in the MW-K, L cluster has significantly lower concentrations of xylene, but demonstrates that the xylene is migrating vertically downward.

See Figure 5-5 and 5-6

The suite of volatile compounds associated with gasoline were detected in samples from monitor wells H and J presumably reflecting a gasoline spill. Ethylbenzene was detected (along with xylene) in MW-L, K, I, and G, but the other gasoline-type volatiles were not detected.

Purgeable halocarbons were detected in highest concentration in MW-H, with lower concentrations in MW-N, L, J, and F. The predominant source area for the purgeable halocarbons appears to be the rinsate pond, with minor contribution from the formulation building area.

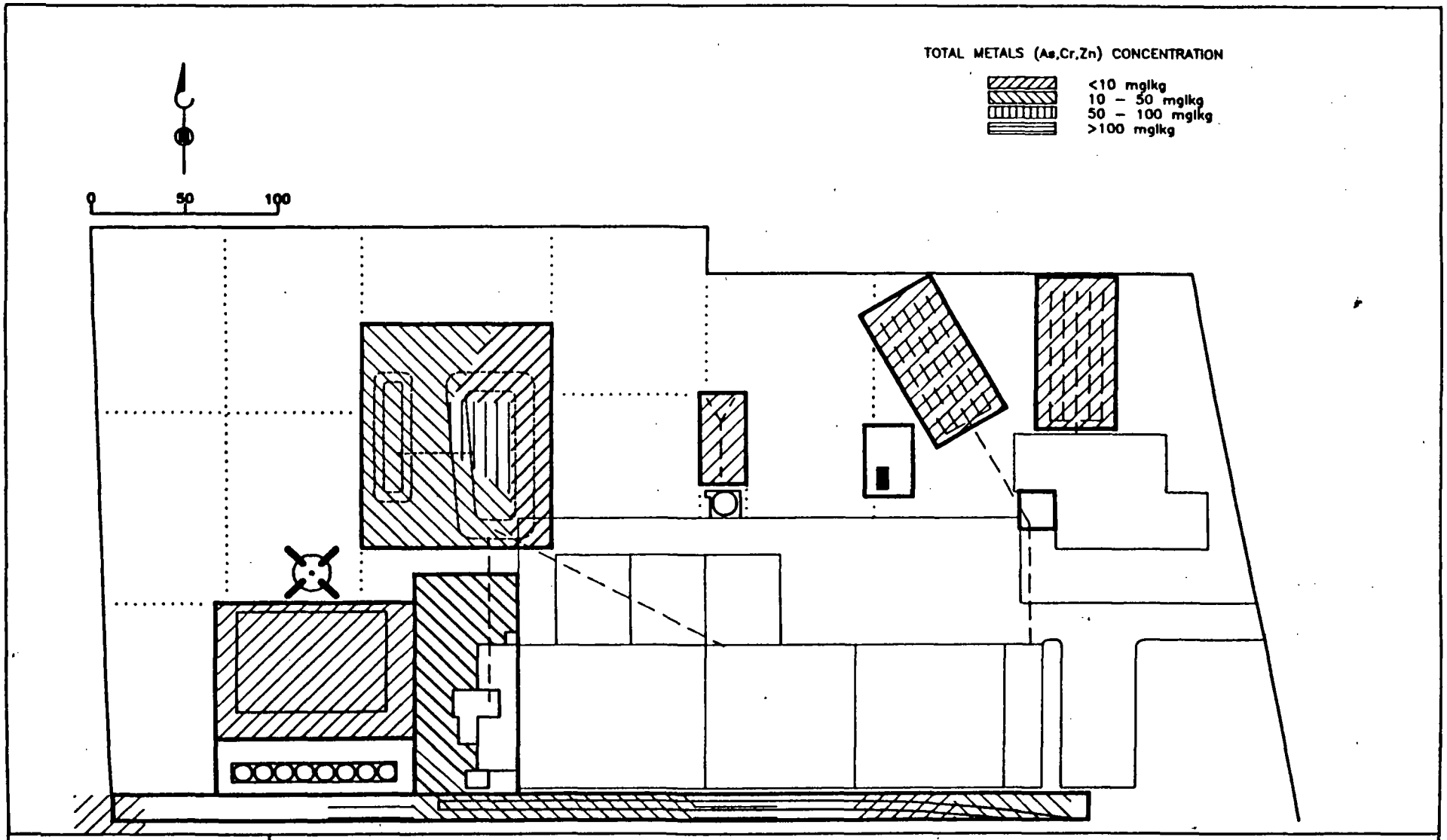

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Figure 5–4. Distribution of Metals in Soils

~ 1500 ~ = VOLATILE ORGANIC CONCENTRATIONS IN ug/l

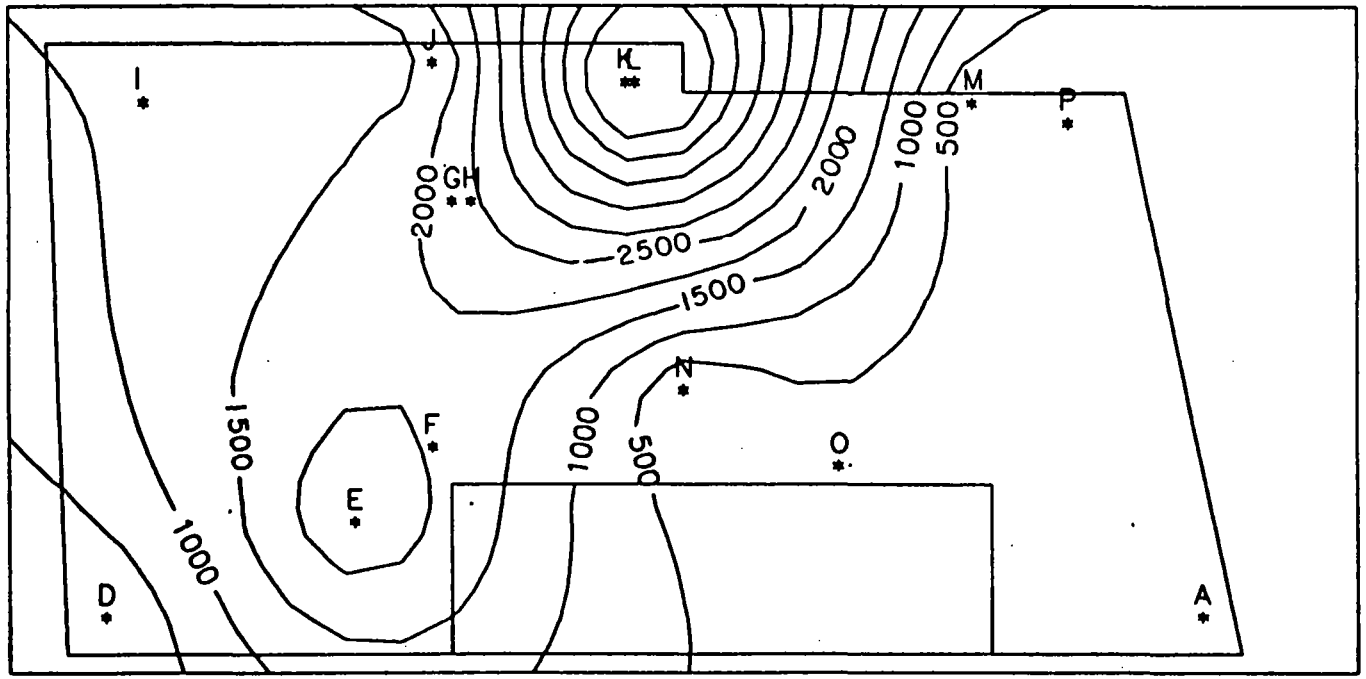

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Figure 5–5. Total Volatile Organic Compound Concentrations in Shallow Wells

~100~ = TOTAL VOLATILES CONCENTRATION IN ug/l

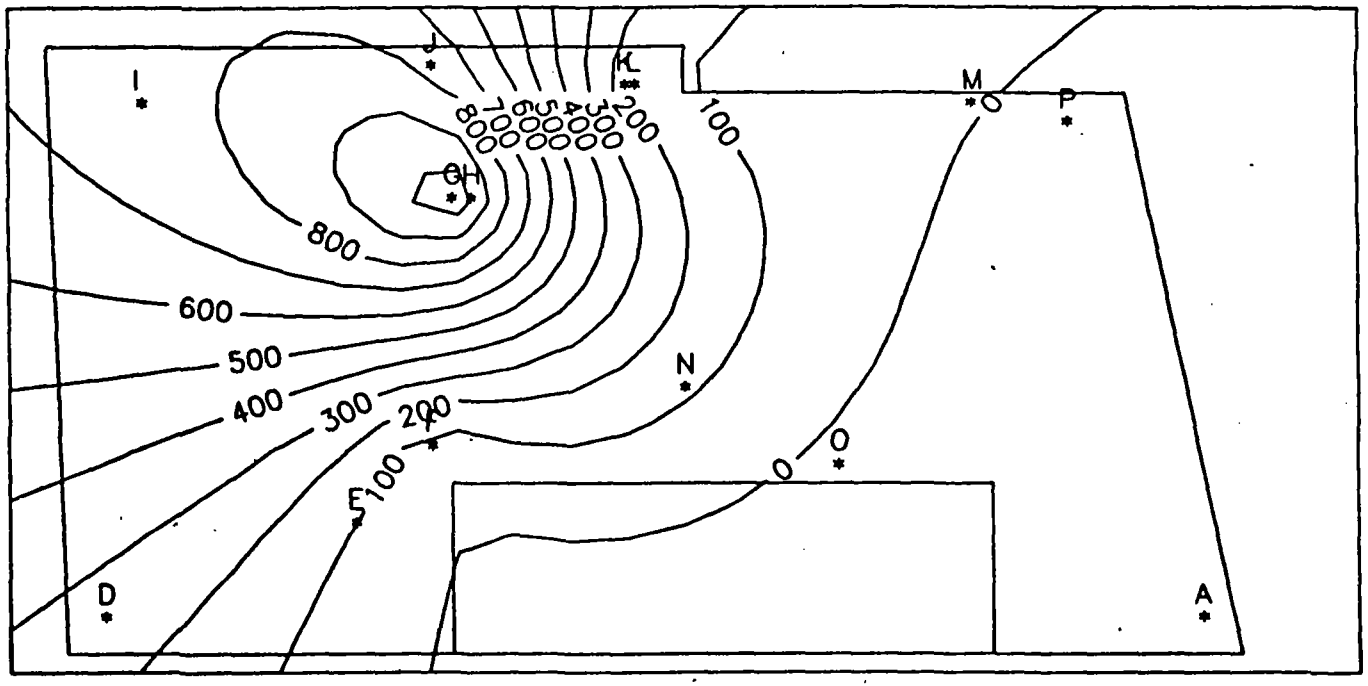

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Figure 5-6. Total Volatile Organic Compound Concentrations in Deep Wells

5.3.2 Semivolatile Organics Distribution

Semivolatile organics were detected in four wells screened in the shallow zone only, and appear to be centered in the approximate location of the rinsate ponds. Total semivolatile distribution is shown on Figure 5-7.

See Figure 5-7

5.3.3 Organochlorine Pesticide Distribution

Organochlorine pesticides in the shallow zone appear in to be wide spread across the site, with two distinct lobes. One lobe, located in the area north of the rinsate pond corresponds to areas of high soil contamination. The second lobe, located in the eastern portion of the site, appears to be centered around MW-O. This area is covered with concrete/asphalt, and soil sampling was not conducted over much of this area. Soil samples collected in the septic tank area adjacent to MW-M and MW-P did not contain organochlorine pesticides. Organochlorine distribution in the shallow groundwater unit is given on Figure 5-8.

See Figure 5-8

The primary groundwater contaminants are the BHC isomers, with minor contributions from aldrin, 4,4'-DDD, endrin, endosulfan I, and heptachlor. Florida Drinking Water Standards are available for gamma-BHC (lindane) and endrin, at 4 µg/l and 0.2 µg/l, respectively. The Drinking Water Standard for lindane was exceeded in wells J and O, and for endrin in wells J, M, and the duplicate sample from well H. Organochlorine pesticides were also detected in two of the three deeper wells, confirming downward vertical migration of these contaminants, as shown on Figure 5-9.

See Figure 5-9

The rinsate pond and the rail spur area are the two most apparent source areas for the BHC isomers. Based on the available data, select organochlorine pesticides appear to be migrating off site in the groundwater in a northerly and northeasterly direction. However, additional off site data are required to determine whether off site migration is occurring. Additional sampling with depth is also required to determine the vertical extent of contaminant migration.

5.3.4 Organophosphate Pesticide Distribution

Of the organophosphate pesticides, demeton-O is the predominant groundwater contaminant. The demeton-O distribution is similar to the distribution of organochlorine pesticides, with a plume associated with the rinsate pond, and a plume in the northeast portion of the site. Parathion and methyl parathion were detected in MW-P only, and are probably the result of a parathion spill reported in the northeast portion of the site. This distribution is shown on Figure 5-10.

See Figure 5-10

~ 40 ~ = TOTAL SEMIVOLATILES CONCENTRATIONS IN ug/l

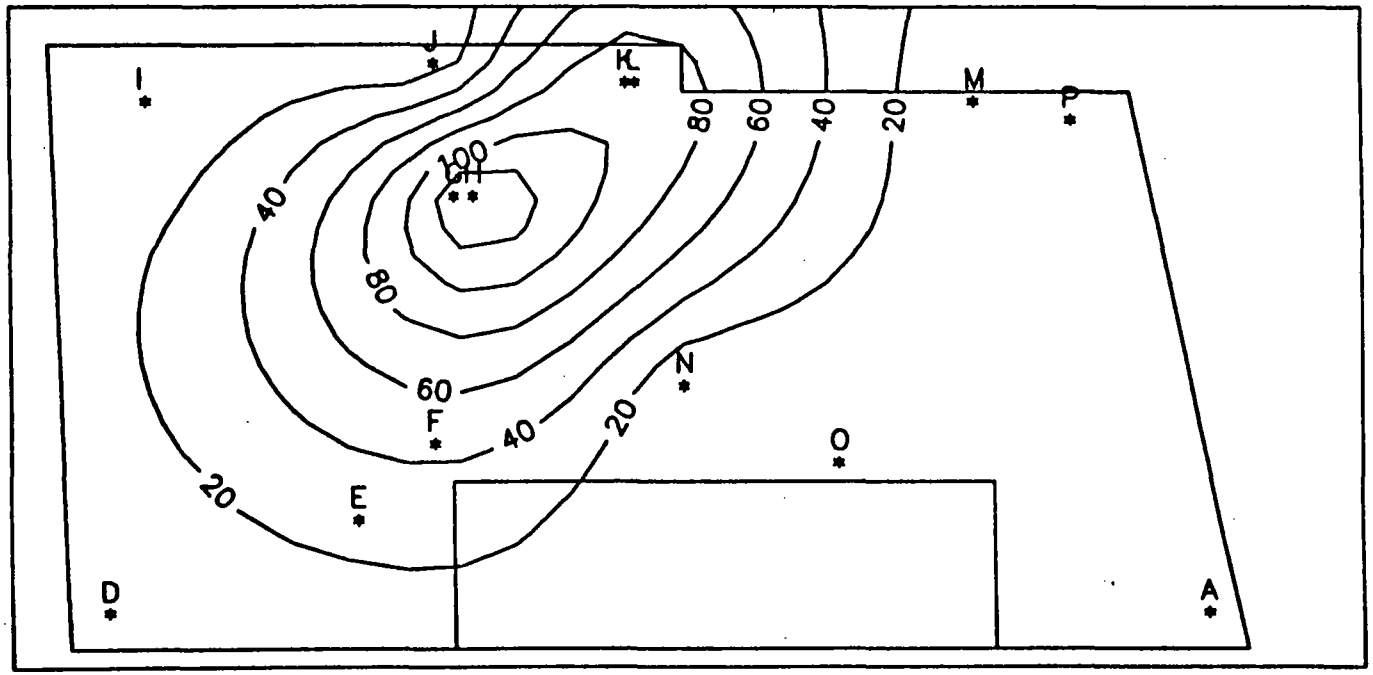

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Figure 5–7. Total Semivolatile Organics Concentrations in Shallow Wells

~ 40 ~ = TOTAL ORGANOCHLORINE PESTICIDES CONCENTRATIONS IN ug/l

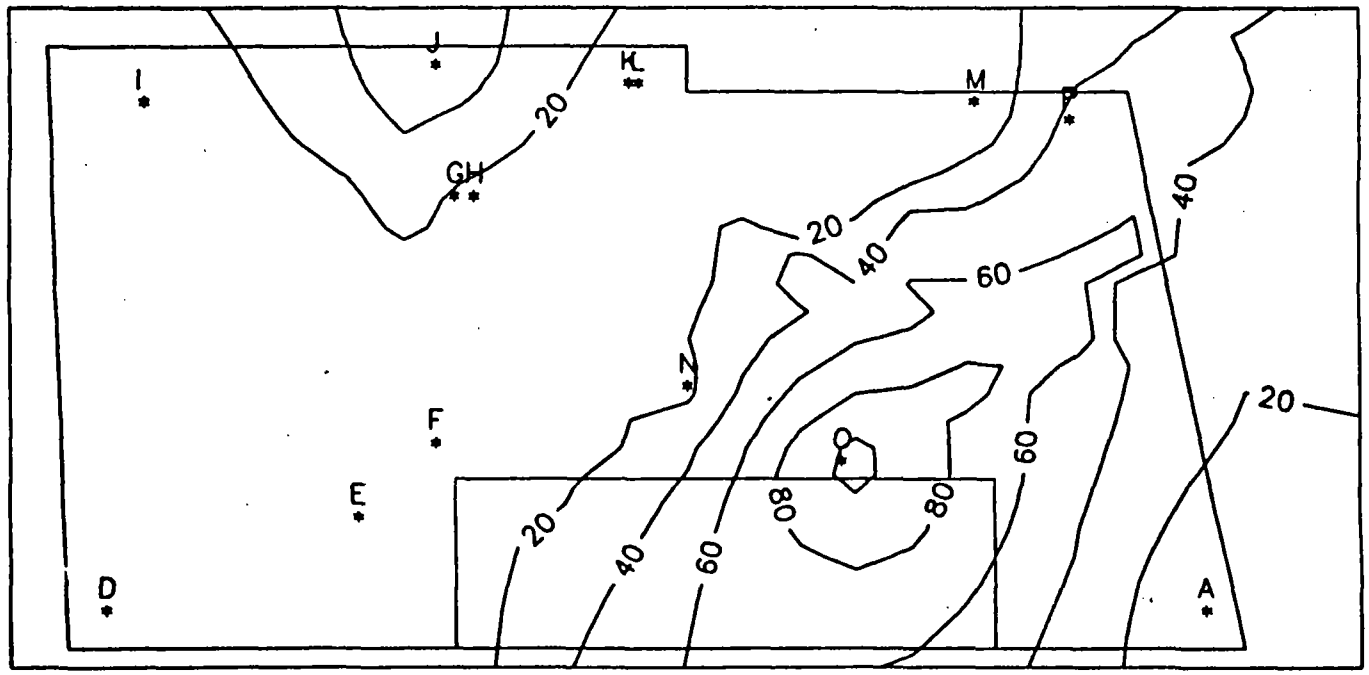

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Figure 5–8. Total Organochlorine Pesticides Concentrations in Shallow Wells

~ 40 ~ = TOTAL ORGANOCHLORINE PESTICIDES CONCENTRATIONS IN ug/l

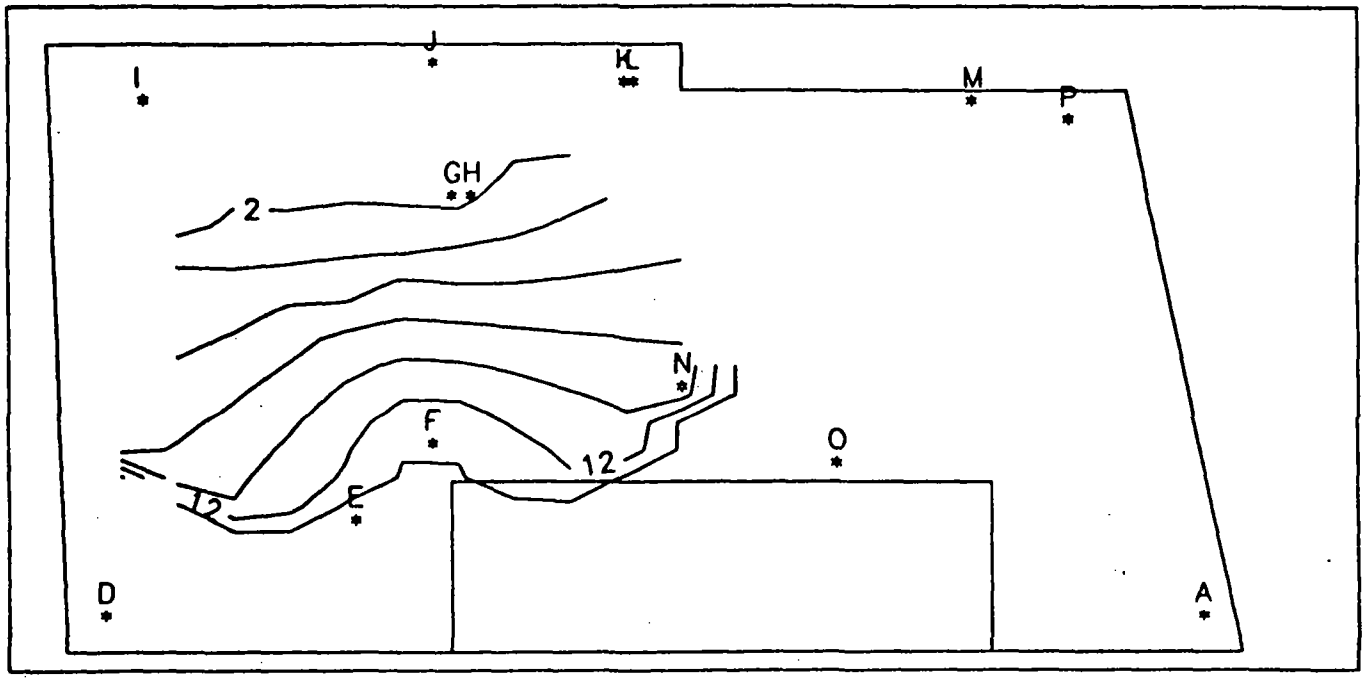

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Figure 5-9. .Total Organochlorine Pesticide Concentrations in Deep Wells

~ 40 ~ = ORGANOPHOSPHATE PESTICIDE CONCENTRATIONS IN ug/l

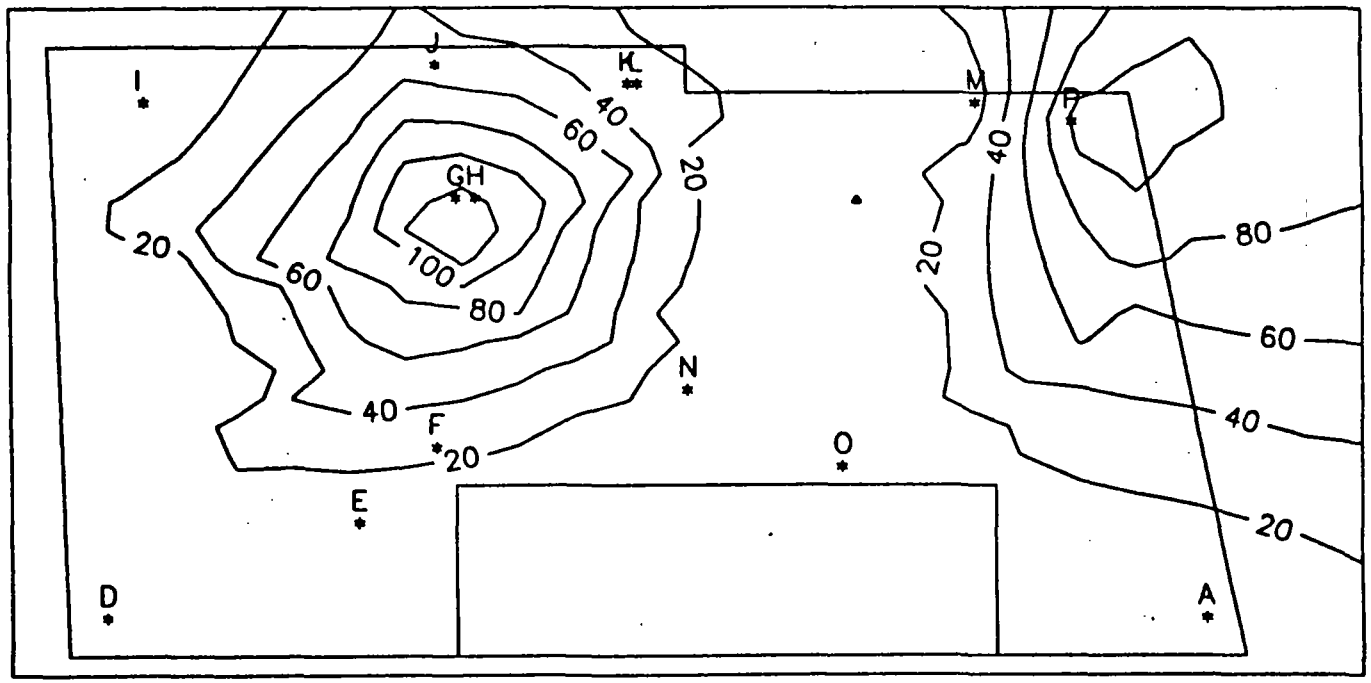

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Figure 5-10. Total Organophosphate Concentrations in Shallow Wells

5.3.5 Metals Distribution

The arsenic, chromium, and zinc distribution in the groundwater is sporadic and does not reflect a definitive source area onsite. Arsenic was detected in three shallow wells (MW-H, J, and L) and no deep wells. Chromium was detected in seven shallow wells, with the highest concentration (in the shallow zone) in the southeast corner of the site (MW-A and oil mg/l). Chromium was also detected in MW-G, which may reflect contribution from the rinsate pond. Zinc was detected in 10 monitor wells, but in concentrations well below the drinking water standard.

CHAPTER 6.0

RECOMMENDATIONS

6.1 INTRODUCTION

Based on the data evaluation presented in Chapter 5.0, additional site characterization is required to fully delineate the extent of soil and groundwater contamination at the site. The results of the site investigation indicate that several pesticides and volatile organic compounds remain in the soils on the site, and that additional soil characterization data are required to develop an effective soil cleanup plan. However, due to the variety and distribution of contaminants present at the site, the performance of a risk assessment is necessary to identify the contaminants of concern and to develop cleanup levels. This information will then be used to design a second soil investigation with the objective of delineating the extent of soil contamination for the contaminants of concern. The results of the risk assessment will also be used to establish cleanup levels for groundwater contaminants for which no standards exist.

The results of the groundwater investigation indicate that there are two plumes of contaminated groundwater which may be migrating offsite. In order to fully delineate the extent of these plumes and to determine whether offsite migration is occurring, additional groundwater characterization is required. The additional groundwater characterization will consist of a soil gas and hydropunch investigation to develop a preliminary map of the plumes, to be followed by the installation and sampling of groundwater monitor wells. Sampling and analysis of selected existing monitor wells will also be performed to better characterize the groundwater contamination.

Specific recommended additional site characterization activities are described in the following sections.

6.2 RISK ASSESSMENT

As described above, a wide variety of contaminants have been detected in the soils and groundwater at various locations across the site, and additional site characterization will be required to develop an effective site cleanup plan. In addition, because of the diversity and wide distribution of contaminants detected in the soil, it will be necessary to first identify the contaminants of concern and establish cleanup levels based on the health and environmental risks posed by these contaminants. With this information and the sampling data from the initial site investigation, it will be possible to design an additional soil sampling and analysis plan that will more fully delineate the extent of soil contamination.

Therefore, the performance of a risk assessment of the site to identify the contaminants of concern and establish cleanup levels for these contaminants is recommended. The risk

assessment will be performed in accordance with the Risk Assessment Guidance for Superfund (USEPA 1989) to determine the contaminant migration pathways and to estimate the magnitude of actual and/or potential human exposures. Results of the exposure assessment will then be used to define soil and groundwater concentrations that must be attained to protect human health and the environment.

A baseline risk assessment consists of four phases: 1) data collection and evaluation; 2) exposure assessment (EA); 3) toxicity assessment (TA); and 4) risk characterization (RC). The initial data collection and evaluation has been completed, as presented in Chapters 1 through 5 of this report. To complete the risk assessment, a limited amount of additional site characterization data will have to be gathered.

The EA will utilize site specific data to predict the potential for chemicals to reach specific receptor populations. Estimates of contaminant releases and source concentrations will be derived from the chemical analysis of soils and water. This will be followed by identification of the populations potentially exposed and the likely exposure pathways. Finally, quantitative estimates of chemical concentrations at selected exposure points will be made given the measured source concentrations and the identified exposure pathways. Calculations of exposure point concentrations will be based on both the data collected in this phase and on the results of predictive modeling of the fate and transport of selected contaminants.

The relationship between the exposure levels, as determined by the EA, and the risk of adverse health effects is a function of the toxicity values for the compounds of concern (determined from a TA). The TA will act as a screening tool to define the contaminants (the indicator compounds) most important in bracketing the risk associated with the action levels defined for analytes in each of the media.

Using the information generated by the EA and TA, the RC will be performed to evaluate the potential occurrence of adverse health effects. Specifically, the risk to the potentially exposed human population for each contaminant of concern, as a function of the analyte concentration in soil, groundwater, and air, will be estimated in the RC. Using this methodology, it will be possible to determine risk-based cleanup concentrations for the contaminants of concern in soil, groundwater, and air. This information will then be used to design an additional soil sampling and analysis plan to more fully delineate the extent of the contaminants of concern in the soil.

6.3 GROUNDWATER INVESTIGATION

The objective of the groundwater investigation is to delineate the vertical and horizontal extent of the two groundwater plumes which were identified onsite. This objective will be accomplished in three steps, to ensure characterization of the entire plume within one period of field activity. The three steps are as follows:

1. Soil Gas Survey: Based on the detection of volatile organic compounds in the groundwater, and the fact that the volatile organic compounds are much more mobile in groundwater than the pesticides, a soil gas survey will be conducted to delineate the areal extent of each plume. This survey consists of driving stainless steel probes through the soil horizon to the base of the unsaturated zone. A sample of soil gas will be extracted into a tedlar bag, and the sample screened using an organic vapor analyzer.

2. Hydropunch Sampling: Hydropunch sampling will be conducted within the plume areas as delineated by the soil gas survey to characterize the areal and vertical extent of the organochlorine pesticide migration in the groundwater. Hydropunch is a direct push technology which facilitates collection of samples from discrete zones in the aquifer without installation of permanent monitor wells.

   Groundwater samples will be collected from select locations and depths, and will be analyzed in the field using a field gas chromatograph. The gas chromatograph will analyze samples for EPA Method 8080 organochlorine pesticides. Up to 14 hydropunch samples will be collected and analyzed.

3. Based on the plume delineation developed through soil gas and hydropunch sampling, locations and depths for permanent monitor wells will be selected. For planning purposes, an estimated five shallow wells, two intermediate depth wells, and one deep well will be installed and sampled. Several existing wells will be resampled to provide an adequate data set for plume delineation. Monitor well samples will be analyzed for EPA Method 8080 organochlorine pesticides, EPA Method 8140 organophosphate pesticides plus malathion and ethion, and for EPA Method 8020 (plus xylenes) volatile organic compounds.

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APPENDIX A

SOIL BORING AND WELL COMPLETION LOGS

APPENDIX A

SOIL BORING AND WELL COMPLETION LOGS

Lithologic logs were made as each well was being drilled. Split spoon sampling on 5-foot centers was performed in order to describe the formation encountered at the site. The 33-foot deep wells were continuously sampled for a more detailed description of the lithologic at the site.

A well completion log was completed as each well was drilled in order to graphically depict the construction of the well.

Soil boring logs were maintained for each boring drilled at the site.

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: M[illegible]

METHOD: Hollow stem [illegible] Split spoon

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	Brown sandy soil organic debris	
	White limey sand	
5'	white f-mgr, qtz sand	Blow cts
7'	brn, f-mgr qtz sand	6,3,4,2
WET at 7'		
	12in. SS - Blk, fgr, oily appearance	4, 7, 5, 7
SATURATED at 12'	3in - wh, f-mg sand, tr silt	
	6in - Brn, fgr sand, tr clay	
15	6in - brn silty sand	4, 6, 6, 6
17	6in - brn silty sand, [illegible] fgr sand	
	2in - brn f-mg sand	

DATE: [illegible]

LOGGER; [illegible]

Brown and Caldwell Consultants

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: D

METHOD: Hollow Stem Auger, Split Spoon

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	Dk brn top soil, silty sand slightly wet.	
3'		
5'	9in sand, dk brn sme blk f-mgr, silty	5' } 6, 2, 3, 4
		7'
	15in sand, brn, f-mg, silty	
10		10'
WET	6in - sand, dk brn - blk, vf-fgr, sme silt	} 2, 3, 2, 3
12'		12'
	3in - sand, ltbrn, f-mgr.	
	15in - sand, dk brn, vfgr, sme silt	
15'		15 } 5, 7, 7, 8
17'	6in - sand, dk brn, vfgr, sme silt	17'
	12in - sand, gy-tan, sme wh, vf-fgr, + silt.	

DATE: 9-11-90

LOGGER: [illegible]

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: E

METHOD: Hollow Stem Auger Split Spoon

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	3' of dk brn sandy silty top soil	
5'	6in - no recovery	5'
	12in - blk fill	> 7 5 5, 2
7'	6in - sand, brn, fgr, sme silt	7'
WET		
10'	3in no recovery	10'
	6in - blk fill	> 7, 6, 5, 6
12'	15in - sand, vdk brn, vfgr, sme silt	12'
15	8in - sand, vdk brn, vfgr	15'
	16in - sand, lt brn - tan f-mgr	> 6, 9, 11, 12
17'		17'

DATE: 9-12-90

LOGGER: [illegible]

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: F

METHOD: Continuous Flight Auger

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	Block fill and chunks of concrete	
3'	Sand, blk, silty	
5'		
6.5'	Sand, vdk brn-reddish brn, f-gr, tr silt	
10 ET		
10'	Sand, vdk brn, vfgr	
12'	Sand, wh-ltgy, vf-fgr	
	Clay, gy, vfgr sand, tr silt	
15'	Sand, brngy, vf-fgr	
18'	Sand, brn, silty, tr clay	
19.5	Sand, brn, some clay	
	Sand, TAN vfgr, some clay	
23'		
	Sand, wh, f-mgr	
25'		
26'	Sand, TAN, f-mgr	
	Clay, grey, sandy	
28'	Sand, wh, ltgy, clayey	
30'	Sand, gy, f-mgr, some clay, iron oxide stain	
32.5'	Clay, MED gy, very plastic	

DATE: 4-12-90

LOGGER: J. Minnon

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: G

METHOD: Continuous Flight Auger

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	Sand, dk brn, silty	
3'	sand, brn, vf-fgr, sme silt	
5'	sand, dk brn-blk, silty	
6'	Silt, dk gy brn, sme sand tr gy clay	
9'	WET	
11.5'	sand, brn, fgr, sme silt	
15'	sand, gy brn, vfgr, sme silt, tr clay	
18'	sand, gy brn, f-mgr, silty, tr clay	
20'	as above, vfgr	
22'	sand, dk gy brn, f-mgr	
25'	sand, tan, f-mgr	
	as above	
30'	as above	
32.5	clay, med gy, tr iron oxide	

DATE: 4-13-90

LOGGER: [illegible]

WELL CONSTRUCTION LOG

PROJECT: SVSC

WELL NO.: 4

METHOD: HSA

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	no log since next to deep well continuous log	

DATE:

LOGGER:

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: I

METHOD: [illegible], Sem Auger Split Spoon

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	Dk brn top soil	
	Silty sand	
		Blow Cts
5'	12in no recovery	5'
	3in - brn silty sand	7' > 5, 4, 2, 5
	9in sand dk red brn,	
	vfg, silty, tr clay	
10'	12in fill from above	10'
	dk brn silty sand	12' > 2, 4, 6, 6
	12in - sand - brn - gy brn	
15'	8in - silt, dk brn, sme	15 > [illegible], 3, 4, 5
	sand, tr clay	
17'	16in - sand - brn - wh,	
	fgr, sme mgr, tr silt	

DATE: 9-11-90

LOGGER: [illegible]

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: J

METHOD: CFA

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	no log since next to [illegible] well [illegible] Log	

DATE: _____

LOGGER: _____

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: K

METHOD: Continuous Flight Auger

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	Dk brn TOP SOIL	
3'	Sand, lt brn, silty	
5'	Sand, brn-dk brn f-mgr, silty	
6'	Sand, dk-red brn sme silt	
8'	Sand, dk brn dk gy brn, vfgr, silty	
10'		
11'	Sand, gy, vfgr	
	Sand, gy brn, vfgr, tr clay	
15'	Sand, lt brn, sme mclay, vf-fgr, sme silt, tr clay	
18'	AS ABOVE - SME mgr	
20'	SAND TAN mgr, sme fgr	
22'	SAND TAN, fgr, sme mgr	
25'	SAND TAN F-mgr	
30'	TAN SAND	
33.5	CLAY, mgy, REDDISH OXIDE STAIN	

DATE: 4-13-90

LOGGER: T. Mauldin

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: L

METHOD: Hollow stem auger

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	did not log since deep well right next to this one was logged.	

DATE:

LOGGER:

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WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: V1

METHOD: Hollow Stem Auger, Split Spoon

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	Dk brn TOP SOIL	
3'		
5'	6 in - no recovery	5
	6 in - sand, dk gray, vfgr, silty	
7'	7 in - sand, tan, sme dk gray vfgr	7
	5 in - sand reddish brn, silty	
10'	10 in - sand, vdk brn - blk, vfg, silty	10
12' WET	6 in - sand, brn vfgr	12'
15' SATURATED	16 in - sand, vdk brn, rd brn, silty (v wet)	15
17'	8 in SAND, TAN - LTGY, vfgr. (mod. wet)	17'
20'	6 in sand, tan, sme blk, silty	20
22'	16 in sand, tan, [illegible] fgr mgr (mod. wet)	22

DATE: 9-11-90

LOGGER: [illegible]

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: N

METHOD: Hollow STEM Auger Split Spoon

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	TOP SOIL. Dkgy-brn, sand	
2'	SAND, white, silty, hard	
3'		Blow cts,
5'	3in sand, brn, fgr, silty	5'
	6in sand, dkbrngy, sme silt	> 6, 2, 4, 5
	2in sec. wh. sand	7'
	13in - sand brn fgr	
WET		
10'	9in - sand brn, f-mgr, sme silt, mottled w/ dkbrn, wh. sand	10' > 2, 3, 3, 5
		12'
SATURATED	15' sand BRN fgr.	
15'	1in - sand, blk, sme silt, tr clay	15' > 2, 2, 2, 3
17'	4in - sand, brn silty	17'
	2in - sand, lt brn f-mgr	
	12in - sand, gy, fgr, clayey	

DATE: 4-10-90

LOGGER: [illegible]

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: C

METHOD: Hollow Stem Auger Split Spoon

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	Blk top soil	
		Blow Cts
5'	3in - sand, wh-ltgy, tr blk, vf-fgr	5'
		> 7, 6, 2, 2
7'	12in - sand, dkgy-blk, fgr	7'
DAMP	9in - sand, dkrdbrn, vfgr	
10'	4in sand, tan-ltbrn, silty	13'
WET		> 9, 6, 6, 5
12'	6in - sand, blk, oily, silty	12
	9in sand, dkbrn, vfgr, tr clay	
15'	16in - sand, dkbrn, fgr	15'
WET		> 5, 3, 7, 8
17'	8in - sand, wh-ltbrn, fgr,	17'
DAMP	some mgr	

DATE: 4.12.90

LOGGER: [illegible]

WELL CONSTRUCTION LOG

PROJECT: 5456

WELL NO.: P

METHOD: Hollow Stem Auger Split Spoon

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
	TOP SOIL, Ltbrn silty sand.	
3'		Blow Cts
5'	6in - sand, ltbrn, fgr, sme silt	5'
	4in - sand, wh vf-fgr	> 2, 2, 3, 3
7'	4in - sand, gyorn, vfgr, sme silt	7'
	10in - sand, vdkbrn, silty	
10'	11in no recovery	10' > 2, 4, 6, 6
12'	4in - sand, wh, okay vfgr, + silt	12'
	8in - sand, vdkbrn, vfgr, sme silt	
15' WET		15' > 2, 4, 5, 4
17'	6in - sand, vdkbrn, silty	17'
	18in - sand, tan-wh, vfgr, sme silt	
22'		

DATE: [illegible]

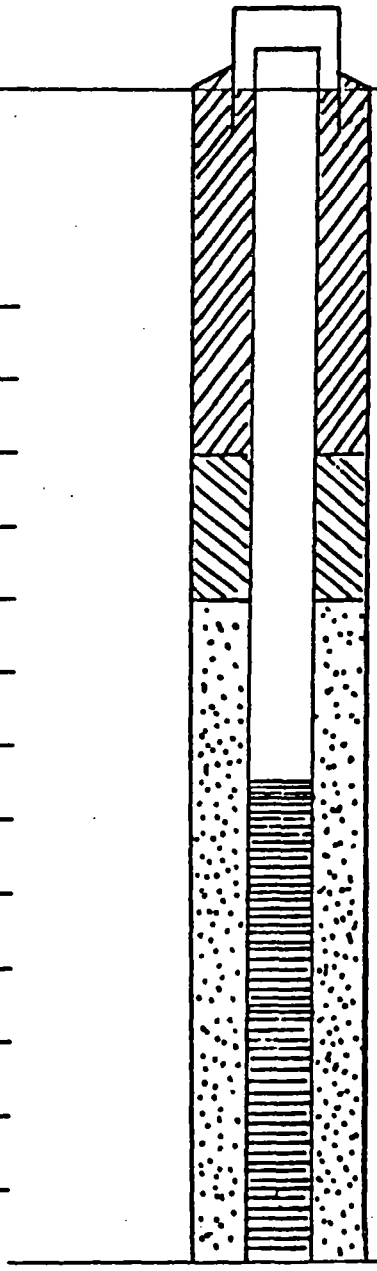
LOGGER: [illegible]

WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: A

DRILLING METHOD: Hollow Stem Auger



LAND SURFACE

PROTECTIVE CASING HEIGHT (FEET ALS): 3 surface

CASING: 2 inch PVC

GROUT: TYPE I Portland

MATERIALS USED:

TOP OF BENTONITE (FEET BLS): 3 5

TOP OF SAND PACK (FEET BLS): 5 17

TOP OF SCREEN (FEET BLS): 7 17

SCREEN: 2 inch

SLOT: .010

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS): 17

COMPLETION DATE: 9-10-96

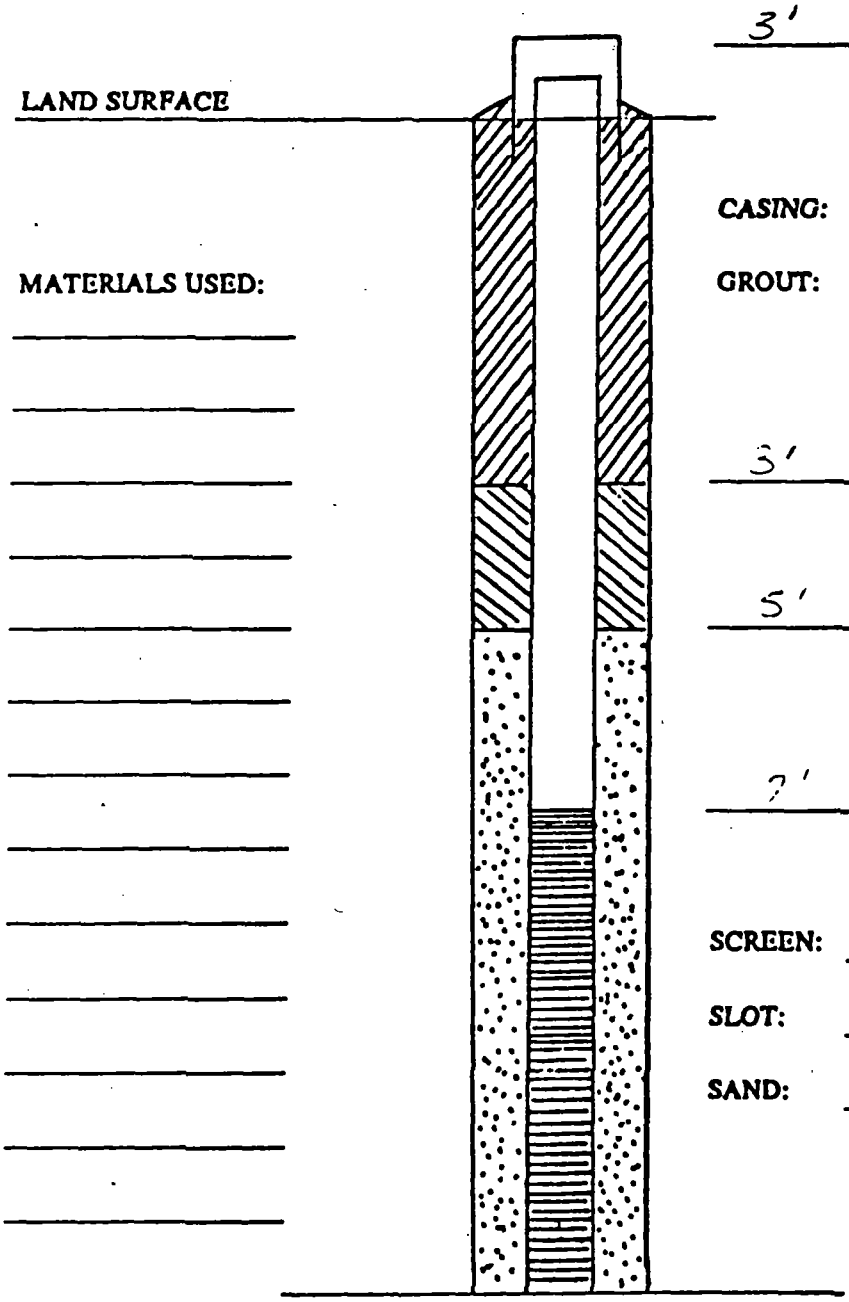
LOGGED BY: [illegible]

WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: D

DRILLING METHOD: Hollow stem auger



3' PROTECTIVE CASING HEIGHT (FEET ALS) Surface

LAND SURFACE

CASING: 2in PVC

GROUT: TYPE 1 Portland

MATERIALS USED:

3' TOP OF BENTONITE (FEET BLS) 5'

5' TOP OF SAND PACK (FEET BLS) 17'

7' TOP OF SCREEN (FEET BLS) 17'

SCREEN: 2in PVC

SLOT: .010 mill slot

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS) 17'

COMPLETION DATE: 9-11-90

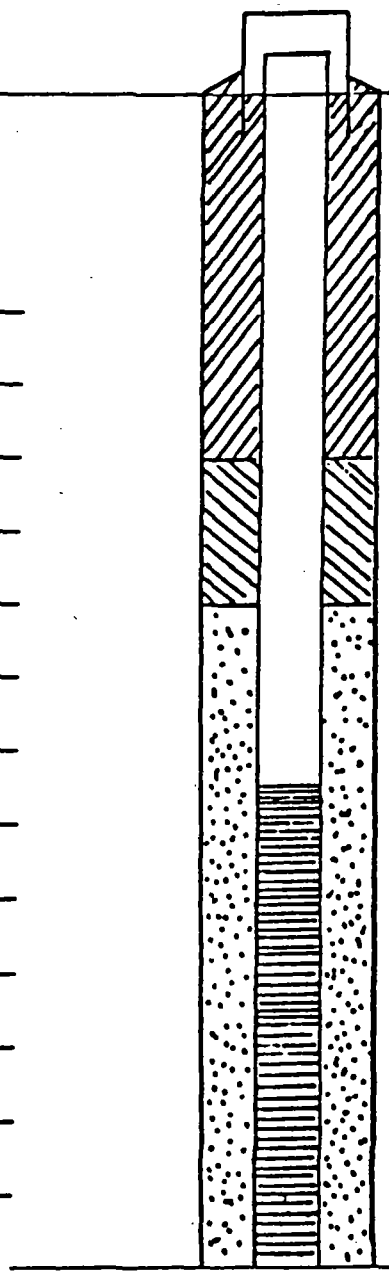
LOGGED BY: Jim Mercer

WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: E

DRILLING METHOD: Hollow stem auger



PROTECTIVE CASING HEIGHT (FEET ALS): 3' Surface

LAND SURFACE

CASING: 2in. PVC

GROUT: Type I Portland

MATERIALS USED:

TOP OF BENTONITE (FEET BLS): 5.16' 5'

TOP OF SAND PACK (FEET BLS): 5' 17'

TOP OF SCREEN (FEET BLS): 7' 17'

SCREEN: 2in PVC

SLOT: .010 mill slot

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS): 17'

COMPLETION DATE: 9-12-90

LOGGED BY: Lisa [illegible]

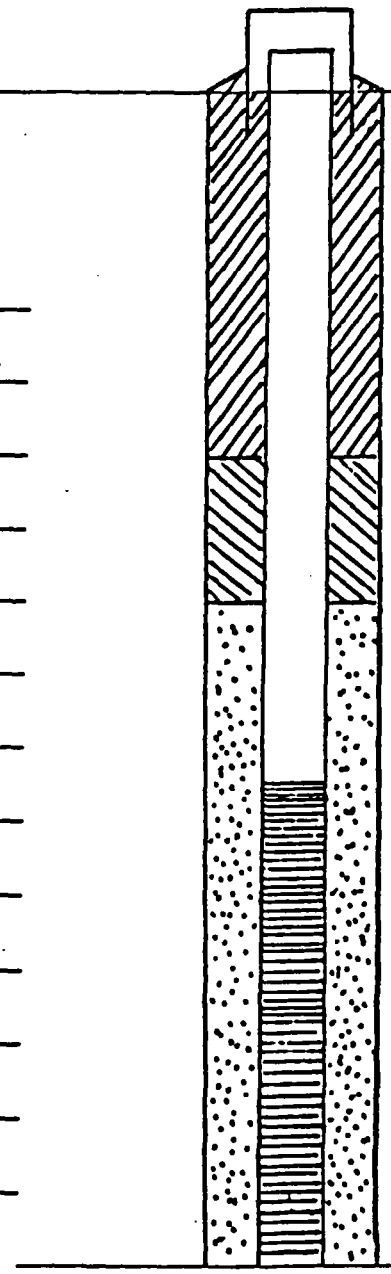
Brown and Caldwell Consultants

WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: F

DRILLING METHOD: Continuous flight auger



3' PROTECTIVE CASING HEIGHT (FEET ALS) surface

LAND SURFACE

CASING: 2in PVC

MATERIALS USED:

GROUT: TYPE 1 Portland

15' TOP OF BENTONITE (FEET BLS) 17.5'

17.5' TOP OF SAND PACK (FEET BLS) 32'

22 TOP OF SCREEN (FEET BLS) 32

SCREEN: 2in PVC

SLOT: .010

SAND: 20/30 SILICA

TOTAL DEPTH (FEET BLS) 32'

COMPLETION DATE: 9-12-90

LOGGED BY: Jim Morrison

WELL COMPLETION LOG

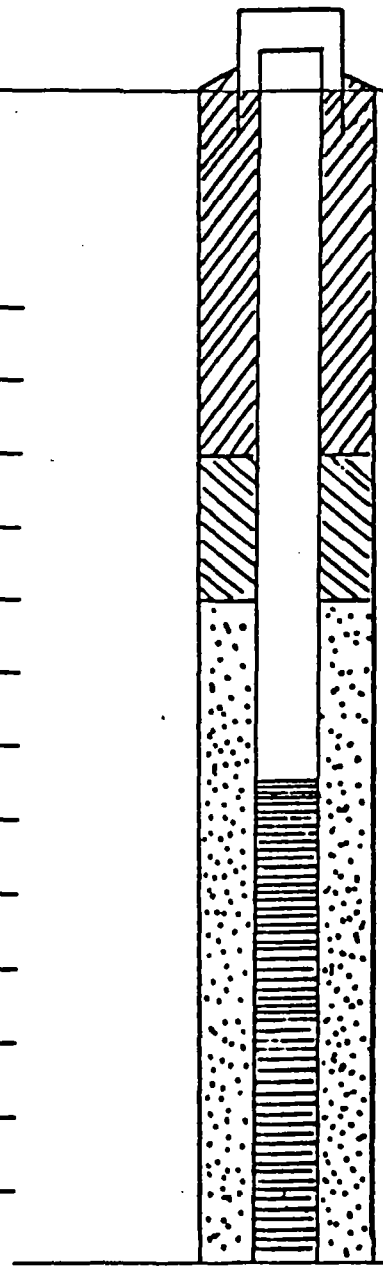
PROJECT: 5456

WELL NUMBER: G

DRILLING METHOD: Continuous Flight Auger

PROTECTIVE CASING HEIGHT (FEET ALS): 3' Paved Surface

LAND SURFACE



CASING: 2in. PVC

GROUT: TYPE 1 Portland

MATERIALS USED:

TOP OF BENTONITE (FEET BLS): 17' 19'

TOP OF SAND PACK (FEET BLS): 19' 33'

TOP OF SCREEN (FEET BLS): 23' 33'

SCREEN: 2in PVC

SLOT: .010

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS): 33'

COMPLETION DATE: 9-13-90

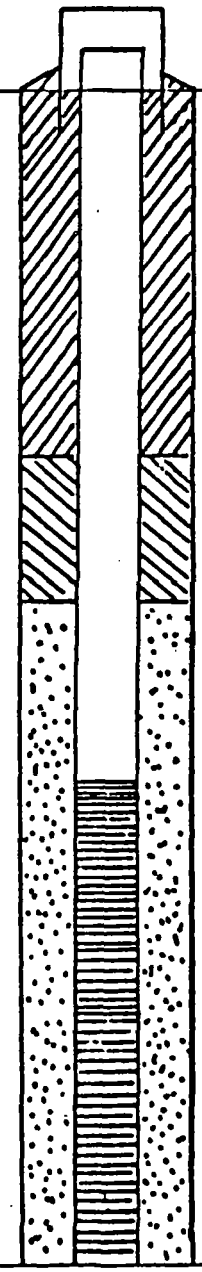
LOGGED BY: Tim Mannion

WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: H

DRILLING METHOD: Hollow Stem Auger



PROTECTIVE CASING HEIGHT (FEET ALS): 3' land surface

LAND SURFACE

CASING: 2 in PVC

GROUT: TYPE 1 Portland

MATERIALS USED:

TOP OF BENTONITE (FEET BLS): 3.5' 5'

TOP OF SAND PACK (FEET BLS): 5' 17'

TOP OF SCREEN (FEET BLS): 7' 17'

SCREEN: 2 in. PVC

SLOT: .010

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS): 17'

COMPLETION DATE: 01-13 90

LOGGED BY: Tim Morrison

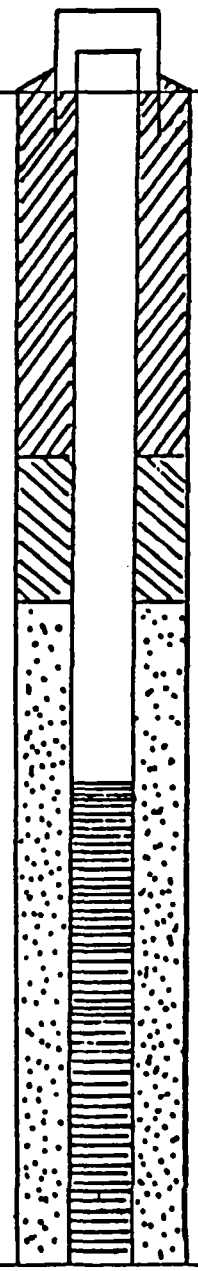
WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: I

DRILLING METHOD: Hollow Stem Auger

LAND SURFACE



3' PROTECTIVE CASING HEIGHT (FEET ALS) Land Surface

CASING: 2in PVC

GROUT: TYPE 1 Portland

MATERIALS USED:

3.5' TOP OF BENTONITE (FEET BLS) 5'

5' TOP OF SAND PACK (FEET BLS) 17'

7' TOP OF SCREEN (FEET BLS) 17'

SCREEN: 2in PVC

SLOT: .010

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS) 17'

COMPLETION DATE: 9-11-90

LOGGED BY: Lisa Morrison

Brown and Caldwell Consultants

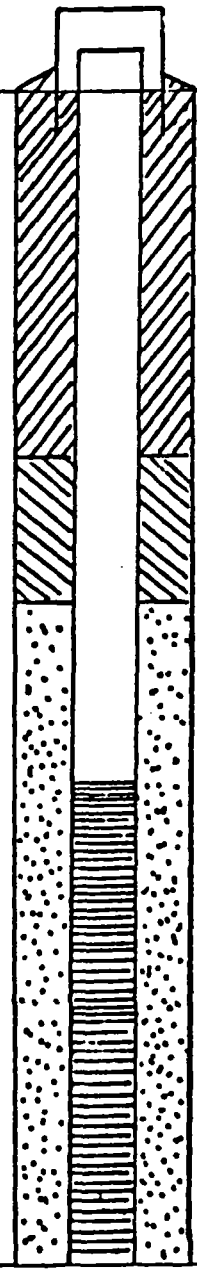
WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: J

DRILLING METHOD: Hollow Stem Auger

LAND SURFACE



3' PROTECTIVE CASING HEIGHT (FEET ALS) Surface

CASING: 2 in. PVC

GROUT: TYPE 1 Portland

MATERIALS USED:

3.5' TOP OF BENTONITE (FEET BLS) 5'

5' TOP OF SAND PACK (FEET BLS) 17'

7' TOP OF SCREEN (FEET BLS) 17'

SCREEN: 2 in. PVC

SLOT: 010

SAND: 20/30 Sauce

TOTAL DEPTH (FEET BLS) 17'

COMPLETION DATE: 9-13 90

LOGGED BY: Lisa Morrison

WELL COMPLETION LOG

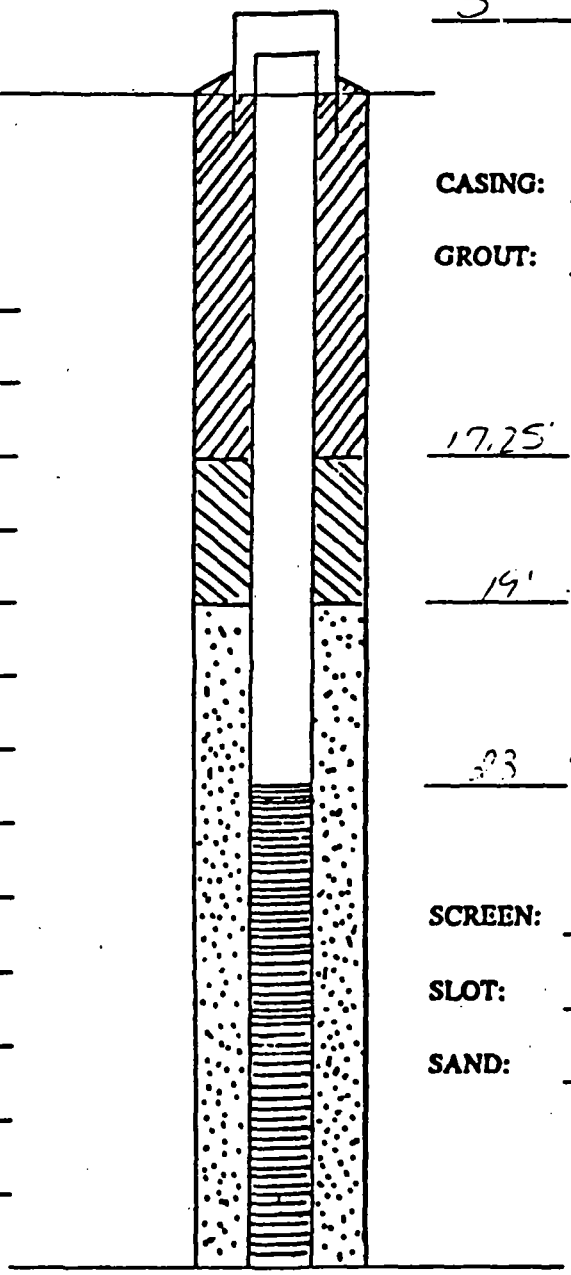
PROJECT: 5456

WELL NUMBER: K

DRILLING METHOD: Continuous Flight Auger

PROTECTIVE CASING HEIGHT (FEET ALS): 3' Land surface

LAND SURFACE



CASING: 2in. PVC

GROUT: Type 1 Portland

MATERIALS USED:

TOP OF BENTONITE (FEET BLS): 17.25' 19'

TOP OF SAND PACK (FEET BLS): 19' 33'

TOP OF SCREEN (FEET BLS): 23 23'

SCREEN: 2in. PVC

SLOT: .010

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS): 33'

COMPLETION DATE: 9-13-90

LOGGED BY: Lisa Marrier

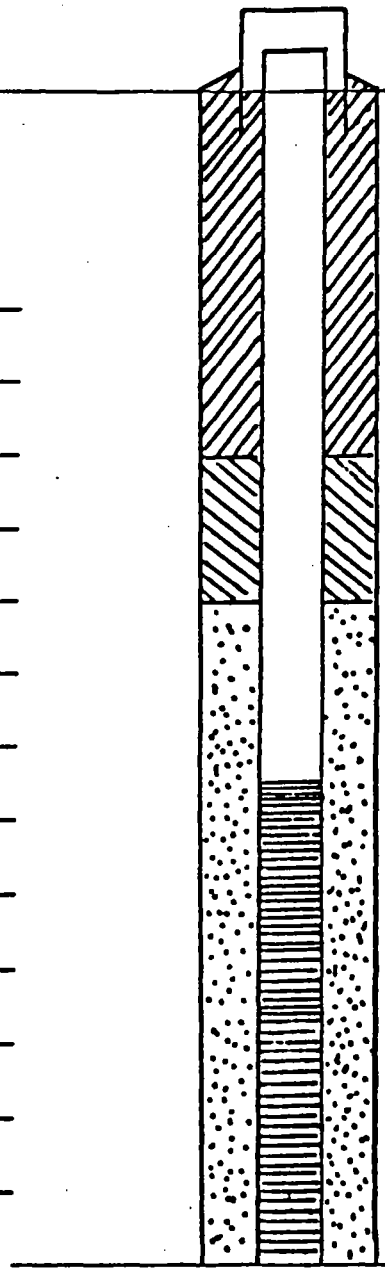
Brown and Caldwell Consultants

WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: 2

DRILLING METHOD: Continuous Flight Auger



LAND SURFACE

PROTECTIVE CASING HEIGHT (FEET ALS): 3' surface

CASING: 2in. PVC

GROUT: Type 1 Portland

MATERIALS USED:

TOP OF BENTONITE (FEET BLS): 3' 5'

TOP OF SAND PACK (FEET BLS): 5' 17'

TOP OF SCREEN (FEET BLS): 7' 7

SCREEN: 2in. PVC

SLOT: .010

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS): 17'

COMPLETION DATE: 9-12-90

LOGGED BY: Tom Munson

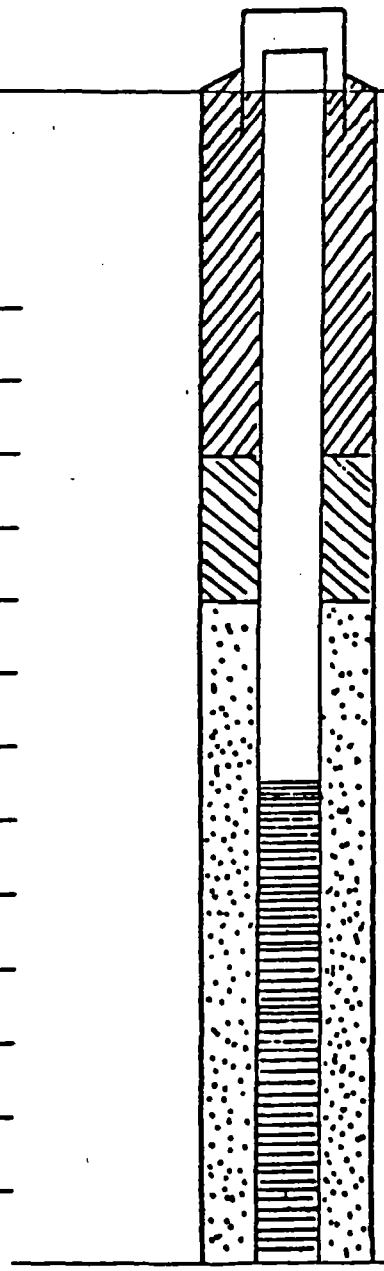
Brown and Caldwell Consultants

WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: 21

DRILLING METHOD: Hollow Stem Auger



3' PROTECTIVE CASING HEIGHT (FEET ALS) Surface

LAND SURFACE

CASING: 2in PVC

MATERIALS USED:

GROUT: TYPE 1 Portland

3.5' TOP OF BENTONITE (FEET BLS) 5'

5' TOP OF SAND PACK (FEET BLS) 22'

12' TOP OF SCREEN (FEET BLS) 22'

SCREEN: 2in. PVC

SLOT: .010

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS) 22'

COMPLETION DATE: 09-11-90

LOGGED BY: Ken Monroe

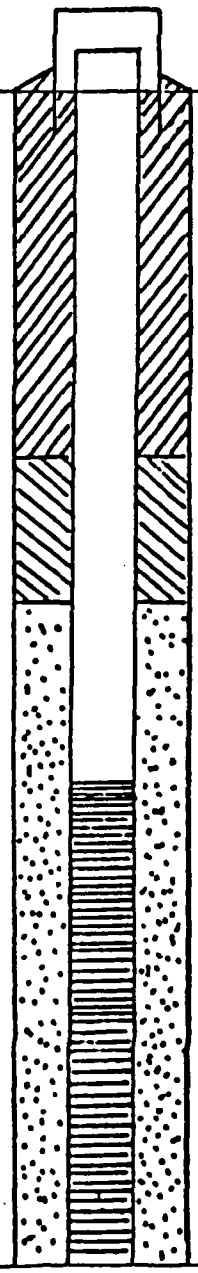
WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: N

DRILLING METHOD: hollow stem auger

LAND SURFACE



3' PROTECTIVE CASING HEIGHT (FEET ALS) surface

CASING: 2in PVC

GROUT: TYPE 1 Portland

MATERIALS USED:

3.5' TOP OF BENTONITE (FEET BLS) 5'

5' TOP OF SAND PACK (FEET BLS) 17'

7' TOP OF SCREEN (FEET BLS) 17'

SCREEN: 2in, PVC

SLOT: .010

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS) 17'

COMPLETION DATE: 6-15-90

LOGGED BY: Lisa Munson

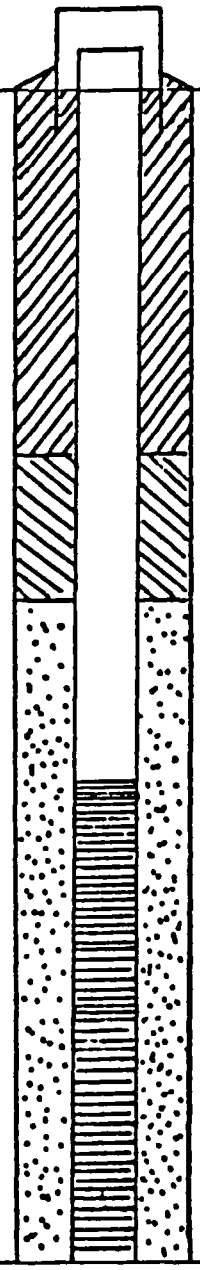
WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: C

DRILLING METHOD: Hollow stem auger

LAND SURFACE



3' PROTECTIVE CASING HEIGHT (FEET ALS) Surface

CASING: 2in PVC

GROUT: Type 1 Portland

MATERIALS USED:

3' TOP OF BENTONITE (FEET BLS) 5'

5' TOP OF SAND PACK (FEET BLS) 17'

7' TOP OF SCREEN (FEET BLS) 17'

SCREEN: 2in. PVC

SLOT: .010

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS) 17'

COMPLETION DATE: 9-12-90

LOGGED BY: [illegible]

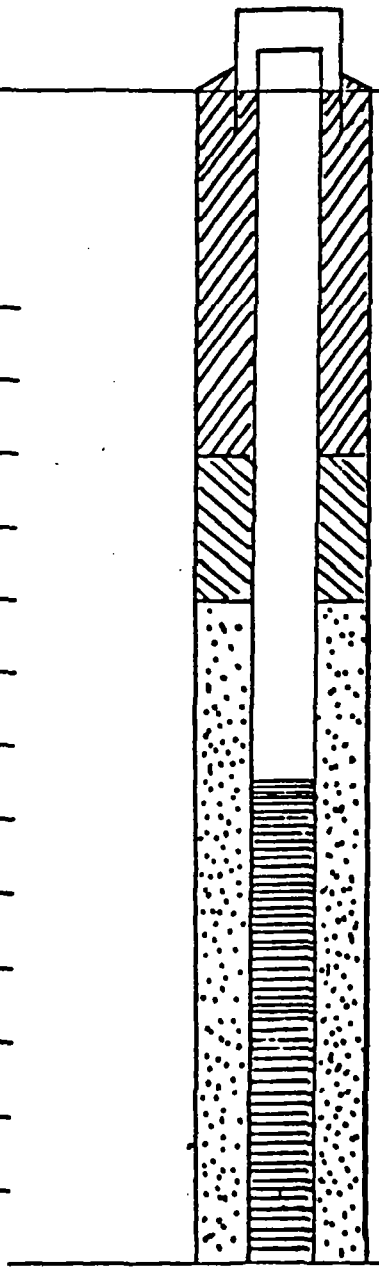
Brown and Caldwell Consultants

WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: D

DRILLING METHOD: Hand Stem Auger



PROTECTIVE CASING HEIGHT (FEET ALS): 3' Surface

LAND SURFACE

CASING: 2 in PVC

MATERIALS USED:

GROUT: Type 1 Portland

TOP OF BENTONITE (FEET BLS): 8.5 10'

TOP OF SAND PACK (FEET BLS): 10' 22'

TOP OF SCREEN (FEET BLS): 12' 22'

SCREEN: 2 in PVC

SLOT: 010

SAND: 20/30 Silica

TOTAL DEPTH (FEET BLS): 22'

COMPLETION DATE: 09-11-90

LOGGED BY: [illegible]

Brown and Caldwell Consultants

SOIL BORING CONSTRUCTION LOG

PROJECT: 5456 DATE: 10-10-90

CODE: T-1 TIME: 0830

METHOD: Continuous Split Spoon LOGGER: L. Morrison

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0-8"	white limey fill		
8"-2'	snd, dkgy, vfg, wrnd, wsrt		
2'-2.5'	snd - ltgy, vfg		
2.5-4'	snd - wh. vfng		
4'-5'	As above		
5'-6'	snd, blk, vfgr		wet
6-8'	snd, vdkbrn-blk, silty		wet 1 foot of recovery
8'-10'	snd, vdkbrn, vfgr, sme silt.		saturated

SOIL BORING CONSTRUCTION LOG

PROJECT: 5456 DATE: 10-10-90

CODE: T-2 TIME: 1000

METHOD: Spt LOGGER: L. Morrison

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0-9"	white lime fill		
9"-2'	snd, dkgybrn, vf		
2'-4'	snd, wh-tan, vfgr, w srt		
4'-5'	As above		
5'-6'	snd, dkbrn, fgr, w srt mw rnd		damp
6'-8'	snd, dkbrn, vfgr		1 ft recovery Saturated
8-10'	snd, dk brn, vfgr, tr clay		1 ft recovery

SOIL BORING CONSTRUCTION LOG

PROJECT: 5456 DATE: 10-10-90

CODE: T-3 TIME: 1025

METHOD: SPT LOGGER: L. Morrison

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0-1'	white lime fill		
1'-2'	snd, dk gy, vfg		
2'-3'	as above		
3'-4'	snd wh, vfgr, alternating w/ 3in layers of brn sand		
4'-5'	as above		
5-6'	snd, vdk brn, vfg		wet
6'-8'	snd, vdk brn, vfg, tr silt		wet
8'-10'	snd - vdk brn, brn - ltbrn vfg.		Saturated

SOIL BORING CONSTRUCTION LOG

PROJECT: 5456 DATE: 10-10-90

CODE: T-4 TIME: 10:45

METHOD: SPT LOGGER: L. Morrison

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0-2'	fill - 6in 18in snd, av brn, v fgr		
2'-2.5' 2.5-4'	as above snd, wh, ltgy, v fg, w srt		
4'-5' 5'-6'	as above snd, vdk brn, v fgr, some plant material		wet
6'-7' 7'-8'	snd, dk brn, v fgr snd, v dk brn, v fgr, silty		wet very hard layer
8'-10'	snd, vdk brn, silty		

SOIL BORING CONSTRUCTION LOG

PROJECT: 5456 DATE: 10-10-90

CODE: T-5 TIME: 1130

METHOD: SPT LOGGER: L. Morrison

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0-6"	fill		
6"-2'	snd, dk brn, f-mgr, wrnd, w srt		
2'-4'	snd, wh. fgr		
4'-5'	snd, white, vf fg, wrnd, m w srt		
5'-6'	snd, dkbrn-blk, vfgr.		wet
6-8'	snd, blk, fgr, silty		
8'-10'	snd, dkbrn-blk, fgr silty.		Saturated

SOIL BORING CONSTRUCTION LOG

PROJECT: 5456 DATE: 10·10·90

CODE: T-6 TIME: 1200

METHOD: SPT LOGGER: L. MORRISON

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0-4''	organic blk fill		
4''-2'	snd, dk brn		
2'-4'	snd, wh, c fgr		
4'-4'6''	fill		
4'6''-5'6''	snd, wh, fgr		
5'6''-6'	snd, brn, fgr		
6-8'	snd, wh-brn, 1ft blk silty snd.		
8'-10'	snd, dk brn-blk, silty		wet

GROUNDWATER PROTECTION, INC.
LOG OF BORING

SITE NAME	CHEVRON CHEMICAL	DRILLER	VANCE BIEHL
LOCATION	3100 N HWY 441	DREW CREW	RAYMOND & DAVE
	ORLANDO, FL.	BORING DATE	10/09/90
CLIENT	BROWN & CALDWELL CONSULTANTS	BORING #	SB #17
PROJECT#	5287	WORKORDER #	2418

METHOD: HAMMER ADV. X THRU AUGER X ROTARY SPLIT SPOON X SHELBY TUBE

STATIC WATER LEVEL 5'

SAMP. #	SAMPLE DEPTH	BLOW COUNT	SAMPLE TYPE	WATER PRESENCE	DESCRIPTION/REMARKS
	0'-4'	---	PH	DRY	FINE BROWN SAND
	4'-6'	4,5,4,3		WET	
	6'-8'	5,5,5,5			
					END OF BORING

GROUNDWATER PROTECTION, INC.
LOG OF BORING

SITE NAME	CHEVRON CHEMICAL	DRILLER	VANCE BIEHL
LOCATION	3100 N HWY 441	DREW CREW	RAYMOND & DAVE
	ORLANDO, FL.	BORING DATE	10/09/90
CLIENT	BROWN & CALDWELL CONSULTANTS	BORING #	SB #23
PROJECT#	5287	WORKORDER #	2418

METHOD: HAMMER ADV. X THRU AUGER X ROTARY SPLIT SPOON X SHELBY TUBE

STATIC WATER LEVEL 5'

SAMP. #	SAMPLE DEPTH	BLOW COUNT	SAMPLE TYPE	WATER PRESENCE	DESCRIPTION/REMARKS
	0'-4'	---	PH	DRY	FINE BROWN SAND
	4'-6'	2,1,1,1	⊥	WET	
					END OF BORING

GROUNDWATER PROTECTION, INC.
LOG OF BORING

SITE NAME	CHEVRON CHEMICAL	DRILLER	VANCE BIEHL
LOCATION	3100 N HWY 441	DREW CREW	RAYMOND & DAVE
	ORLANDO, FL.	BORING DATE	10/09/90
CLIENT	BROWN & CALDWELL CONSULTANTS	BORING #	SB #27
PROJECT#	5287	WORKORDER #	2418

METHOD: HAMMER ADV. X THRU AUGER X ROTARY SPLIT SPOON X SHELBY TUBE

STATIC WATER LEVEL 5'

SAMP. #	SAMPLE DEPTH	BLOW COUNT	SAMPLE TYPE	WATER PRESENCE	DESCRIPTION/REMARKS
	0'-4'	---	PH	DRY	FINE BROWN SAND
	4'-6'	2,3,3,4	⊥	WET	⊥
					END OF BORING

GROUNDWATER PROTECTION, INC.
LOG OF BORING

SITE NAME	CHEVRON CHEMICAL	DRILLER	VANCE BIEHL
LOCATION	3100 N HWY 441	DREW CREW	RAYMOND & DAVE
	ORLANDO, FL.	BORING DATE	10/09/90
CLIENT	BROWN & CALDWELL CONSULTANTS	BORING #	SB #29
PROJECT#	5287	WORKORDER #	2418

METHOD: HAMMER ADV. X THRU AUGER X ROTARY SPLIT SPOON X SHELBY TUBE

STATIC WATER LEVEL 5'

SAMP. #	SAMPLE DEPTH	BLOW COUNT	SAMPLE TYPE	WATER PRESENCE	DESCRIPTION/REMARKS
	0'-4'	---	PH	DRY	FINE BROWN SAND
	4'-6'	2,3,3,2	⊥	WET	⊥
					END OF BORING

GROUNDWATER PROTECTION, INC.
LOG OF BORING

SITE NAME	CHEVRON CHEMICAL	DRILLER	VANCE BIEHL
LOCATION	3100 N HWY 441	DREW CREW	RAYMOND & DAVE
	ORLANDO, FL.	BORING DATE	10/09/90
CLIENT	BROWN & CALDWELL CONSULTANTS	BORING #	SB #35
PROJECT#	5287	WORKORDER #	2418

METHOD: HAMMER ADV. X THRU AUGER X ROTARY SPLIT SPOON X SHELBY TUBE

STATIC WATER LEVEL 5'

SAMP. #	SAMPLE DEPTH	BLOW COUNT	SAMPLE TYPE	WATER PRESENCE	DESCRIPTION/REMARKS
	0'-4'	---	PH	DRY	FINE BROWN SAND
	4'-6'	3,2,3,4		WET	
					END OF BORING

APPENDIX B

GROUND PENETRATING RADAR SURVEY REPORT

DETECTION SCIENCES, INC. EASTERN DIVISION
496 HEALD ROAD CARLISLE, MASSACHUSETTS 01741 (508) 369-7999
TELEX: 495-2806
FAX: (508) 264-9934

FINAL REPORT

GROUND-PENETRATING RADAR SURVEY

CHEVRON ORLANDO
ORLANDO, FLORIDA

Prepared for:

BROWN & CALDWELL, INC.
201 East Pine Street Suite 1416
Orlando, Florida 32801

November 15, 1990

TABLE OF CONTENTS

INTRODUCTION AND SUMMARY 1
DESCRIPTION OF THE SURVEY 2
Survey Grid 2
Odometer Wheel 5
Accuracy of Ground Location 5
METHODOLOGY 6
Ionic Chemical Contamination 6
Non-Ionic Chemical Contamination 6
PRINCIPLES OF OPERATION 7
Velocity and Depth 7
Subsurface Reflections 7
Subsurface Materials 7
Use of Borings 8
Penetration Depth 8
EQUIPMENT 9
RESULTS OF THE SURVEY 10
Radar Survey Map 10
Ionic Anomalies 10
Non-Ionic Anomalies 10
Metal 11
Concrete Covering 11
Vertical Distribution 11
Lateral Boundaries 12
Sinkers 12
Table I 12
CONCLUSIONS 17
Ionic Materials 17
Non-Ionic Materials 17
Boring Locations 17
RETROSPECTIVE 18
APPENDIX 19

FIGURES

Figure 1 600 MHZ RADAR ANTENNA 3
Figure 2 CHART RECORDER AND RADAR CONTROLS 4

TABLES

Table I GRID COORDINATES OF RADAR ANOMALIES 13
Table A-I RECOMMENDED BORING LOCATIONS A-1

DRAWINGS

Drawing No. 291-90-01 RADAR SURVEY MAP 22

INTRODUCTION AND SUMMARY

On September 5-7, 1990, Detection Sciences, Inc. performed a ground-penetrating radar (GPR) survey at the Chevron Orlando Facility, Orlando, Florida. The purpose of the ground-penetrating radar survey was to identify and delineate soil which may have become contaminated from the operation of a former industrial facility on this property. The survey was conducted according to the requirements of Brown & Caldwell Consulting Engineers under the field direction of Mr. Russell V. Bowen, P.E. of Brown & Caldwell, with the assistance of Ms. Lisa Morrison of Brown & Caldwell.

The survey found both ionic and non-ionic radar anomalies in the soil. We presume that these radar anomalies are caused by chemical contamination. The exact cause of the radar signatures — i.e., the types of chemicals and the concentrations of these chemicals — must be determined by laboratory analysis of soil samples.

There are four main advantages for using ground-penetrating radar (GPR) for this type of survey:

- Ionic vs. Non-Ionic. The radar is capable of distinguishing between ionic and non-ionic chemicals such as acids and salts versus pesticides and petroleum products.
- Improved Detection Threshold. Detection Sciences has made proprietary design modifications to our radar equipment which has greatly improved the sensitivity of this equipment. Previously, the detection threshold was a concentration level in the low parts per million (ppm) range. Recent data suggests the detection threshold of our modified radar system may now be in the parts-per-billion (ppb) range.
- Lateral Definition Accuracy. The locations of the boundaries defining the contaminated areas are accurate to within 1 foot, thereby providing a precise determination as to the aerial extent of the modified physical properties in the soil.
- Vertical Definition Accuracy. The vertical distribution, or depth, of the contaminated areas are accurate to within a few inches, thereby providing a precise determination as to the vertical extent of the modified physical properties in the soil.
- Characterization. The radar is capable of characterizing soil conditions caused by the presence of specific chemicals. Used in conjunction with laboratory testing, the radar data can be "calibrated" to precisely determine the lateral and vertical extent of a specific type of contamination.

The results of the survey are shown on Detection Sciences, Inc. Drawing **#291-90-01**, titled "RADAR SURVEY MAP, CHEVRON ORLANDO SITE, ORLANDO, FLORIDA", which shows the distribution of modified soil characteristics classified as *ionic* or *non-ionic* with gradations within each classification. At certain locations the radar showed a response that is characteristic of metal; these locations are also shown on the map.

The data shown on the RADAR SURVEY MAP (Drawing #291-90-01) are listed in tabular form in **Table I**, titled "GRID COORDINATES OF RADAR ANOMALIES".

DESCRIPTION OF THE SURVEY

The survey covered an area of approximately 1½ acres. A total of 50 radar survey lines were run on the site, covering the accessible portions of the site. The northwest corner and the southeast corner of the survey grid were not accessible for surveying with the GPR equipment.

The majority of the survey lines were run in the area north of the buildings as a series of parallel east-west lines with a spacing of 5 feet. In the northeast corner of the grid, seven survey lines were run with a 10-foot spacing. In the area west of the buildings, a series of fifteen north-south survey lines were also run with a spacing of 10 feet.

The "footprint" of each survey line covers a path nearly 5 feet wide at the surface of the ground, becoming progressively wider with greater depth. (The radar beam spreads about 20° on either side, or approximately 40° total beam angle measured from side-to-side.) In the area covered with the 5-foot spacing between adjacent lines, the survey provided 100-percent inspection of the total volume of soil. In the areas covered with the 10-foot spacing between adjacent lines, the survey effectively sampled 50 percent of the total volume of soil.

Figure 1 illustrates a 600 MHz radar antenna being hand-pulled over the ground. For this site, the survey was run with a radar antenna operating at a frequency of 120 MHz. This larger, lower-frequency antenna can penetrate more deeply into the ground and is better suited for towing behind a vehicle. The radar system was set to probe to a depth of 24 feet. This 24-foot depth setting results in a vertical scale-factor of 1 inch = 2 feet on the 12-inch radar charts.

A van was used to tow the 120 MHz radar antenna along each survey line. The van carried all electronic controls, power supplies and recording equipment. All of the data were tape-recorded for subsequent laboratory analysis and interpretation. (These magnetic tapes are permanently retained in our project archives.) A scanning chart-recorder provided a hard-copy display of the radar data, as shown in **Figure 2.**

Survey Grid

The survey grid is aligned with the buildings and structures on the site. The survey baseline designated as the Ø' EAST BASELINE is displaced two feet west of the west edge of the concrete ramp. The Ø' NORTH BASELINE is displaced 20 feet north of the building containing the Truck Service Bays. All north-south measurements were made with respect to the Ø' NORTH BASELINE. All east-west measurements were made with respect to the Ø' EAST BASELINE.

Two reference points, designated as GAI "A" and GAI "B", were also established on the grid. GAI "A" and GAI "B" are nails driven into the asphalt and marked with red surveyor's ribbon. Red fluorescent paint was sprayed on the asphalt to identify these grid reference points. GAI "A" is located 20 feet north of the building containing the Truck Service Bays, and 20 feet east of the Ø' EAST BASELINE. GAI "A" also defines the position of the Ø' NORTH BASELINE for the survey grid. The specific grid coordinates for GAI "A" are Ø'N, 20'E.

The marker nail designated as GAI "B" was driven into the asphalt at grid coordinates 100'N, 340'W. The placement of GAI "A" and GAI "B" provides a means of establishing the survey grid independent of the buildings and structures on the site.

Figure 1.

600 MHz RADAR ANTENNA

The operator is guiding the high-resolution 600 MHz radar antenna along the surface of the ground. The handle has an event-marker switch to electronically annotate the ground locations on the radar charts. Extending to the left is the coaxial cable assembly (100 feet in length) which connects the radar antenna to the radar controls, power supplies, tape recorder and the graphics recording equipment.

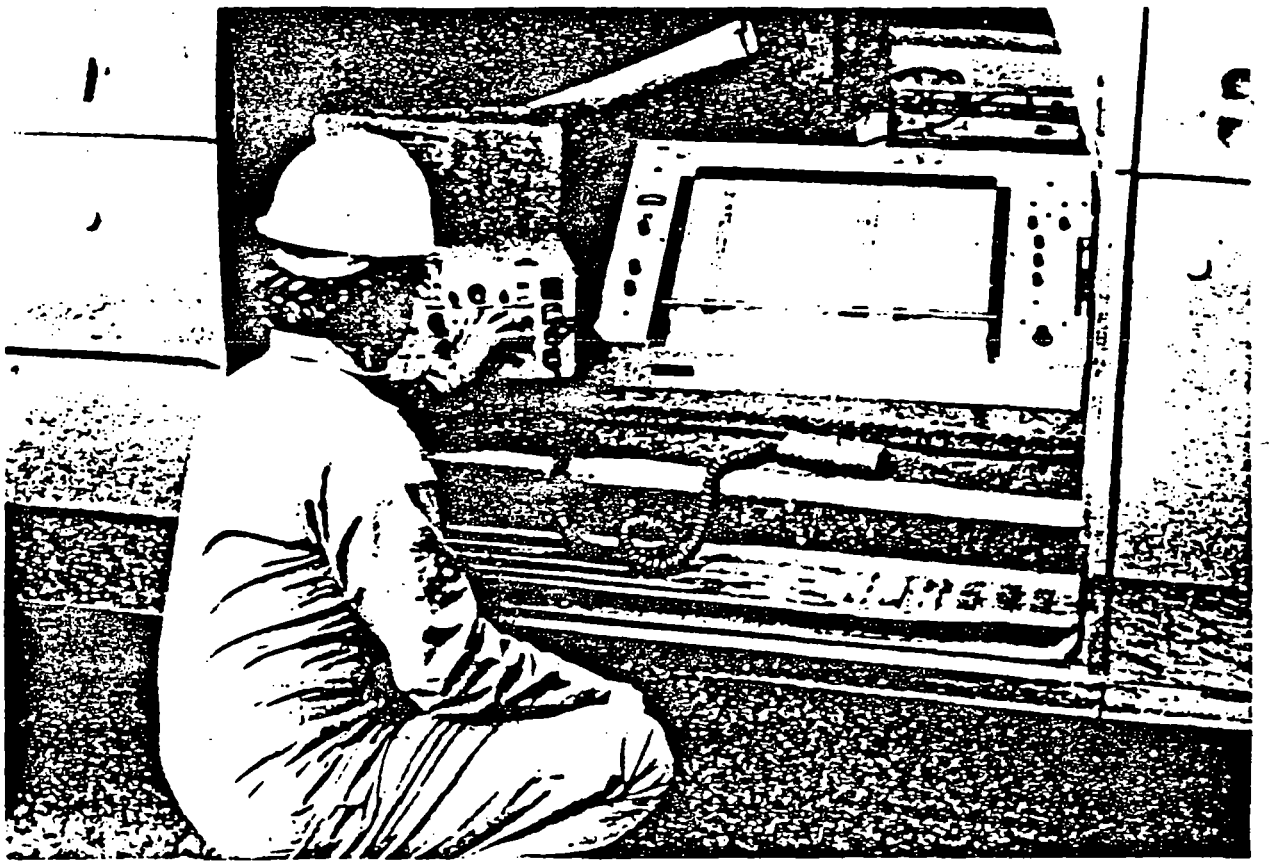


Figure 2.

CHART RECORDER AND RADAR CONTROLS

The EPC scanning chart recorder (right foreground) produces the hard-copy vertical-profile radar records. All data is tape-recorded on the four-channel Hewlett-Packard instrumentation tape recorder (rear left). The radar control unit (left foreground) also provides the operator with a CRT display. The power supply (right background) provides a.c. electrical power for the system.

DESCRIPTION OF THE SURVEY (Cont.)9

Odometer Wheel

A 20-inch diameter "fifth-wheel" odometer attached to the rear bumper of the survey vehicle automatically logs distance traveled along the survey line. A microswitch attached to the frame of the odometer wheel triggers an electronically generated "tick-mark" at the top of the radar record. Each revolution of the odometer wheel is an incremental distance of 5 feet. Although the odometer wheel has been calibrated over long distances, its principal use is to record incremental distance traveled from the previous grid station, usually a marker stake or a spray-painted mark. It is assumed that the marker-stake locations are the most accurate (and most convenient) method of locating points along the survey line. To record the position of each marker stake, a manually operated event-marker switch generates a vertical dashed line on the radar record. Each increment of 100 feet is marked with a pair of these vertical dashed lines. Using the odometer wheel in conjunction with grid-marker stakes eliminates any problems with odometer wheel slippage or other possible sources of accumulated error over the length of the survey line. The use of two independent measuring systems also provides a back-up in the event of a malfunction of one of the systems.

Accuracy of Ground Location

Although the odometer wheel is inherently accurate, the "tick-marks" at the top of the radar record only occur at intervals corresponding to a distance of 5.0 feet of travel (one revolution of the odometer wheel). To determine ground location between successive "tick-marks", it is necessary to interpolate. The accuracy of the interpolation process is about ± 10 percent, equivalent to about ± 0.5 feet for each 5-foot interval along the line of traverse. (The ± 10 percent criterion is derived from the possible short-term deviation in the velocity of the vehicle which tows the radar antenna. The tape recorder and the graphic chart recorder both run at constant speed. If the vehicle speeds up or slows down, it has the net effect of shrinking or stretching the horizontal scale, an effect which can be calibrated by observing the spacing between successive "tick-marks" on the radar record.)

Side-to-side location accuracy is normally about ±1 foot, this being the accuracy of maintaining lateral position while running a survey line. Because the "footprint" of the antenna is a path nearly 5 feet wide, lateral deviations up to a foot or more have only a minor effect on the data. Although accuracy along the length of a line (±0.5 foot) is better than the lateral accuracy (±1 foot), ground location accuracy is generally specified as ±1 foot in all directions.

METHODOLOGY

The bulk of the survey was run as a series of parallel lines spaced 5 feet apart, which provided 100-percent coverage of the area contained with this spacing. Each survey line produced a vertical profile chart to a total depth of 24 feet. The data contained in each vertical profile chart was tabulated according to grid location and the results were plotted on a map. The map shows the distribution and relative concentrations of non-ionic and ionic material in the soil.

Ionic Chemical Contamination

Ground-penetrating radar is capable of observing chemical contamination in the ground and is capable of distinguishing between ionic and non-ionic liquids.[1] Fundamentally, the presence of chemical contamination alters the physical properties of the host material. The two physical properties important to the radar are electrical conductivity and the dielectric constant. The presence of ionic chemicals (i.e., acids, bases, and salts) will typically increase the electrical conductivity of the ground. Such changes show as a lighter-than-normal contrast on the radar.

Non-Ionic Chemical Contamination

Chemicals which are not electrically active (i.e., petroleum products, organics, pesticides and solvents) will typically modify the dielectric constant of the ground. This type of change is observed as a darker-than-normal contrast on the radar record.[2] Previous data had shown that our modified GPR equipment was capable of detecting concentration levels as low as a few parts-per-million (ppm). More recently, we have observed good, strong radar reflections from 2 ppm benzene in the soil, and believe that the detection threshold for our modified GPR system for detecting non-ionic liquids (pesticides, etc.) may currently be in the parts-per-billion (ppb) range.

---

1 Stanfill, D.F. III and McMillan, K.S., "Inspection of Hazardous Waste Sites Using Ground-Penetrating Radar (GPR)," *Proc. National Conference on Hazardous Waste and Environmental Emergencies*, p. 244-249, Hazardous Materials Control Research Institute (H.M.C.R.I.), Cincinnati, OH, May, 1985.

2 Stanfill, D.F. III and McMillan, K.S., "Radar-Mapping of Gasoline and Other Hydrocarbons in the Ground", *Proc. 6th National Conference on Management of Uncontrolled Hazardous Waste Sites*, p. 269-274, Hazardous Materials Control Research Institute (H.M.C.R.I.), Washington, D.C., November, 1985.

PRINCIPLES OF OPERATION

The ground-penetrating radar system is an echo-location system which emits a brief impulse of radio energy lasting only a few billionths of a second. The length of time for the radar echoes to return to the radar antenna corresponds to the depth below the surface. By recording these depth-dependent echoes on a scanning time-based chart recorder, a vertical profile of the ground is generated. This vertical profile shows the longitudinal distribution of subsurface strata and other features over which the radar antenna has passed.

Velocity and Depth

The radar impulse travels into the ground at an average speed of about 40 percent of the speed of light. The exact speed depends on the nature of the material through which the impulse is traveling. The slowest medium is water, where the speed is about 11 percent of the speed of light. The fastest material is dry sand, where the speed is about 50 percent of the speed of light. In air, such as an underground cavity, the radar impulse travels almost exactly at the speed of light, taking one nanosecond (one billionth of a second) to travel one foot.

The ground-penetrating radar equipment is designed to measure and display the time-based echoes down to a fraction of a nanosecond. To convert to depth, it is necessary to know the exact velocity of the radar impulse as it travels through the ground. Over the past decade, Detection Sciences has developed a proprietary database of the radar velocities of various materials. With this database we are able to electronically calibrate the radar system within about 1 percent of local depth. Borings, test trenches and the common point method (a time-based geometric triangulation method) can also be used to depth-calibrate the radar. The ultimate limit of accuracy is determined by lateral variations in soil moisture content and the inhomogeneity of soil materials. Because of these limits, we have come to rely on electronic calibration. This method has proven to be at least as good as, or better than, the accuracy of depth measurements based on soil borings.

Subsurface Reflections

At the interface of two materials, the radar impulse typically undergoes an abrupt change in velocity. It is this change in velocity which causes some of the radar energy to be reflected back to the surface of the ground where it is detected by the antenna. The amount of energy that is reflected, or the reflection coefficient, depends on the contrast between the two materials; i.e., the difference between their respective radar velocities. Because the radar velocity is proportional to the inverse square root of the dielectric constant, the fundamental parameter to which the radar is responding is the difference in the dielectric constants at the reflecting surface.

All materials with the exception of metals are relatively transparent to the passage of radar energy. Metals reflect all of the energy striking their surface; buried metal objects like pipes or metal containers are therefore excellent targets. The fact that most materials are relatively transparent means that the radar impulse can continue to send back reflection after reflection as it propagates downward into the ground, thus revealing the various subsurface strata and profiles.

Subsurface Materials

In effect, the radar functions as a "difference meter" by drawing a boundary at the interface of two different materials. The "texture" of the radar reflections also vary with different type of materials. With experience it is possible to interpret the radar reflections to accurately identify common subsurface materials such as clay, peat, glacial till, and bedrock. Certain special situations, such as ionic chemicals, non-ionic chemicals, and gasoline in the soil which are also relatively easy to identify. Other situations such as interspersed layers of organic silt, silty sands, etc., are impossible to identify without direct visual inspection by means of a test trench or core sample.

Use of Borings

The radar can be "calibrated" by using available boring logs to identify the types of subsurface materials. The best strategy is to first perform the radar survey and then use the radar data to specify the locations for a few strategically-placed borings. Although borings are useful for direct physical examination of subsurface materials and for confirming suspected low-density zones, the use of radar can largely supplant the use of borings. In this regard, it is useful to think of the radar system as a means of making a continuous profile of "electronic borings" spaced 1 to 3 inches apart. Each radar impulse and its successive train of echoes constitute a single scan, or sounding. At a rate of 52 vertical soundings per second, the radar is capable of generating millions of "electronic boreholes" in the course of a day. Using radar in conjunction with a few diagnostic borings is more economical than a complete schedule of borings. Radar also provides continuous subsurface profiles which is much more accurate than having to interpolate between borings.

Penetration Depth

The penetration depth of the radar system depends on the operating frequency and the electrical conductivity of the ground. For shallow penetration of a few feet, the optimum choice is an operating frequency of 600 MHz. This small, lightweight antenna can penetrate to a depth of about 5 feet under the most adverse ground conditions, and as much as 25 to 30 feet under good conditions. "Adverse" refers to highly conductive materials having a resistivity of less than 10 ohm-meters. "Good" radar conditions are resistivities of several hundred ohm-meters or more.

Shifting to a lower operating frequency provides greater penetration, the improvement being the square root of the ratio of the respective wavelength. An operating frequency of 120 MHz is a good general-purpose frequency for reaching depths that are beyond the capability of the 600 MHz antenna. We routinely use this antenna to probe to a depth of 48 feet. The 48-foot depth setting provides a convenient vertical scale of 1 inch = 4 feet on the 12-inch vertical profile strip charts. In general, we tend to work in multiples of 12 feet so that the vertical scale factor on 12-inch charts will correspond to a convenient engineering scale (instead of using arbitrary time-based scales which have long been the custom in this field).

Although lower-frequency antennas provide greater depth of penetration, there is a corresponding loss of detail, or spatial resolution, due to the longer wavelength. The optimum is to use as high an operating frequency as possible consistent with the depth requirements, thus providing the best possible detail under the operating conditions. The useful range of ground-penetrating radar frequencies is limited to about 10 MHz at the lower end, up to a maximum of about 1200 MHz (1.2 GHz) at the upper end. The penetration of the 1.2 GHz antenna is limited to a few inches. The 10 MHz antenna can penetrate hundreds of feet into the ground but the corresponding loss of detail limits its usefulness to large features such as geologic strata. Fortunately, the most demanding spatial resolution requirements are usually small, near-surface targets such as wire reinforcing-mesh in concrete or the shallow burial of electric wires. The more deeply-buried targets are nearly always larger objects such as sewer pipes or storm drains.

The discussion regarding penetration depth assumes that all antennas have the same power. The penetration depth at any given frequency can be improved with increased power, but the improvement suffers from inverse-square losses as a function of depth, so that a quantum jump in power is necessary to gain any significant improvement. For this reason, Detection Sciences, Inc. has focused its research efforts on improving the sensitivity of the radar receiver and reducing the internal noise of the receiver. These efforts have paid off by increasing the penetration depth of our equipment by about a factor of 5 compared to standard, commercially-available systems. This improved capability allows Detection Sciences, Inc. to obtain data under conditions that were previously impossible for ground-penetrating radar. Unlike the early days of ground-penetrating radar, the depth of penetration, particularly in clay, is no longer a compelling issue.

EQUIPMENT

The radar equipment consisted of a custom-modified GSSI SIR System-8 Subsurface Interface Radar. Detection Sciences has developed proprietary circuit designs and other proprietary modifications which have increased the depth of penetration by nearly a factor of five (5) compared to the original commercial equipment purchased in 1980. There are also corresponding improvements in spatial resolution and clarity of the radar records. The net result is that the modified radar system is able to penetrate clay and other difficult environments having high electrical conductivity (ionic materials) where it would be impossible to obtain data with an ordinary, unmodified radar system.

All data was tape-recorded on a Hewlett-Packard Model 3964A Instrumentation Tape Recorder. The radar graphic charts consist of vertical-profile strip charts run on an EPC Laboratories, Inc. Model 2200S Scanning Graphic Chart Recorder, as shown in Figure 2. The radar graphic charts are reproduced with a vertical scale of 2 feet per inch, equivalent to a total depth of 24 feet on a 12-inch high strip chart. The specific equipment used on this survey are:

CONTROL UNIT. The control unit is a custom-modified GSSI Model 4800. This unit contains the bulk of all the radar electronics and system controls, and has an oscilloscope which shows the amplitude of each radar impulse and its corresponding echoes.

MOTOROLA MODEL M68MM01A/1A2 MONOBOARD MICROCOMPUTER. The microcomputer has real-time processing capability for background removal, digital filtering, running averages, stacking and other radar signal-processing algorithms.

HEWLETT-PACKARD MODEL 3964A TAPE RECORDER. This high quality, four-channel instrumentation tape recorder provides master tapes of all data recorded in the field.

EPC LABORATORIES, INC. MODEL 2200S CHART RECORDER. This scanning chart recorder generates the 12-inch hard-copy radar graphic charts (vertical profiles) used to interpret the radar data.

RADAR ANTENNA UNITS. The custom-designed radar antennas have proprietary high-performance electronic circuits. The antennas operate at different frequencies; the depth requirements determine the operating frequency selected for the survey:
[ ] 900 MHz [ ] 600 MHz [ ] 300 MHz [X] 120 MHz [ ] 80 MHz [ ] 10 MHz

TRIPPE 500VA SOLID STATE INVERTER. This power supply unit provides both 120 volt ac power as well as 12 volt dc power for operating all field equipment from the survey vehicle's electrical system.

REMOTE STOP/START UNIT. The remote stop/start feature allows the operator to control the radar system from the antenna location.

ODOMETER WHEEL ASSEMBLY. The custom-built, 20-inch diameter "fifth wheel" odometer attached to the rear bumper of the survey vehicle provides automatic logging of 5-foot increments traveled along the survey path. Each 5-foot increment is automatically recorded as a "tick mark" along the top of the radar chart.

SUPPORT EQUIPMENT. The various support equipment includes the Micro-computer Box, the Remote Control/Market Unit, Hand-held Marker Unit, towing sled, towing harness and miscellaneous electrical cables and connectors.

RESULTS OF THE SURVEY

Radar Survey Map

Drawing #291-90-01, titled "RADAR SURVEY MAP, CHEVRON ORLANDO SITE, ORLANDO, FLORIDA", shows the results of the survey. The soil conditions are identified as ionic or non-ionic. There are three gradations of relative concentrations, designated as "strong" "medium" or "light". (The specific concentration levels corresponding to the three gradation levels would have to be determined by laboratory analysis of soil samples.) The map also shows the location of each radar survey line run on the site.

Ionic Anomalies

The areas showing an elevated electrical conductivity relative to the site at large are designated as having *ionic* anomalies. There are only two gradations of ionic anomalies: "medium" and "light". There were no locations where a strong ionic response (high electrical conductivity) was observed. The areas having moderately elevated levels of electrical conductivity, classified as *medium ionic* response, are shaded medium-grey. The areas having slightly elevated levels of electrical conductivity, classified as *light ionic* response, are shaded light-grey. The locations having elevated electrical conductivity appear to be confined to the northwest corner of the grid; elevated electrical conductivity was not observed at any other location.

Non-Ionic Anomalies

The areas showing an elevated dielectric constant relative to the site at large are designated as having *non-ionic* anomalies. An elevated dielectric constant is indicative of a non-ionic liquid being present in the pore space of the soil. There are three gradations of non-ionic anomalies: "strong", "medium" and "light". The areas having the most elevated dielectric constant, classified as *strong non-ionic* response, are shown by the darkest cross-hatched shading. The areas having moderately elevated dielectric constant, classified as *medium non-ionic* response, are shown by the medium-toned cross-hatching. The areas having slightly elevated dielectric constant , classified as *light non-ionic* response, are shown by the lightest-toned cross-hatching.

RESULTS OF THE SURVEY (Cont.)

Metal

In the area north of the Truck Service Bays in the vicinity of grid coordinate 100'E, the radar shows signatures that are characteristic of metal in the ground. These locations are shown on the map by the solid black shading.

Concrete Covering

The ground-penetrating radar system can penetrate through concrete and observe the soil conditions below the concrete. Penetrating through a concrete cover produces some attenuation of the radar signal. The net result is that light non-ionic condition may not offer much contrast compared to normal background conditions. About 2 feet east of the Ø EAST BASELINE, from grid coordinates 40'N to 90'N, there is a line of demarcation which corresponds to the edge of the concrete. We suspect that the light ionic conditions observed west of this line could possibly extend under the concrete, but the effects of the concrete may make these conditions too subtle to be observed. Alternately, the lack of observable anomalies under the concrete may be a genuine observation; the concrete could be acting as an umbrella, or shield, to protect the underlying soil from contamination. The line of demarcation at the edge of the concrete may therefore be an artifact caused by the run-off of surface water infiltrating into the adjoining soil. Soil testing would be necessary to resolve this question.

Vertical Distribution

The map shows the lateral distribution of modified soil characteristics. The vertical distributions observed on this site are relatively featureless. To define the meaning of "featureless" vertical distribution, is is necessary to describe more ordinary vertical distributions observed with GPR.

In the absence of lateral migration patterns (which is the case on this site), we are often able to see distinct phase-fronts of vertical migration. We believe that these phase-fronts are the result of viscosity segregation, where migration rates are determined by the viscosity of the various components of liquid contaminants (including dissolved contaminants). The soils appear to act like a chromatography column, separating the various components into discrete phase-fronts according to their specific rates of migration. We do not observe any such phase-fronts of vertical migration on this site. We suspect that the sandy soils are relatively permeable, permitting vertical migration down to the shallow water table without noticeable vertical segregation effects.

RESULTS OF THE SURVEY (Cont.)

Lateral Boundaries

The areas with non-ionic response have sharply-defined lateral boundaries. In particular, the areas with the strongest levels of non-ionic response have sharp, vertical boundaries that indicate that the non-ionic material is contained within the boundaries of an excavation. We observe the interruption of the soil horizons in the surrounding soils, which provides additional evidence of an excavation having been made at these locations. The strong radar responses observed at these locations are indicative of relatively high concentration levels (hundreds, or thousands of ppm), possibly approaching saturation conditions.

"Sinkers"

We do not observe any vertical "sinkers" on this site. Sinkers consist of liquid components whose density is greater than water. Sinkers can be observed migrating down through the soil, extending below the shallow water table. Such behavior is typical of liquids such as creosote and heavy petroleum distillates. The radar data indicates that the liquid components on this site appear to be contained within the pore spaces of the soil above the shallow water table. The absence of sinkers suggests that the liquid components are less dense than water.

Table I

For convenience, all of the data shown on the RADAR SURVEY MAP have been numerically tabulated in **Table I**, titled "GRID COORDINATES OF RADAR ANOMALIES". This table lists the grid coordinates on each radar survey line where the radar anomalies are observed. In all cases, the conditions described in the Table extend down a depth corresponding to the shallow water table.[3]

[3] Due to capillary action, water tables are seldom visible with GPR. In certain rare situations where coarse sand or well-washed gravel cannot support a capillary fringe, there may be a sharply-defined water table that is visible on radar. Otherwise, most soils have a capillary fringe about two feet thick. Within the fringe, there is a gradual transition of moisture level, ranging from the residual soil moisture level above the fringe to full saturation below the fringe. The gradual transition of moisture level in the capillary fringe does not provide a distinct water surface that is capable of producing a radar reflection.

Table I.

GRID COORDINATES OF RADAR ANOMALIES CHEVRON SITE, ORLANDO, FLORIDA

Survey Line	Start of Condition	End of Condition	Type of Condition
0' N	85' E	95' E	Metal
"	104' E	121' E	"
"	11' W	63' W	Medium Non-Ionic *
5' N	12' E	40' E	Light Non-Ionic
"	43' W	64' W	"
"	86' E	120' E	Metal
"	8' W	43' E	Medium Non-Ionic
10' N	148' E	163' E	Light Non-Ionic
"	28' W	60' W	"
"	109' W	126' W	"
"	52' E	67' E	Metal
"	86' E	122' E	"
"	137' E	148' E	"
"	60' W	85' W	Medium Non-Ionic
15' N	154' E	167' E	Light Non-Ionic
"	45' W	84' W	"
"	10' E	27' E	"
"	66' E	85' E	"
"	87' E	95' E	Metal
"	109' E	119' E	"
"	133' E	142' E	"
"	43' E	66' E	Medium Non-Ionic
20' N	39' E	55' E	Light Non-Ionic
"	69' E	88' E	"
"	156' E	176' E	"
"	26' W	49' W	"
"	88' W	99' W	"
"	88' E	122' E	Metal
"	55' E	69' E	Medium Non-Ionic
"	136' E	143' E	"
"	49' W	70' W	"
25' N	32' E	50' E	Light Non-Ionic
"	81' E	98' E	"
"	31' W	70' W	"
"	85' W	114' W	"
"	132' W	152' W	"
"	50' E	81' E	Medium Non-Ionic
"	122' E	149' E	"
30' N	52' E	89' E	Strong Non-Ionic
"	124' E	149' E	"
"	89' E	124' E	Light Non-Ionic
"	149' E	171' E	"
"	30' W	50' W	Light Non-Ionic
"	31' E	52' E	Medium Non-Ionic
"	50' W	72' W	"
35' N	64' E	91' E	Strong Non-Ionic

Table I. (Cont.)

GRID COORDINATES OF RADAR ANOMALIES CHEVRON SITE, ORLANDO, FLORIDA

Survey Line	Start of Condition	End of Condition	Type of Condition
35' N	111' E	145' E	Strong Non-Ionic
"	91' E	111' E	Light Non-Ionic
"	58' W	76' W	"
"	32' E	64' E	Medium Non-Ionic
"	145' E	177' E	"
40' N	60' E	110' E	Strong Non-Ionic
"	121' E	153' E	"
"	5' E	17' E	Light Non-Ionic
"	110' E	121' E	"
"	153' E	175' E	"
"	55' W	74' W	"
"	28' E	60' E	Medium Non-Ionic
45' N	179' E	192' E	Light Non-Ionic
"	42' E	151' E	Strong Non-Ionic
"	55' W	74' W	Light Non-Ionic
"	4' E	16' E	Medium Non-Ionic
"	25' E	42' E	"
50' N	42' E	145' E	Strong Non-Ionic
"	14' E	42' E	Light Non-Ionic
"	166' E	186' E	"
"	41' W	70' W	"
"	5' W	14' E	Medium Non-Ionic
55' N	53' E	79' E	Strong Non-Ionic
"	96' E	125' E	"
"	4' E	23' E	Light Non-Ionic
"	153' E	166' E	"
"	53' W	72' W	"
"	79' E	96' E	Medium Non-Ionic
"	125' E	142' E	"
"	166' E	187' E	"
60' N	86' E	136' E	Strong Non-Ionic
"	4' E	15' E	Light Non-Ionic
"	45' E	86' E	"
"	184' E	195' E	"
"	166' E	184' E	Medium Non-Ionic
"	53' W	70' W	"
63' N	243'E	260'E	Light Ionic
65' N	86' E	117' E	Strong Non-Ionic
"	3' E	15' E	Light Non-Ionic
"	52' E	86' E	"
"	166' E	185' E	"
"	50' W	80' W	"
"	117' E	130' E	Medium Non-Ionic
70' N	89' E	138'E	Strong Non-Ionic
"	5' E	40' E	Light Non-Ionic
"	73' E	89' E	"

Table I. (Cont.)

GRID COORDINATES OF RADAR ANOMALIES CHEVRON SITE, ORLANDO, FLORIDA

Survey Line	Start of Condition	End of Condition	Type of Condition
70' N	58' W	68' W	Light Non-Ionic
"	238' E	267' E	Medium Ionic
75' N	49' E	73' E	Medium Non-Ionic
"	130' E	150' E	Light Non-Ionic
"	62' E	92' E	Strong Non-Ionic
"	3' E	22' E	Light Non-Ionic
"	44' E	62' E	"
"	50' W	72' W	"
"	92' E	108' E	Medium Non-Ionic
80' N	70' E	103' E	Strong Non-Ionic
"	3' E	33' E	Light Non-Ionic
"	131' E	147' E	"
"	26' W	56' W	Light Non-Ionic
"	56' W	70' W	Medium Non-Ionic
85' N	52' E	78' E	Light Non-Ionic
"	0' E	38' E	"
"	26' W	45' W	"
"	45' W	74' W	Medium Non-Ionic
90' N	7' W	12' E	Light Non-Ionic
"	19' E	39' E	"
"	203' E	243' E	Medium Ionic
"	7' W	70' W	Medium Non-Ionic
95' N	25' E	36' E	Light Non-Ionic
"	43' W	63' W	"
"	5' E	43' W	Medium Non-Ionic
"	63' W	77' W	"
100' N	216' E	230' E	Light Ionic
"	47' E	75' E	Light Non-Ionic
"	3' E	70' W	"
"	230' E	255' E	Medium Ionic
110' N	217' E	2P33' E	Light Ionic
"	233' E	272' E	Medium Ionic
120' N	231' E	250' E	Light Ionic
5' S	26' W	64' W	Medium Non-Ionic
"	85' E	96' E	Metal
10' S	24' W	70' W	Medium Non-Ionic
50' S	20' W	57' W	Light Non-Ionic
"	127' W	148' W	"
30' W	0' N	13' S	Medium Non-Ionic
"	48' S	62' S	Light Non-Ionic
40' W	0' N	21' S	Medium Non-Ionic
"	36' S	52' S	Light Non-Ionic
50' W	0' N	31' S	Medium Non-Ionic
"	46' S	63' S	Light Non-Ionic
60' W	0' N	25' S	Medium Non-Ionic
"	75' S	90' S	"

Table I. (Cont.)

GRID COORDINATES OF RADAR ANOMALIES CHEVRON SITE, ORLANDO, FLORIDA

Survey Line	Start of Condition	End of Condition	Type of Condition
60' W	25' S	75' S	Light Non-Ionic
70' W	61' S	85' S	"
"	102' S	112' S	"
80' W	47' S	74' S	Medium Non-Ionic
"	99' S	125' S	Light Non-Ionic
90' W	61' S	74' S	Medium Non-Ionic
"	74' S	114' S	Light Non-Ionic
"	19' N	36' N	"
"	53' N	77' N	"
100' W	78' S	125' S	"
110' W	75' S	125' S	"
120' W	65' S	83' S	Medium Non-Ionic
"	105' S	127' S	Light Non-Ionic
130' W	68' S	80' S	Medium Non-Ionic
"	80' S	106' S	Light Non-Ionic
140' W	40' S	55' S	"
"	70' S	89' S	Medium Non-Ionic
150' W	50' S	65' S	"
"	65' S	90' S	Light Non-Ionic
160' W	54' S	95' S	"
170' W	52' S	88' S	"
180' W	71' S	78' S	"

* All conditions are observed in the pore spaces of the soil. The depths extend from the near-surface soils down to the water table.

CONCLUSIONS

Ionic Materials

The relatively low levels of ionic response observed with the radar system appear to be confined to the northwest corner of the survey grid. It is possible that these relatively low levels of ionic response could be due to natural soil conditions. Soil samples would be required to resolve this question.

High levels of ionic response — indicating high levels of concentration — are noticeably absent on this site. It appears that the material handling activities on this site were principally concerned with non-ionic materials, such as organic liquids and petroleum derivatives.

Non-Ionic Materials

Non-ionic responses were the prevailing characteristic of this site. In particular, the sharply-delineated edges of the conditions identified as strong non-ionic response indicate that these materials had been placed in some type of excavation. Surface spillage could not account for the type of radar signature observed in the areas where strong non-ionic response is found.

Boring Locations

Based on the soil characteristics observed with the ground-penetrating radar system, we had previously recommended certain strategically-placed boring locations for obtaining soil samples. The recommended locations, together with other locations planned to be investigated by Brown & Caldwell, are listed in **Table A-1** in the APPENDIX.

The soil sample data, in conjunction with the ground-penetrating radar data, should provide an assessment of site conditions that is far more comprehensive than could be obtained with either method alone.

RETROSPECTIVE

Although ground-penetrating radar is a powerful tool, it is an indirect method for assessing the actual soil conditions. The radar is exceedingly sensitive to localized changes in the physical properties of the soil, including the changes brought about by the presence of chemical contamination in the soil. But changes in the physical properties of the soil, including localized changes, can also be brought about by natural physical processes irrespective of any industrial use of the site.

What we attribute as being ionic and non-ionic "contamination" is largely circumstantial, bolstered by the fact that we know the site was used for handling potentially hazardous materials. Previous soil borings have also shown contamination to be present in the soil. The strongest circumstantial evidence is the placement and lateral distribution of the altered physical properties as seen by the radar. The resulting distribution pattern of non-ionic radar signatures, when plotted on the site maps, is entirely consistent with what we know about the former usage of the site

The program of borings and soil sampling can be expected to provide definitive answers as to what the radar is actually seeing at various locations on the site. Experience has shown that a single-point calibration (soil sample) can be extended over the lateral extent of the radar signature; i.e., the radar can be relied upon, with a high level of confidence, to show the lateral extent of any particular condition that has been quantitatively identified by external means.

We recommend correlating the available laboratory analysis of soil samples with the radar data to "calibrate" or quantize the radar response in regard to observed contamination levels. Although the radar response is a composite of *all* of the contaminants in the ground at any single location, the radar map should still indicate the lateral extent of the "soup" found at any location. Moreover, the radar information is valuable for what it does *not* indicate: i.e., the *absence* of any anomalous radar response which would indicate the presence of contamination in the ground.

At this point, we believe the threshold sensitivity of our high-performance radar to be in the ppb range. This estimate is an extrapolation of quantitative data (obtained at another site) where we have observed a strong radar response at levels of 2 ppm of benzine. What we conclude is that contamination levels in the areas of this site where no radar response was observed would have to be well below the ppm range — or else the radar would have observed some level of response.

APPENDIX

Table A-I

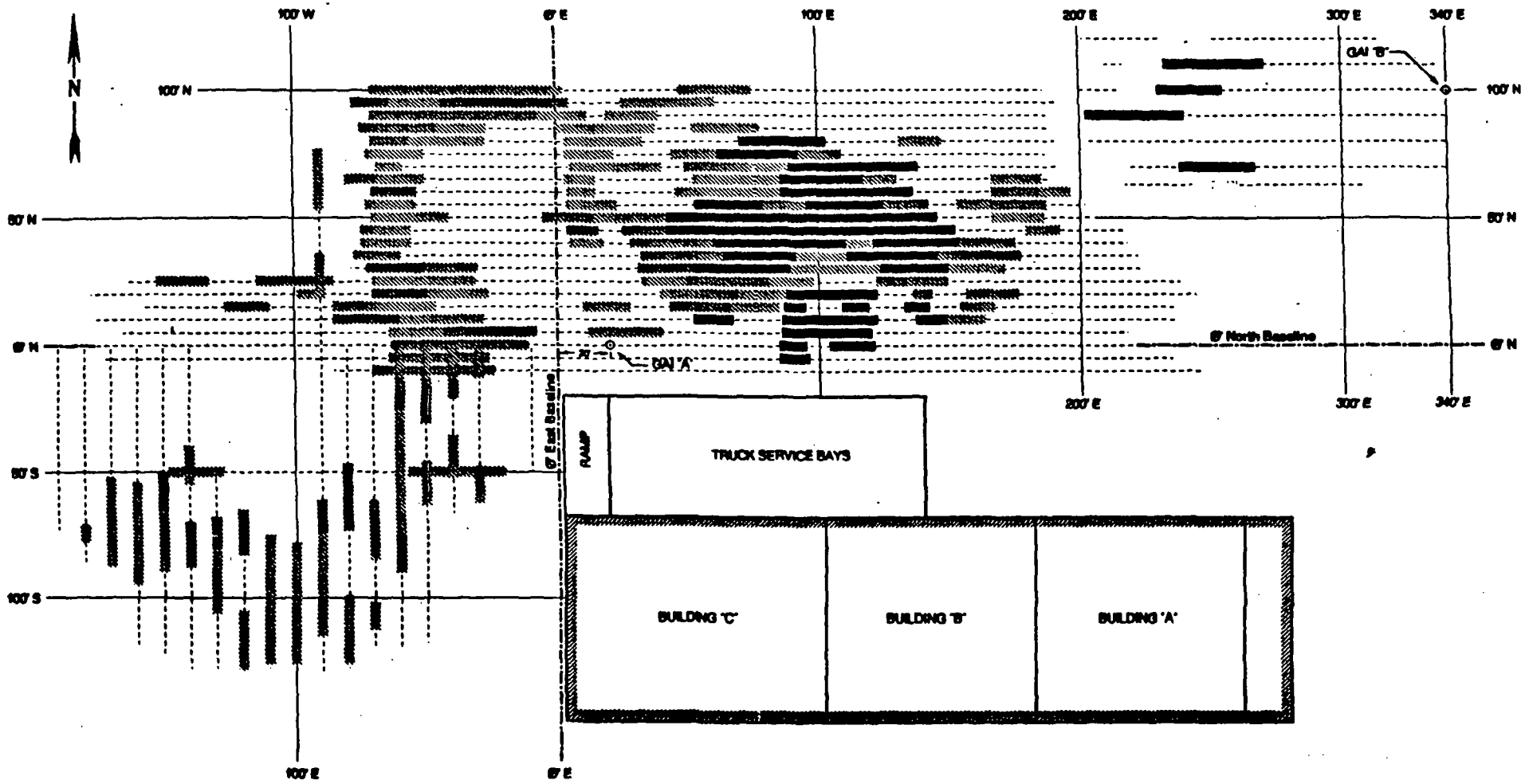
RECOMMENDED BORING LOCATIONS CHEVRON SITE, ORLANDO, FLORIDA

Boring Number	Grid Location	Comments
1	Outside of radar coverage	-
2	"	-
3	"	-
4	"	-
5	"	-
6	"	-
7	"	-
8	"	-
9-1	"	-
9-2	"	-
9-3	"	-
9-4	"	-
10-1	"	-
10-2	"	-
10-3	"	-
10-4	"	-
11-1	103'S, 109'W	No change
11-2	80'S, 137'W	No change
11-3	Outside of radar coverage	-
11-4	80'S, 80'W	No change
12-1	Outside of radar coverage	-
12-2	"	-
12-3	"	-
12-4	"	-
13-1	"	-
13-2	"	-
13-3	"	-
13-4	"	-
14-1	25'S, 148'W	Move to 35'S, 150'W
14-2	Outside of radar coverage	-
14-3	"	-
14-4	10'S, 100'W	No change
15-1	Outside of radar coverage	-
15-2	"	-
15-3	"	-
15-4	"	-

Table A-I (Cont.)

RECOMMENDED BORING LOCATIONS CHEVRON SITE, ORLANDO, FLORIDA

Boring Number	Grid Location	Comments
16-1	Outside of radar coverage	-
16-2	"	-
16-3	"	-
16-4	"	-
17	10'N, 65'W	No change
18	50'N, 65'W	No change
19	72'N, 52'W	No change
20	56'N, 5'W	No change
21	28'N, 6'E	No change
22	37'N,16'W	No change
23	2'S, 16'W	Move to 0'N, 17'W
24-1	Outside of radar coverage	-
24-2	"	-
24-3	"	-
24-4	"	-
25-1	98'N, 84'E	Move to 100'N, 52'E
25-2	Outside of radar coverage	-
25-3	"	-
25-4	98'N, 84'E	No change
26-1	15'N, 39'E	Move to 15'N, 50'E
26-2	52'N, 39'E	No change
26-3	53'N, 84'E	No change
26-4	17'N, 84'E	No change
27	62'N, 107'E	No change
28-1	Outside of radar coverage	-
28-2	"	-
28-3	84'N, 82'E	No change
28-4	46'N, 63'E	No change
29-1	74'N, 223'E	Move to 90'N, 230'E
29-2	110'N, 225'E	Move to 110'N, 240'E
30	Outside of radar coverage	-
31-1	92'N, 295'E	Move to 90'N, 304'E
31-2	125'N, 309'E	Move to 120'N, 290'E



Legend

- Radar Survey Line
- Metal
- Medium Ionic
- Light Ionic
- Strong Non - Ionic
- Medium Non - Ionic
- Light Non - Ionic

Scale:

0 15' 30' 60' 90'

— RADAR SURVEY MAP —

CHEVRON ORLANDO SITE

ORLANDO , FLORIDA

DETECTION SCIENCES, INC.
496 Heald Road, Carlisle, MA 01741

Date: September 7, 1990 | Drawing No.: 291-90-(

APPENDIX C

QUALITY ASSURANCE ANALYSIS AND LABORATORY DATA

Quality Assurance (QA) Analysis

Chevron/Orlando Site

I. FIELD QA

Field QA samples included the following sample types:

- Equipment Blanks to detect possible cross contamination resulting from insufficient sampling equipment decontamination,
- Field Blanks to detect possible cross contamination resulting from ambient conditions during sampling,
- Trip Blanks to detect possible cross contamination resulting from improper sample and container handling, and
- Duplicate Samples to determine the precision of the sampling process.

Blank Analysis

Chloroform was detected (3 ug/l) in a field blank collected during the deep soil sampling, and benzyl alcohol was detected (51 ug/l) in a field blank collected during the rail spur area sampling. These compounds were not detected in any sample collected during any sampling event, and consequently have no effect on the analytical data.

Bis (2-ethylhexyl) phthalate was also detected (99 ug/l) in the field blank from the rail spur area. This compound was detected in a single soil sample (SB-31, 76,000 ug/l) at a level 3 orders of magnitude greater than that of the blank.

No other contaminants were detected.

Duplicate Analysis

Soils

Duplicates were collected for soil samples SB-26 and SB-29. Due to elevated detection limits resulting from matrix interference, duplicate organic data is difficult to evaluate. Ethion, however, was detected in both duplicates of SB-26 with a precision of 36.22% relative standard deviation (RSD) as determined by:

$$\%RSD = |A-B|/((A+B)/2) * 100$$

Where: A = Value of replicate A
B = Value of replicate B.

Arsenic, chromium, and zinc were detected in both duplicates of SB-

29 with precisions of 16.67%, 7.69%, and 7.41% RSD, respectively. The average precision for metals was 10.59% with a standard deviation of 4.30%.

Overall average precision for soil was 17.00% with a standard deviation of 11.71%, well within acceptable limits of variability.

Groundwater

Groundwater duplicates were collected from MW-A, MW-D, and MW-H. Chromium and zinc were detected in both replicates of MW-A and MW-D with average precisions of 77.79% and 13.03% RSD, respectively. Duplicates of MW-H provided data for a wide range of organics, arsenic, chromium, and zinc with average precision equalling 54.11% RSD with a standard deviation of 48.35%.

Variability in precision for the groundwater samples ranged from 0.00% to over 100%. Organochlorine pesticides and other base neutral/acid extractables exhibited good precision with an average RSD of 13.58%. Volatile analysis became more variable with an average RSD of 56.24%. Metals were the most variable with and average of 70.89% RSD and a standard deviation of 41.77%.

During sampling, all samples for volatile organic analysis were collected from a single bailer volume, then randomly divided between the two duplicates. Due to the random nature of container division between duplicates, it is impossible to determine if order of filling influenced volatiles concentrations, and subsequent duplicate variability.

Field notes indicate that groundwater samples were turbid and brown to gray in color, suggesting a high content of suspended silts and other particulates. The presence of these particulates and their effect on contaminant concentrations due to adsorption and desorption could account for much of the variability, particularly with respect to metals. Filtration of future samples would eliminate this potential source of error.

II. LABORATORY QA

Data from the laboratory duplicate and matrix spike analysis indicates that the data meets the goals for precision and accuracy defined in SW-846. No contaminants were detected in laboratory blanks. The laboratory data is included in this appendix.

Shallow Soil Sample Analytical Results, Duplicate Analysis
Field Sampling, 1990

Parameter	Units	SB-26	DUP-26	%RSD
1,4-Dichlorobenzene	ug/kg	970	BDL	NA
4,4'-DDD	ug/kg	*	51000	NA
Chlordane	ug/kg	87000	*	NA
Ethion	ug/kg	75	52	36.22%
Average Percision:			+/-	36.22%
Standard Deviation:				NA

Deep Soil Sample Analytical Results, Duplicate Analysis
Field Sampling, 1990

Parameter	Units	SB-29	DUP-29	%RSD
Xylenes	ug/kg	BDL	24	NA
Arsenic	mg/kg	1.3	1.1	16.67%
Chromium	mg/kg	5.4	5	7.69%
Zinc	mg/kg	2.8	2.6	7.41%
Average Precision:			+/-	10.59%
Standard Deviation:				4.30%

Overall Average Precision for Soil:	+/-	17.00%
Standard Deviation:		11.71%

Groundwater Sample Analytical Results, Duplicate Analysis
Field Sampling, 1990

Parameter	Units	Well Identification MW-A	DUP-A	%RSD
Chromium	mg/l	0.1	0.043	79.72%
Zinc	mg/l	0.054	0.12	75.86%
Average Precision:			+/-	77.79%
Standard Deviation:				NA

Groundwater Sample Analytical Results, Duplicate Analysis
Field Sampling, 1990

Parameter	Units	MW-D	DUP-D	%RSD
Aldrin	ug/l	0.014	0.014	0.00%
Endosulfan I	ug/l	BDL	0.025	NA
Chromium	mg/l	0.011	0.011	0.00%
Zinc	mg/l	0.035	0.052	39.08%
Average Precision:			+/-	13.03%
Standard Deviation:				18.42%

Groundwater Sample Analytical Results, Duplicate Analysis
Field Sampling, 1990

Parameter	Units	MW-H	DUP-H	%RSD
Benzene	ug/l	97	54	56.95%
Toluene	ug/l	76	54	33.85%
Xylene	ug/l	1300	640	68.04%
Ethylbenzene	ug/l	220	130	51.43%
Chlorobenzene	ug/l	130	120	8.00%
1,4-Dichlorobenzene	ug/l	72	80	10.53%
1,2-Dichloroethane	ug/l	56	BDL	NA
1,1-Dichloroethene	ug/l	48	55	13.59%
Methylene Chloride	ug/l	290	68	124.02%
1,1,2-Trichloroethane	ug/l	220	39	139.77%
a-BHC	ug/l	2.4	2.8	15.38%
b-BHC	ug/l	7.7	8.2	6.29%
g-BHC	ug/l	1.7	1.7	0.00%
4,4'-DDD	ug/l	2.6	5.5	71.60%
Endosulfan I	ug/l	BDL	1.5	NA
Isopherone	ug/l	56	55	1.80%
2,4-Dimethylphenol	ug/l	BDL	47	NA
Phenol	ug/l	46	46	0.00%
Demeton-O	ug/l	130	22	142.11%
Arsenic	mg/l	0.03	0.092	101.64%
Chromium	mg/l	0.011	0.051	129.03%
Zinc	mg/l	BDL	0.027	NA
Average Precision:			+/-	54.11%
Standard Deviation:				51.00%

Overall Average Precision for Liquid:	+/-	50.81%
Standard Deviation:		48.35%

Summary by Analyte Class	Mean %RSD	Standard Deviation
Metals:	70.89%	41.77%
Volatiles:	56.24%	45.30%
Organochlorines/BNA's:	13.58%	24.25%

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

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LOG NO: T0-11097

Received: 10 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-6	CO-SB-20-01	Client
11097-7	CO-SB-21-01	
11097-8	CO-SB-22-01	
11097-9	CO-SB-22-02	
11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
Volatile Organics					
Benzyl chloride, ug/kg dw	<5.8	<110	<120	<130	<610
bis(2-Chloroethoxy) methane, ug/kg dw	<5.8	<110	<120	<130	<610
Bis(2-chloroisopropyl)ether , ug/kg dw	<5.8	<110	<120	<130	<610
Bromobenzene, ug/kg dw	<5.8	<110	<120	<130	<610
Bromodichloromethane, ug/kg dw	<5.8	<110	<120	<130	<610
Benzene, ug/kg dw	<5.8	<110	<120	<130	<610
Bromoform, ug/kg dw	<5.8	<110	<120	<130	<610
Bromomethane, ug/kg dw	<5.8	<110	<120	<130	<610
Carbon Tetrachloride, ug/kg dw	<5.8	<110	<120	<130	<610
Chloroacetaldehyde, ug/kg dw	<5.8	<110	<120	<130	<610
→ Chlorobenzene, ug/kg dw	<5.8	1800	130	300	<610
Chloroethane, ug/kg dw	<5.8	<110	<120	<130	<610
Chloroform, ug/kg dw	<5.8	<110	<120	<130	<610
1-Chlorohexane, ug/kg dw	<5.8	<110	<120	<130	<610
2-Chloroethylvinyl Ether, ug/kg dw	<5.8	<110	<120	<130	<610
Chloromethane, ug/kg dw	<5.8	<110	<120	<130	<610
Chloromethyl methyl ether, ug/kg dw	<5.8	<110	<120	<130	<610

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11097-9	CO-SB-22-02	
11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
Chlorotoluene, ug/kg dw	<5.8	<110	<120	<130	<610
Dibromochloromethane, ug/kg dw	<5.8	<110	<120	<130	<610
Dibromomethane, ug/kg dw	<5.8	<110	<120	<130	<610
1,2-Dichlorobenzene, ug/kg dw	<5.8	<110	<120	<130	<610
1,3-Dichlorobenzene, ug/kg dw	<5.8	<110	<120	<130	<610
1,4-Dichlorobenzene, ug/kg dw	<5.8	3600	<120	<130	<610
Dichlorodifluoromethane, ug/kg dw	<5.8	<110	<120	<130	<610
1,1-Dichloroethane, ug/kg dw	<5.8	<110	<120	<130	<610
1,2-Dichloroethane, ug/kg dw	<5.8	<110	<120	<130	<610
1,1-Dichloroethene, ug/kg dw	<5.8	<110	<120	<130	<610
1,2-Dichloropropane, ug/kg dw	<5.8	<110	<120	<130	<610
1,3-Dichloropropylene, ug/kg dw	<5.8	<110	<120	<130	<610
→ Ethylbenzene, ug/kg dw	<5.8	1500	2200	64000	14000
Methylene Chloride, ug/kg dw	<5.8	<110	<120	<130	<610
1,1,2,2-Tetrachloroethane, ug/kg dw	<5.8	<110	<120	<130	<610
1,1,1,2-Tetrachloroethane, ug/kg dw	<5.8	<110	<120	<130	<610
Tetrachloroethylene, ug/kg dw	<5.8	<110	<120	<130	<610
→ Toluene, ug/kg dw	<5.8	720	380	490	620

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11097-9	CO-SB-22-02	
11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
1,1,1-Trichloroethane, ug/kg dw	<5.8	<110	<120	<130	<610
1,1,2-Trichloroethane, ug/kg dw	<5.8	<110	<120	<130	<610
Trichloroethene, ug/kg dw	<5.8	<110	<120	<130	<610
Trichlorofluoromethane, ug/kg dw	<5.8	<110	<120	<130	<610
Trichloropropane, ug/kg dw	<5.8	<110	<120	<130	<610
Vinyl Chloride, ug/kg dw	<5.8	<110	<120	<130	<610
Xylenes, ug/kg dw	26	6200	190000	470000	100000

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11097-8	CO-SB-22-01	
11097-9	CO-SB-22-02	
11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
Aldrin, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Dibutyl phthalate, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Heptachlor epoxide, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Endosulfan I, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Fluoranthene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Dieldrin, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
4,4'-DDE, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Pyrene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Endrin, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Endosulfan II, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
4,4'-DDD, ug/kg dw	<350	51000	<18000*	40000	120000
Benzidine, ug/kg dw	<2800	<280000*	<140000*	<130000*	<310000*
4,4'-DDT, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Endosulfan sulfate, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Endrin Aldehyde, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Butylbenzylphthalate, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
bis(2-Ethylhexyl) phthalate, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Chrysene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Benzo(a)Anthracene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-11	CO-SB-23-02	Client
11097-12	CO-SB-32-01	
11097-13	CO-SB-33-01	
11097-14	CO-SB-29-02	

PARAMETER	11097-11	11097-12	11097-13	11097-14
Endrin, ug/kg dw	<33000*	<340	<340	<310
Endosulfan II, ug/kg dw	<33000*	<340	<340	<310
4,4'-DDD, ug/kg dw	92000	<340	<340	<310
Benzidine, ug/kg dw	<270000*	<2700	<2700	<2500
4,4'-DDT, ug/kg dw	<33000*	<340	<340	<310
Endosulfan sulfate, ug/kg dw	<33000*	<340	<340	<310
Endrin Aldehyde, ug/kg dw	<33000*	<340	<340	<310
Butylbenzylphthalate, ug/kg dw	<33000*	<340	<340	<310
bis(2-Ethylhexyl) phthalate, ug/kg dw	<33000*	<340	290000	<310
Chrysene, ug/kg dw	<33000*	<340	<340	<310
Benzo(a)Anthracene, ug/kg dw	<33000*	<340	<340	<310
3,3'-Dichlorobenzidine, ug/kg dw	<67000*	<680	<680	<620
Di-n-octylphthalate, ug/kg dw	<33000*	<340	<340	<310
Benzo(b)fluoranthene, ug/kg dw	<33000*	<340	<340	<310
Benzo (k) Fluoranthene, ug/kg dw	<33000*	<340	<340	<310
Benzo(a)pyrene, ug/kg dw	<33000*	<340	<340	<310
Indeno (1,2,3-cd)pyrene, ug/kg dw	<33000*	<340	<340	<310
Dibenz (a,h)anthracene, ug/kg dw	<33000*	<340	<340	<310
Benzo(g,h,i)perylene, ug/kg dw	<33000*	<340	<340	<310
N-Nitrosodimethylamine, ug/kg dw	<33000*	<340	<340	<310
Chlordane, ug/kg dw	470000	<680	<680	<620

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11097-7	CO-SB-21-01	
11097-8	CO-SB-22-01	
11097-9	CO-SB-22-02	
11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
Chlorinated Herbicides (8150)					
2,4-D, ug/kg dw	<100	<20000*	<5000*	<1000*	<25000*
2,4-DB, ug/kg dw	<100	<20000*	<5000*	<1000*	<25000*
2,4,5-T, ug/kg dw	<60	<12000*	<3000*	<600*	<15000*
2,4,5-TP Silvex, ug/kg dw	<20	<3900*	<1000*	<200*	<4900*
Dalapon, ug/kg dw	<2000	<400000*	<100000*	<20000*	<500000*
Dicamba, ug/kg dw	<1000	<200000*	<50000*	<10000*	<250000*
Dichlorprop, ug/kg dw	<100	<20000*	<5000*	<1000*	<25000*
Dinoseb, ug/kg dw	<100	<20000*	<5000*	<1000*	<25000*
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<2000	<400000*	<100000*	<10000*	<500000*
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<2000	<400000*	<100000*	<10000*	<500000*
Arsenic, mg/kg dw	<0.93	<0.88	1.2	1.7	<0.99
Chromium, mg/kg dw	6.1	3.6	2.9	14	2.7
Zinc, mg/kg dw	<1.9	<1.8	13	52	7.8

* = Increased detection limit is due to matrix interference.

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11097-6	CO-SB-20-01	Client
11097-7	CO-SB-21-01	
11097-8	CO-SB-22-01	
11097-9	CO-SB-22-02	
11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
Phenol, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2,4-Dimethylphenol, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2,4-Dichlorophenol, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2,4,6-Trichlorophenol, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
4-Chloro-3-methylphenol, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2,4-Dinitrophenol, ug/kg dw	<1800	<170000*	<89000*	<82000*	<200000*
2-Methyl-4,6-dinitrophenol, ug/kg dw	<1800	<170000*	<89000*	<82000*	<200000*
Pentachlorophenol, ug/kg dw	<1800	<170000*	<89000*	<82000*	<200000*
4-Nitrophenol, ug/kg dw	<1800	<170000*	<89000*	<82000*	<200000*
Benzyl alcohol, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2-Methylphenol (o-cresol), ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
4-Methylphenol (p-cresol), ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Benzoic acid, ug/kg dw	<1800	<170000*	<89000*	<82000*	<200000*
4-Chloroaniline, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2-Methylnaphthalene, ug/kg dw	<350	<34000*	<18000*	16000	41000
2,4,5-Trichlorophenol, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2-Nitroaniline, ug/kg dw	<1800	<170000*	<89000*	<82000*	<200000*
3-Nitroaniline, ug/kg dw	<1800	<170000*	<89000*	<82000*	<200000*
Dibenzofuran, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
4-Nitroaniline, ug/kg dw	<1800	<170000*	<89000*	<82000*	<200000*

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11097-1	CO-SB-17-01	Client
11097-2	CO-SB-17-02	
11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
Volatile Organics					
Benzyl chloride, ug/kg dw	<110	<160	<600	<320	<690
bis(2-Chloroethoxy) methane, ug/kg dw	<110	<160	<600	<320	<690
Bis(2-chloroisopropyl)ether , ug/kg dw	<110	<160	<120	<320	<690
Bromobenzene, ug/kg dw	<110	<160	<120	<320	<690
Bromodichloromethane, ug/kg dw	<110	<160	<120	<320	<690
Benzene, ug/kg dw	<110	<160	<120	<320	<690
Bromoform, ug/kg dw	<110	<160	<120	<320	<690
Bromomethane, ug/kg dw	<110	<160	<120	<320	<690
Carbon Tetrachloride, ug/kg dw	<110	<160	<120	<320	<690
Chloroacetaldehyde, ug/kg dw	<110	<160	<120	<320	<690
Chlorobenzene, ug/kg dw	710	900	610	<320	760
Chloroethane, ug/kg dw	<110	<160	<120	<320	<690
Chloroform, ug/kg dw	<110	<160	<120	<320	<690
1-Chlorohexane, ug/kg dw	<110	<160	<120	<320	<690
2-Chloroethylvinyl Ether, ug/kg dw	<110	<160	<120	<320	<690
Chloromethane, ug/kg dw	<110	<160	<120	<320	<690
Chloromethyl methyl ether, ug/kg dw	<110	<160	<120	<320	<690

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LOG NO: T0-11097

Received: 10 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-1	CO-SB-17-01	Client
11097-2	CO-SB-17-02	
11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
Chlorotoluene, ug/kg dw	<110	<160	<120	<320	<690
Dibromochloromethane, ug/kg dw	<110	<160	<120	<320	<690
Dibromomethane, ug/kg dw	<110	<160	<120	<320	<690
1,2-Dichlorobenzene, ug/kg dw	<110	<160	<120	<320	<690
1,3-Dichlorobenzene, ug/kg dw	<110	<160	<120	<320	<690
1,4-Dichlorobenzene, ug/kg dw	3200	3800	<120	<320	<690
Dichlorodifluoromethane, ug/kg dw	<110	<160	<120	<320	<690
1,1-Dichloroethane, ug/kg dw	<110	<160	<120	<320	<690
1,2-Dichloroethane, ug/kg dw	<110	<160	<120	<320	<690
1,1-Dichloroethene, ug/kg dw	<110	<160	<120	<320	<690
1,2-Dichloropropane, ug/kg dw	<110	<160	<120	<320	<690
1,3-Dichloropropylene, ug/kg dw	<110	<160	<120	<320	<690
Ethylbenzene, ug/kg dw	230	360	2100	510	4000
Methylene Chloride, ug/kg dw	<110	<160	<120	<320	<690
1,1,2,2-Tetrachloroethane, ug/kg dw	<110	<160	<120	<320	<690
1,1,1,2-Tetrachloroethane, ug/kg dw	<110	<160	<120	<320	<690
Tetrachloroethylene, ug/kg dw	<110	<160	<120	<320	<690
Toluene, ug/kg dw	480	220	<120	<320	690

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-1	CO-SB-17-01	Client
11097-2	CO-SB-17-02	
11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
1,1,1-Trichloroethane, ug/kg dw	<110	<160	<120	<320	<690
1,1,2-Trichloroethane, ug/kg dw	<110	<160	<120	<320	<690
Trichloroethene, ug/kg dw	<110	<160	<120	<320	<690
Trichlorofluoromethane, ug/kg dw	<110	<160	<120	<320	<690
Trichloropropane, ug/kg dw	<110	<160	<120	<320	<690
Vinyl Chloride, ug/kg dw	<110	<160	<120	<320	<690
Xylenes, ug/kg dw	1600	4200	10000	3500	19000

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REPORT OF RESULTS

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11097-1	CO-SB-17-01	Client
11097-2	CO-SB-17-02	
11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
Heptachlor, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
alpha-BHC, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Aldrin, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Dibutyl phthalate, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Heptachlor epoxide, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Endosulfan I, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Fluoranthene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Dieldrin, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
4,4'-DDE, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Pyrene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Endrin, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Endosulfan II, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
4,4'-DDD, ug/kg dw	68000	48000	17000	21000	180000
Benzidine, ug/kg dw	<320000*	<300000*	<54000*	<135000*	<240000*
4,4'-DDT, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Endosulfan sulfate, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Endrin Aldehyde, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Butylbenzylphthalate, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
bis(2-Ethylhexyl) phthalate, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*

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201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-1	CO-SB-17-01	Client
11097-2	CO-SB-17-02	
11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
Chrysene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Benzo(a)Anthracene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
3,3'-Dichlorobenzidine, ug/kg dw	<80000*	<74000*	<14000*	<34000*	<60000*
Di-n-octylphthalate, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Benzo(b)fluoranthene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Benzo (k) Fluoranthene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Benzo(a)pyrene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Indeno (1,2,3-cd)pyrene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Dibenz (a,h)anthracene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Benzo(g,h,i)perylene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
N-Nitrosodimethylamine, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Chlordane, ug/kg dw	<80000*	<74000*	26000	<34000*	170000
Toxaphene, ug/kg dw	<800000*	<740000*	<140000*	<340000*	<600000*
Aroclor-1016, ug/kg dw	<400000*	<370000*	<68000*	<170000*	<300000*
Aroclor-1221, ug/kg dw	<400000*	<370000*	<68000*	<170000*	<300000*

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REPORT OF RESULTS

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11097-1	CO-SB-17-01	Client
11097-2	CO-SB-17-02	
11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
Chlorinated Herbicides (8150)					
2,4-D, ug/kg dw	<6500*	<5300*	<590*	<60000*	<500*
2,4-DB, ug/kg dw	<6500*	<5300*	<590*	<60000*	<500*
2,4,5-T, ug/kg dw	<3900*	<3200*	<350*	<35000*	<300*
2,4,5-TP Silvex, ug/kg dw	<1300*	<1100*	<120*	<12000*	<100*
Dalapon, ug/kg dw	<130000*	<130000*	<12000*	<1200000*	<10000*
Dicamba, ug/kg dw	<65000*	<63000*	<5900*	<600000*	<5000*
Dichlorprop, ug/kg dw	<6500*	<5300*	<590*	<60000*	<500*
Dinoseb, ug/kg dw	<6500*	<5300*	<590*	<60000*	<500*
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<130000*	<130000*	<12000*	<1200000*	<10000*
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<130000*	<130000*	<12000*	<1200000*	<10000*
Arsenic, mg/kg dw	<0.83	1.1	<0.98	1.6	3.5
Chromium, mg/kg dw	6.7	12	4.2	10	13
Zinc, mg/kg dw	16	3.0	2.6	4.3	<1.8

* = Increased detection limit is due to matrix interference.

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201 E. Pine Street, Suite 1416
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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-8	CO-SB-05-01	Client
11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
alpha-BHC, ug/kg dw	<1700	<340	<3200	72000	<1700
Aldrin, ug/kg dw	5100	<340	<3200	<59000	<1700
Dibutyl phthalate, ug/kg dw	<1700	<340	<3200	<59000	<1700
Heptachlor epoxide, ug/kg dw	<1700	<340	<3200	<59000	<1700
Endosulfan I, ug/kg dw	<1700	<340	<3200	<59000	<1700
Fluoranthene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Dieldrin, ug/kg dw	3500	<340	<3200	<59000	<1700
4,4'-DDE, ug/kg dw	7700	<340	14000	160000	<1700
Pyrene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Endrin, ug/kg dw	<1700	<340	<3200	<59000	<1700
Endosulfan II, ug/kg dw	<1700	<340	<3200	<59000	<1700
4,4'-DDD, ug/kg dw	15000	<340	18000	1600000	<1700
Benzidine, ug/kg dw	<14000	<2700	<26000	<470000	<13000
4,4'-DDT, ug/kg dw	<1700	<340	13000	1800000	<1700
Endosulfan sulfate, ug/kg dw	<1700	<340	<3200	<59000	<1700
Endrin Aldehyde, ug/kg dw	<1700	<340	<3200	<59000	<1700
Butylbenzylphthalate, ug/kg dw	<1700	<340	<3200	<59000	<1700
bis(2-Ethylhexyl) phthalate, ug/kg dw	<1700	350	<3200	<59000	<1700
Chrysene, ug/kg dw	<1700	<340	<3200	<59000	<1700

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-3	CO-SB-01-01	Client
11143-4	CO-SB-02-01	
11143-5	CO-SB-3S-01	
11143-6	CO-SB-04-01	
11143-7	CO-SB-04-02	

PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
3,3'-Dichlorobenzidine, ug/kg dw	<680	<630	<660	<69000	<34000
Di-n-octylphthalate, ug/kg dw	<340	<310	<330	<35000	<17000
Benzo(b)fluoranthene, ug/kg dw	<340	<310	<330	<35000	<17000
Benzo (k) Fluoranthene, ug/kg dw	<340	<310	<330	<35000	<17000
Benzo(a)pyrene, ug/kg dw	<340	<310	<330	<35000	<17000
Indeno (1,2,3-cd)pyrene, ug/kg dw	<340	<310	<330	<35000	<17000
Dibenz (a,h)anthracene, ug/kg dw	<340	<310	<330	<35000	<17000
Benzo(g,h,i)perylene, ug/kg dw	<340	<310	<330	<35000	<17000
N-Nitrosodimethylamine, ug/kg dw	<340	<310	<330	<35000	<17000
Chlordane, ug/kg dw	8200	13000	43000	1400000	<34000
Toxaphene, ug/kg dw	<6800	<6300	<6600	<690000	<340000
Aroclor-1016, ug/kg dw	<3400	<3100	<3300	<350000	<170000
Aroclor-1221, ug/kg dw	<3400	<3100	<3300	<350000	<170000
Aroclor-1232, ug/kg dw	<3400	<3100	<3300	<350000	<170000
Aroclor-1242, ug/kg dw	<3400	<3100	<3300	<350000	<170000
Aroclor-1248, ug/kg dw	<3400	<3100	<3300	<350000	<170000
Aroclor-1254, ug/kg dw	<3400	<3100	<3300	<350000	<170000
Aroclor-1260, ug/kg dw	<3400	<3100	<3300	<350000	<170000
2-Chlorophenol, ug/kg dw	<340	<3100	<330	<350000	<170000
2-Nitrophenol, ug/kg dw	<340	<3100	<330	<350000	<170000

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Received: 13 OCT 90

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201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-8	CO-SB-05-01	Client
11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
Tokuthion (Prothiofos), ug/kg dw	<10	<9.8	<8.6	<10	<10
Trichloronate, ug/kg dw	<100	<98	<86	<100	<100
Additional Compounds:					
Ethion, ug/kg dw	<10	<9.8	<8.6	<10	<10
Chlorinated Herbicides (8150)					
2,4-D, ug/kg dw	<600*	<550*	<280*	<3300*	<6000*
2,4-DB, ug/kg dw	<600*	<550*	<280*	<3300*	<6000*
2,4,5-T, ug/kg dw	<360*	<330*	<170*	<1900*	<3600*
2,4,5-TP Silvex, ug/kg dw	<120*	<110*	<55*	<630*	<1200*
Dalapon, ug/kg dw	<12000*	<11000*	<5600*	<66000*	<120000*
Dicamba, ug/kg dw	<6000*	<5500*	<2800*	<33000*	<60000*
Dichlorprop, ug/kg dw	<600*	<550*	<280*	<3300*	<6000*
Dinoseb, ug/kg dw	<600*	<550*	<280*	<3300*	<6000*
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<12000*	<11000*	<5600*	<66000*	<120000*
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<12000*	<11000*	<5600*	<66000*	<120000*
Arsenic, mg/kg dw	38	31	22	86	<0.94

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client

PARAMETER	11075-1
Volatile Organics	
Benzyl chloride, ug/kg dw	<110
bis(2-Chloroethoxy) methane, ug/kg dw	<110
Bis(2-chloroisopropyl)ether, ug/kg dw	<110
Bromobenzene, ug/kg dw	<110
Bromodichloromethane, ug/kg dw	<110
Benzene, ug/kg dw	<110
Bromoform, ug/kg dw	<110
Bromomethane, ug/kg dw	<110
Carbon Tetrachloride, ug/kg dw	<110
Chloroacetaldehyde, ug/kg dw	<110
Chlorobenzene, ug/kg dw	2400
Chloroethane, ug/kg dw	<110
Chloroform, ug/kg dw	<110
1-Chlorohexane, ug/kg dw	<110
2-Chloroethylvinyl Ether, ug/kg dw	<110
Chloromethane, ug/kg dw	<110
Chloromethyl methyl ether, ug/kg dw	<110
Chlorotoluene, ug/kg dw	<110
Dibromochloromethane, ug/kg dw	<110
Dibromomethane, ug/kg dw	<110
1,2-Dichlorobenzene, ug/kg dw	<110
1,3-Dichlorobenzene, ug/kg dw	<110
1,4-Dichlorobenzene, ug/kg dw	970

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-3	CO-SB-01-01	Client
11143-4	CO-SB-02-01	
11143-5	CO-SB-3S-01	
11143-6	CO-SB-04-01	
11143-7	CO-SB-04-02	

PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Volatile Organics					
Benzyl chloride, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Bromobenzene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Bromodichloromethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Benzene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Bromoform, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Bromomethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Carbon Tetrachloride, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Chlorobenzene, ug/kg dw	<5.0	1400	<5.0	<5.0	580
Chloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Chloroform, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1-Chlorohexane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
2-Chloroethylvinyl Ether, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Chloromethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Chlorotoluene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Dibromochloromethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Dibromomethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,2-Dichlorobenzene, ug/kg dw	<5.0	12000	<5.0	570	970
1,3-Dichlorobenzene, ug/kg dw	<5.0	840	<5.0	120	140
1,4-Dichlorobenzene, ug/kg dw	<5.0	28000	<5.0	1500	2800

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LOG NO: T0-11143

Received: 13 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-3	CO-SB-01-01	Client
11143-4	CO-SB-02-01	
11143-5	CO-SB-3S-01	
11143-6	CO-SB-04-01	
11143-7	CO-SB-04-02	

PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Aldrin, ug/kg dw	<340	<310	<330	<35000	<17000
Dibutyl phthalate, ug/kg dw	<340	<310	<330	<35000	<17000
Heptachlor epoxide, ug/kg dw	<340	<310	<330	<35000	<17000
Endosulfan I, ug/kg dw	<340	<310	<330	<35000	<17000
Fluoranthene, ug/kg dw	<340	<310	<330	<35000	<17000
Dieldrin, ug/kg dw	<340	1400	380	<35000	<17000
4,4'-DDE, ug/kg dw	1400	2300	<330	40000	<17000
Pyrene, ug/kg dw	<340	<310	<330	<35000	<17000
Endrin, ug/kg dw	<340	<310	<330	<35000	<17000
Endosulfan II, ug/kg dw	<340	<310	<330	<35000	<17000
4,4'-DDD, ug/kg dw	2200	1400	<330	490000	56000
Benzidine, ug/kg dw	<2700	<2500	<2600	<280000	<140000
4,4'-DDT, ug/kg dw	4800	10000	<330	<35000	<17000
Endosulfan sulfate, ug/kg dw	<340	<310	<330	<35000	<17000
Endrin Aldehyde, ug/kg dw	<340	<310	<330	<35000	<17000
Butylbenzylphthalate, ug/kg dw	<340	<310	<330	<35000	<17000
bis(2-Ethylhexyl) phthalate, ug/kg dw	<340	610	<330	<35000	<17000
Chrysene, ug/kg dw	<340	<310	<330	<35000	<17000
Benzo(a)Anthracene, ug/kg dw	<340	<310	<330	<35000	<17000

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LOG NO: T0-11075

Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-2	CO-SB-12-01	Client
11075-3	CO-SB-13-01	
11075-4	CO-SB-14-01	
11075-5	CO-SB-15-01	
11075-6	CO-SB-16-01	

PARAMETER	11075-2	11075-3	11075-4	11075-5	11075-6
Tokuthion (Prothiofos), ug/kg dw	<10	<11	<11	<11	<10
Trichloronate, ug/kg dw	<100	<110	<110	<110	<100
Additional Compounds:					
Ethion, ug/kg dw	<10	<11	<11	<11	190000
Chlorinated Herbicides (8150)					
2,4-D, ug/kg dw	<290*	<100	<110	<110	<110
2,4-DB, ug/kg dw	<290*	<100	<110	<110	<110
2,4,5-T, ug/kg dw	<180*	<60	<68	<68	<68
2,4,5-TP Silvex, ug/kg dw	<57*	<20	<23	<23	<23
Dalapon, ug/kg dw	<5800*	<2000	<2300	<2300	<2300
Dicamba, ug/kg dw	<2900*	<1000	<1100	<1100	<1100
Dichlorprop, ug/kg dw	<290*	<100	<110	<110	<110
Dinoseb, ug/kg dw	<290*	<100	<110	<110	<110
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<5800*	<2000	<2300	<2300	<2300
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<5800*	<2000	<2300	<2300	<2300

* = Increased detection limits due to matrix interference.

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LOG NO: T0-11143

Received: 13 OCT 90

Mr. Russ Bowen
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201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-8	CO-SB-05-01	Client
11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
Chromium, mg/kg dw	14	2.6	18	26	6.4
Zinc, mg/kg dw	38	3.1	9.7	200	58

* = Increased detection limit due to matrix interference.

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-3	CO-SB-01-01	Client
11143-4	CO-SB-02-01	
11143-5	CO-SB-3S-01	
11143-6	CO-SB-04-01	
11143-7	CO-SB-04-02	

PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Chromium, mg/kg dw	2.3	2.0	1.5	16	2.4
Zinc, mg/kg dw	15	<1.7	8.1	410	3.7

* = Increased detection limit due to matrix interference.

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-3	CO-SB-01-01	Client
11143-4	CO-SB-02-01	
11143-5	CO-SB-3S-01	
11143-6	CO-SB-04-01	
11143-7	CO-SB-04-02	

PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Dichlorodifluoromethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1-Dichloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,2-Dichloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1-Dichloroethene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,2-Dichloropropane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,3-Dichloropropylene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Ethylbenzene, ug/kg dw	<5.0	3000	<5.0	7.7	1500
Methylene Chloride, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1,1,2-Tetrachloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Tetrachloroethylene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Toluene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1,1-Trichloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1,2-Trichloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Trichloroethene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Trichlorofluoromethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Trichloropropane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Vinyl Chloride, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Xylenes, ug/kg dw	<5.0	57000	<5.0	7.7	1100

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LOG NO: T0-11075

Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client

PARAMETER	11075-1
Dichlorodifluoromethane, ug/kg dw	<110
1,1-Dichloroethane, ug/kg dw	<110
1,2-Dichloroethane, ug/kg dw	<110
1,1-Dichloroethene, ug/kg dw	<110
1,2-Dichloropropane, ug/kg dw	<110
1,3-Dichloropropylene, ug/kg dw	<110
Ethylbenzene, ug/kg dw	1400
Methylene Chloride, ug/kg dw	<110
1,1,2,2-Tetrachloroethane, ug/kg dw	<110
1,1,1,2-Tetrachloroethane, ug/kg dw	<110
Tetrachloroethylene, ug/kg dw	<110
Toluene, ug/kg dw	930
1,1,1-Trichloroethane, ug/kg dw	<110
1,1,2-Trichloroethane, ug/kg dw	<110
Trichloroethene, ug/kg dw	<110
Trichlorofluoromethane, ug/kg dw	<110
Trichloropropane, ug/kg dw	<110
Vinyl Chloride, ug/kg dw	<110
Xylenes, ug/kg dw	14000

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-2	CO-SB-12-01	Client
11075-3	CO-SB-13-01	
11075-4	CO-SB-14-01	
11075-5	CO-SB-15-01	
11075-6	CO-SB-16-01	

PARAMETER	11075-2	11075-3	11075-4	11075-5	11075-6
Acenaphthylene, ug/kg dw	<350	<360	<350	<370	<35000
Acenaphthene, ug/kg dw	<350	<360	<350	<370	<35000
Dimethylphthalate, ug/kg dw	<350	<360	<350	<370	<35000
2,6-Dinitrotoluene, ug/kg dw	<350	<360	<350	<370	<35000
Fluorene, ug/kg dw	<350	<360	<350	<370	<35000
4-Chlorophenyl-phenyl ether, ug/kg dw	<350	<360	<350	<370	<35000
2,4-Dinitrotoluene, ug/kg dw	<350	<360	<350	<370	<35000
Diethyl Phthalate, ug/kg dw	<350	<360	<350	<370	<35000
N-Nitrosodiphenylamine, ug/kg dw	<350	<360	<350	<370	<35000
Hexachlorobenzene, ug/kg dw	<350	<360	<350	<370	<35000
gamma-BHC, ug/kg dw	<350	<360	<350	<370	<35000
4-Bromophenyl-phenyl-ether, ug/kg dw	<350	<360	<350	<370	<35000
delta-BHC, ug/kg dw	<350	<360	<350	<370	<35000
Phenanthrene, ug/kg dw	<350	<360	<350	<370	<35000
Anthracene, ug/kg dw	<350	<360	<350	<370	<35000
beta-BHC, ug/kg dw	<350	<360	<350	<370	<35000
Heptachlor, ug/kg dw	<350	<360	<350	460	<35000
alpha-BHC, ug/kg dw	<350	<360	<350	<370	<35000

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LOG NO: T0-11187

Received: 18 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-11	CO-MW-D-02	Client
11187-12	CO-MW-E-01	

PARAMETER	11187-11	11187-12
Trans-1,3-Dichloropropene, ug/l	<1.0	<100
Methylene Chloride, ug/l	<1.0	<100
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<100
Tetrachloroethylene, ug/l	<1.0	<100
Toluene, ug/l	<1.0	<100
1,1,1-Trichloroethane, ug/l	<1.0	<100
1,1,2-Trichloroethane, ug/l	<1.0	<100
Trichloroethene, ug/l	<1.0	<100
Trichlorofluoromethane, ug/l	<1.0	<100
Vinyl Chloride, ug/l	<1.0	<100
Xylenes, ug/l	<1.0	2500

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Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-11	CO-MW-D-02	Client
11187-12	CO-MW-E-01	

PARAMETER	11187-11	11187-12
Indeno (1,2,3-cd)pyrene, ug/l	<10	<20*
Isophorone, ug/l	<10	<20*
Naphthalene, ug/l	<10	26
Nitrobenzene, ug/l	<10	<20*
N-Nitrosodi-N-Propylamine, ug/l	<10	<20*
Aroclor-1016, ug/l	<100	<200*
Aroclor-1221, ug/l	<100	<200*
Aroclor-1232, ug/l	<100	<200*
Aroclor-1242, ug/l	<100	<200*
Aroclor-1248, ug/l	<100	<200*
Aroclor-1254, ug/l	<100	<200*
Aroclor-1260, ug/l	<100	<200*
Phenanthrene, ug/l	<10	<20*
Pyrene, ug/l	<10	<20*
Toxaphene, ug/l	<200	<400*
1,2,4-Trichlorobenzene, ug/l	<10	<20*
4-Chloro-3-methylphenol, ug/l	<10	<20*
2-Chlorophenol, ug/l	<10	<20*
2,4-Dichlorophenol, ug/l	<10	<20*
2,4-Dimethylphenol, ug/l	<10	<20*
2,4-Dinitrophenol, ug/l	<50	<100*
2-Methyl-4,6-dinitrophenol, ug/l	<50	<100*
2-Nitrophenol, ug/l	<10	<20*
4-Nitrophenol, ug/l	<50	<100*
Pentachlorophenol, ug/l	<50	<100*
Phenol, ug/l	<10	<20*
2,4,6-Trichlorophenol, ug/l	<10	<20*

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-6	CO-MW-N-01	Client
11187-7	CO-MW-F-01	
11187-8	CO-MW-I-01	
11187-9	CO-MW-G-01	
11187-10	CO-MW-D-01	

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
cis/trans-1,2-Dichloroethylene, ug/l	<1.0	<1.0	<25	<50	<1.0
1,2-Dichloropropane, ug/l	<1.0	<1.0	<25	<50	<1.0
Cis-1,3-Dichloropropene, ug/l	<1.0	<1.0	<25	<50	<1.0
Trans-1,3-Dichloropropene, ug/l	<1.0	<1.0	<25	<50	<1.0
Methylene Chloride, ug/l	<1.0	<1.0	<25	<50	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0	<25	<50	<1.0
Tetrachloroethylene, ug/l	<1.0	<1.0	<25	<50	<1.0
Toluene, ug/l	<1.0	<1.0	<25	<50	<1.0
1,1,1-Trichloroethane, ug/l	<1.0	<1.0	<25	<50	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0	<25	<50	<1.0
Trichloroethene, ug/l	<1.0	<1.0	<25	<50	<1.0
Trichlorofluoromethane, ug/l	<1.0	<1.0	<25	<50	<1.0
Vinyl Chloride, ug/l	<1.0	<1.0	<25	<50	<1.0
Xylenes, ug/l	<1.0	15	730	920	<1.0

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201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-6	CO-MW-N-01	Client
11187-7	CO-MW-F-01	
11187-8	CO-MW-I-01	
11187-9	CO-MW-G-01	
11187-10	CO-MW-D-01	

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
Chlorinated Pesticides (608)					
Aldrin, ug/l	<0.10*	<0.20*	<0.20*	<0.10*	0.014
Alpha-BHC, ug/l	3.6	5.1	<0.20*	0.37	<0.010
Beta-BHC, ug/l	2.9	2.1	0.36	0.14	<0.010
Delta-BHC, ug/l	5.8	4.2	0.23	0.29	<0.010
Gamma-BHC, ug/l	0.82	0.44	<0.20*	0.18	<0.010
Chlordane, ug/l	<1.0*	<2.0*	<2.0	<1.0*	<0.10
4,4'-DDD, ug/l	0.59	3.9	1.0	<0.20*	<0.020
4,4'-DDE, ug/l	<0.20*	<0.40*	<0.40*	<0.20*	<0.020
4,4'-DDT, ug/l	<0.50*	<1.0*	<1.0*	<0.50*	<0.050
Dieldrin, ug/l	<0.20*	0.67	0.57	<0.20*	<0.020
Endosulfan I, ug/l	<0.20*	1.5	<0.40*	0.30	0.023
Endosulfan II, ug/l	<0.50*	<1.0*	<1.0*	<0.50*	<0.050
Endosulfan Sulfate, ug/l	<1.0*	<2.0*	<2.0*	<1.0*	<0.10
Endrin, ug/l	<0.20*	<0.40*	<0.40*	<0.20*	<0.020
Endrin Aldehyde, ug/l	<1.0*	<2.0*	<2.0*	<1.0*	<0.10
Heptachlor, ug/l	0.13	0.26	<0.20*	<0.10*	<0.010
Heptachlor Epoxide, ug/l	<0.20*	<0.40*	<0.40*	<0.20*	<0.020
Toxaphene, ug/l	<10*	<20*	<20*	<10*	<1.0
PCB-1016, ug/l	<5.0*	<10*	<10*	<5.0*	<0.50

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2846 Industrial Plaza Drive • Tallahassee, FL 32301 • (904) 878-3994 • Fax (904) 878-9504

LOG NO: T0-11605

Received: 19 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-1	CO-MW-H-01	Client
11605-2	CO-MW-H-02	
11605-3	CO-MW-J-01	
11605-4	CO-MW-K-01	
11605-5	CO-MW-L-01	

PARAMETER	11605-1	11605-2	11605-3	11605-4	11605-5
cis/trans-1,2-Dichloroethylene, ug/l	<25	<25	<50	<5.0	<100
1,2-Dichloropropane, ug/l	<25	<25	<50	<5.0	<100
Cis-1,3-Dichloropropene, ug/l	<25	<25	<50	<5.0	<100
Trans-1,3-Dichloropropene, ug/l	<25	<25	<50	<5.0	<100
Methylene Chloride, ug/l	290	68	90	<5.0	<100
1,1,2,2-Tetrachloroethane, ug/l	<25	<25	<50	<5.0	<100
Tetrachloroethylene, ug/l	<25	<25	<50	<5.0	<100
Toluene, ug/l	76	54	88	<5.0	<100
1,1,1-Trichloroethane, ug/l	<25	<25	<50	<5.0	<100
1,1,2-Trichloroethane, ug/l	220	39	<50	<5.0	<100
Trichloroethene, ug/l	<25	<25	<50	<5.0	<100
Trichlorofluoromethane, ug/l	<25	<25	<50	<5.0	<100
Vinyl Chloride, ug/l	<25	<25	<50	<5.0	<100
Xylenes, ug/l	1300	640	750	89	5500

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LOG NO: T0-11605

Received: 19 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-1	CO-MW-H-01	Client
11605-2	CO-MW-H-02	
11605-3	CO-MW-J-01	
11605-4	CO-MW-K-01	
11605-5	CO-MW-L-01	

PARAMETER	11605-1	11605-2	11605-3	11605-4	11605-5
4-Chlorophenyl-phenyl ether, ug/l	<40	<40	<40	<10	<40
Chrysene, ug/l	<40	<40	<40	<10	<40
4,4'-DDD, ug/l	<40	<40	<40	<10	<40
4,4'-DDE, ug/l	<40	<40	<40	<10	<40
4,4'-DDT, ug/l	<40	<40	<40	<10	<40
Dibenz (a,h)anthracene, ug/l	<40	<40	<40	<10	<40
Di-n-butylphthalate, ug/l	<40	<40	<40	<10	<40
1,3-Dichlorobenzene, ug/l	<40	<40	<40	<10	<40
1,2-Dichlorobenzene, ug/l	<40	<40	<40	<10	<40
1,4-Dichlorobenzene, ug/l	49	51	<40	<10	49
3,3'-Dichlorobenzidine, ug/l	<80	<80	<80	<20	<80
Dieldrin, ug/l	<40	<40	<40	<10	<40
Diethyl Phthalate, ug/l	<40	<40	<40	<10	<40
Dimethyl phthalate, ug/l	<40	<40	<40	<10	<40
2,4-Dinitrotoluene, ug/l	<40	<40	<40	<10	<40
2,6-Dinitrotoluene, ug/l	<40	<40	<40	<10	<40
Di-n-octylphthalate, ug/l	<40	<40	<40	<10	<40
Endosulfan sulfate, ug/l	<40	<40	<40	<10	<40
Endrin Aldehyde, ug/l	<40	<40	<40	<10	<40
Fluoranthene, ug/l	<40	<40	<40	<10	<40

3C

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REPORT OF RESULTS

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11605-2	CO-MW-H-02	
11605-3	CO-MW-J-01	
11605-4	CO-MW-K-01	
11605-5	CO-MW-L-01	

PARAMETER	11605-1	11605-2	11605-3	11605-4	11605-5
Chlorinated Pesticides (608)					
Aldrin, ug/l	<0.50*	<0.50*	<0.50*	<0.20*	1.7
Alpha-BHC, ug/l	2.4	2.8	15	<0.20*	2.1
Beta-BHC, ug/l	7.7	8.2	7.1	<0.20*	1.4
Delta-BHC, ug/l	<0.50*	<0.50*	11	<0.20*	<0.20*
Gamma-BHC, ug/l	1.7	1.7	18	<0.20*	0.67
Chlordane, ug/l	<5.0*	<5.0*	<5.0*	<2.0*	<2.0*
4,4'-DDD, ug/l	2.6	5.5	4.6	<0.40*	<0.40*
4,4'-DDE, ug/l	<1.0*	<1.0*	<1.0*	<0.40*	<0.40*
4,4'-DDT, ug/l	<2.5*	<2.5*	<2.5*	<1.0*	<1.0*
Dieldrin, ug/l	<1.0*	<1.0*	<1.0*	<0.40*	<0.40*
Endosulfan I, ug/l	<1.0*	<1.0*	<1.0*	<0.40*	<0.40*
Endosulfan II, ug/l	<2.5*	<2.5*	<2.5*	<1.0*	<1.0*
Endosulfan Sulfate, ug/l	<5.0*	<5.0*	<5.0*	<2.0*	<2.0*
Endrin, ug/l	<1.0*	1.5	1.1	<0.40*	<0.40*
Endrin Aldehyde, ug/l	<5.0*	<5.0*	<5.0*	<2.0*	<2.0*
Heptachlor, ug/l	<0.50*	<0.50*	<0.50*	<0.20*	<0.20*
Heptachlor Epoxide, ug/l	<1.0*	<1.0*	<1.0*	<0.40*	<0.40*
Toxaphene, ug/l	<50*	<50*	<50*	<20*	<20*
PCB-1016, ug/l	<25*	<25*	<25*	<10*	<10*

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-1	CO-MW-H-01	Client
11605-2	CO-MW-H-02	
11605-3	CO-MW-J-01	
11605-4	CO-MW-K-01	
11605-5	CO-MW-L-01	

PARAMETER	11605-1	11605-2	11605-3	11605-4	11605-5
Fluorene, ug/l	<40	<40	<40	<10	<40
Heptachlor, ug/l	<40	<40	<40	<10	<40
Heptachlor epoxide, ug/l	<40	<40	<40	<10	<40
Hexachlorobenzene, ug/l	<40	<40	<40	<10	<40
Hexachlorobutadiene, ug/l	<40	<40	<40	<10	<40
Hexachloroethane, ug/l	<40	<40	<40	<10	<40
Indeno (1,2,3-cd)pyrene, ug/l	<40	<40	<40	<10	<40
Isophorone, ug/l	56	55	44	<10	56
Naphthalene, ug/l	<40	<40	<40	<10	<40
Nitrobenzene, ug/l	<40	<40	<40	<10	<40
N-Nitrosodi-N-Propylamine, ug/l	<40	<40	<40	<10	<40
Aroclor-1016, ug/l	<400	<400	<400	<100	<400
Aroclor-1221, ug/l	<400	<400	<400	<100	<400
Aroclor-1232, ug/l	<400	<400	<400	<100	<400
Aroclor-1242, ug/l	<400	<400	<400	<100	<400
Aroclor-1248, ug/l	<400	<400	<400	<100	<400
Aroclor-1254, ug/l	<400	<400	<400	<100	<400
Aroclor-1260, ug/l	<400	<400	<400	<100	<400
Phenanthrene, ug/l	<40	<40	<40	<10	<40
Pyrene, ug/l	<40	<40	<40	<10	<40

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11605-3	CO-MW-J-01	
11605-4	CO-MW-K-01	
11605-5	CO-MW-L-01	

PARAMETER	11605-1	11605-2	11605-3	11605-4	11605-5
Toxaphene, ug/l	<800	<800	<800	<200	<800
1,2,4-Trichlorobenzene, ug/l	<40	<40	<40	<10	<40
4-Chloro-3-methylphenol, ug/l	<40	<40	<40	<10	<40
2-Chlorophenol, ug/l	<40	<40	<40	<10	<40
2,4-Dichlorophenol, ug/l	<40	<40	<40	<10	<40
2,4-Dimethylphenol, ug/l	<40	47	<40	<10	<40
2,4-Dinitrophenol, ug/l	<200	<200	<200	<50	<200
2-Methyl-4,6-dinitrophenol, ug/l	<200	<200	<200	<50	<200
2-Nitrophenol, ug/l	<40	<40	<40	<10	<40
4-Nitrophenol, ug/l	<200	<200	<200	<50	<200
Pentachlorophenol, ug/l	<200	<200	<200	<50	<200
Phenol, ug/l	46	46	<40	<10	46
2,4,6-Trichlorophenol, ug/l	<40	<40	<40	<10	<40
Phosphorus Pesticides (614)					
Azinphos methyl, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Demeton-O, ug/l	<0.50	<0.50	<0.50	<0.50	<0.50
Demeton-S, ug/l	130	22	46	<0.50	21
Diazinon, ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
Disulfoton, ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
Malathion, ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
Parathion Ethyl, ug/l	<0.050	<0.050	<0.050	<0.050	<0.050
Parathion Methyl, ug/l	<0.050	<0.050	<0.050	<0.050	<0.050

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201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-6	CO-MW-N-01	Client
11187-7	CO-MW-F-01	
11187-8	CO-MW-I-01	
11187-9	CO-MW-G-01	
11187-10	CO-MW-D-01	

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
601 and 602					
Bromodichloromethane, ug/l	<1.0	<1.0	<25	<50	<1.0
Bromoform, ug/l	<1.0	<1.0	<25	<50	<1.0
Bromomethane, ug/l	<1.0	<1.0	<25	<50	<1.0
Benzene, ug/l	<1.0	<1.0	<25	<50	<1.0
Carbon Tetrachloride, ug/l	<1.0	<1.0	<25	<50	<1.0
Chlorobenzene, ug/l	2.7	5.1	<25	<50	<1.0
Chloroethane, ug/l	<1.0	<1.0	<25	<50	<1.0
2-Chloroethylvinyl Ether, ug/l	<1.0	<1.0	<25	<50	<1.0
Chloroform, ug/l	<1.0	2.8	<25	<50	<1.0
Ethylbenzene, ug/l	1.5	5.7	350	180	<1.0
Chloromethane, ug/l	<1.0	<1.0	<25	<50	<1.0
Dibromochloromethane, ug/l	<1.0	<1.0	<25	<50	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0	<25	<50	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0	<25	<50	<1.0
1,4-Dichlorobenzene, ug/l	1.5	<1.0	<25	<50	<1.0
Dichlorodifluoromethane, ug/l	<1.0	<1.0	<25	<50	<1.0
1,1-Dichloroethane, ug/l	<1.0	1.2	<25	<50	<1.0
1,2-Dichloroethane, ug/l	<1.0	<1.0	<25	<50	<1.0
1,1-Dichloroethene, ug/l	<1.0	1.8	<25	<50	<1.0

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REPORT OF RESULTS

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11187-1	CO-MW-M-01	Client
11187-2	CO-MW-O-01	
11187-3	CO-MW-P-01	
11187-4	CO-MW-A-01	
11187-5	CO-MW-A-02	

PARAMETER	11187-1	11187-2	11187-3	11187-4	11187-5
cis/trans-1,2-Dichloroethylene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
1,2-Dichloropropane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Cis-1,3-Dichloropropene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Trans-1,3-Dichloropropene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Methylene Chloride, ug/l	<1.0	<25	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Tetrachloroethylene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Toluene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
1,1,1-Trichloroethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Trichloroethene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Trichlorofluoromethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Vinyl Chloride, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Xylenes, ug/l	<1.0	420	<1.0	<1.0	<1.0

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11187-2	CO-MW-O-01	
11187-3	CO-MW-P-01	
11187-4	CO-MW-A-01	
11187-5	CO-MW-A-02	

PARAMETER	11187-1	11187-2	11187-3	11187-4	11187-5
Chlorinated Pesticides (608)					
Aldrin, ug/l	<0.010	<1.0*	13	<0.010	<0.010
Alpha-BHC, ug/l	0.027	21	4.5	<0.010	<0.010
Beta-BHC, ug/l	0.096	52	22	<0.010	<0.010
Delta-BHC, ug/l	0.020	21	5.9	<0.010	<0.010
Gamma-BHC, ug/l	0.044	17	1.5	<0.010	<0.010
Chlordane, ug/l	<0.10	<10*	<5.0*	<0.10	<0.10
4,4'-DDD, ug/l	<0.020	<2.0*	<1.0*	<0.020	<0.020
4,4'-DDE, ug/l	<0.020	<2*	<1.0*	<0.020	<0.020
4,4'-DDT, ug/l	<0.050	<5.0*	<2.5*	<0.050	<0.050
Dieldrin, ug/l	0.071	<2*	<1.0*	<0.020	<0.020
Endosulfan I, ug/l	<0.020	<2*	<1.0*	<0.020	<0.020
Endosulfan II, ug/l	<0.050	<5.0*	<2.5*	<0.050	<0.050
Endosulfan Sulfate, ug/l	<0.10	<10*	<5.0*	<0.10	<0.10
Endrin, ug/l	0.021	<2.0*	<1.0*	<0.020	<0.020
Endrin Aldehyde, ug/l	<0.10	<10*	<5.0*	<0.10	<0.10
Heptachlor, ug/l	<0.010	<1.0*	<0.50*	<0.010	<0.010
Heptachlor Epoxide, ug/l	<0.020	<2.0*	<1.0*	<0.020	<0.020
Toxaphene, ug/l	<1.0	<100*	<50*	<1.0	<1.0
PCB-1016, ug/l	<0.50	<50*	<25*	<0.50	<0.50

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11187-7	CO-MW-F-01	
11187-8	CO-MW-I-01	
11187-9	CO-MW-G-01	
11187-10	CO-MW-D-01	

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
Fluorene, ug/l	<10	<10	<10	<10	<10
Heptachlor, ug/l	<10	<10	<10	<10	<10
Heptachlor epoxide, ug/l	<10	<10	<10	<10	<10
Hexachlorobenzene, ug/l	<10	<10	<10	<10	<10
Hexachlorobutadiene, ug/l	<10	<10	<10	<10	<10
Hexachloroethane, ug/l	<10	<10	<10	<10	<10
Indeno (1,2,3-cd)pyrene, ug/l	<10	<10	<10	<10	<10
Isophorone, ug/l	<10	<10	<10	<10	<10
Naphthalene, ug/l	<10	<10	<10	<10	<10
Nitrobenzene, ug/l	<10	<10	<10	<10	<10
N-Nitrosodi-N-Propylamine, ug/l	<10	<10	<10	<10	<10
Aroclor-1016, ug/l	<100	<100	<100	<100	<100
Aroclor-1221, ug/l	<100	<100	<100	<100	<100
Aroclor-1232, ug/l	<100	<100	<100	<100	<100
Aroclor-1242, ug/l	<100	<100	<100	<100	<100
Aroclor-1248, ug/l	<100	<100	<100	<100	<100
Aroclor-1254, ug/l	<100	<100	<100	<100	<100
Aroclor-1260, ug/l	<100	<100	<100	<100	<100
Phenanthrene, ug/l	<10	<10	<10	<10	<10
Pyrene, ug/l	<10	<10	<10	<10	<10

112

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11187-8	CO-MW-I-01	
11187-9	CO-MW-G-01	
11187-10	CO-MW-D-01	

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
4-Chlorophenyl-phenyl ether, ug/l	<10	<10	<10	<10	<10
Chrysene, ug/l	<10	<10	<10	<10	<10
4,4'-DDD, ug/l	<10	<10	<10	<10	<10
4,4'-DDE, ug/l	<10	<10	<10	<10	<10
4,4'-DDT, ug/l	<10	<10	<10	<10	<10
Dibenz (a,h)anthracene, ug/l	<10	<10	<10	<10	<10
Di-n-butylphthalate, ug/l	<10	<10	<10	<10	<10
1,3-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10
1,2-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10
1,4-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10
3,3'-Dichlorobenzidine, ug/l	<20	<20	<20	<20	<20
Dieldrin, ug/l	<10	<10	<10	<10	<10
Diethyl Phthalate, ug/l	<10	<10	<10	<10	<10
Dimethyl phthalate, ug/l	<10	<10	<10	<10	<10
2,4-Dinitrotoluene, ug/l	<10	<10	<10	<10	<10
2,6-Dinitrotoluene, ug/l	<10	<10	<10	<10	<10
Di-n-octylphthalate, ug/l	<10	<10	<10	<10	<10
Endosulfan sulfate, ug/l	<10	<10	<10	<10	<10
Endrin Aldehyde, ug/l	<10	<10	<10	<10	<10
Fluoranthene, ug/l	<10	<10	<10	<10	<10

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11187-8	CO-MW-I-01	
11187-9	CO-MW-G-01	
11187-10	CO-MW-D-01	

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
BN-A Extractables (625)					
Acenaphthene, ug/l	<10	<10	<10	<10	<10
Acenaphthylene, ug/l	<10	<10	<10	<10	<10
Anthracene, ug/l	<10	<10	<10	<10	<10
Aldrin, ug/l	<10	<10	<10	<10	<10
Benzo(a)Anthracene, ug/l	<10	<10	<10	<10	<10
Benzo(b)fluoranthene, ug/l	<10	<10	<10	<10	<10
Benzo (k) Fluoranthene, ug/l	<10	<10	<10	<10	<10
Benzo(a)pyrene, ug/l	<10	<10	<10	<10	<10
Benzo(g,h,i)perylene, ug/l	<10	<10	<10	<10	<10
Benzyl butyl phthalate, ug/l	<10	<10	<10	<10	<10
beta-BHC, ug/l	<10	<10	<10	<10	<10
delta-BHC, ug/l	<10	<10	<10	<10	<10
bis(2-Chloroethyl) ether, ug/l	<10	<10	<10	<10	<10
bis(2-Chloroethoxy) methane, ug/l	<10	<10	<10	<10	<10
bis(2-Ethylhexyl) phthalate, ug/l	<10	<10	<10	<10	<10
Bis(2-chloroisopropyl)ether, ug/l	<10	<10	<10	<10	<10
4-Bromophenyl-phenyl-ether, ug/l	<10	<10	<10	<10	<10
Chlordane, ug/l	<20	<20	<20	<20	<20
2-Chloronaphthalene, ug/l	<10	<10	<10	<10	<10

45

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

2846 Industrial Plaza Drive • Tallahassee, FL 32301 • (904) 878-3994 • Fax (904) 878-9504

LOG NO: T0-11187

Received: 18 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-6	CO-MW-N-01	Client
11187-7	CO-MW-F-01	
11187-8	CO-MW-I-01	
11187-9	CO-MW-G-01	
11187-10	CO-MW-D-01	

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
Toxaphene, ug/l	<200	<200	<200	<200	<200
1,2,4-Trichlorobenzene, ug/l	<10	<10	<10	<10	<10
4-Chloro-3-methylphenol, ug/l	<10	<10	<10	<10	<10
2-Chlorophenol, ug/l	<10	<10	<10	<10	<10
2,4-Dichlorophenol, ug/l	<10	<10	<10	<10	<10
2,4-Dimethylphenol, ug/l	<10	<10	<10	<10	<10
2,4-Dinitrophenol, ug/l	<50	<50	<50	<50	<50
2-Methyl-4,6-dinitrophenol, ug/l	<50	<50	<50	<50	<50
2-Nitrophenol, ug/l	<10	<10	<10	<10	<10
4-Nitrophenol, ug/l	<50	<50	<50	<50	<50
Pentachlorophenol, ug/l	<50	<50	<50	<50	<50
Phenol, ug/l	<10	<10	<10	<10	<10
2,4,6-Trichlorophenol, ug/l	<10	<10	<10	<10	<10
Phosphorus Pesticides (614)					
Azinphos methyl, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Demeton-O, ug/l	<0.50	<0.50	<0.50	<0.50	<0.50
Demeton-S, ug/l	<0.50	<0.50	<0.50	<0.50	<0.50
Diazinon, ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
Disulfoton, ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
Malathion, ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
Parathion Ethyl, ug/l	<0.050	<0.050	<0.050	<0.050	<0.050
Parathion Methyl, ug/l	<0.050	<0.050	<0.050	<0.050	<0.050

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Brown & Caldwell
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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-6	CO-MW-N-01	Client
11187-7	CO-MW-F-01	
11187-8	CO-MW-I-01	
11187-9	CO-MW-G-01	
11187-10	CO-MW-D-01	

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
Chlorinated Herbicides (615)					
2,4-D, ug/l	<0.50	<0.50	<0.50	<0.50	<0.50
2,4-DB, ug/l	<0.50	<0.50	<0.50	<0.50	<0.50
Dicamba, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
Dichlorprop, ug/l	<0.50	<0.50	<0.50	<0.50	<0.50
Dinoseb, ug/l	<0.50	<0.50	<0.50	<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	<10	<10	<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	<10	<10	<10	<10
2,4,5-T, ug/l	<0.30	<0.30	<0.30	<0.30	<0.30
2,4,5-TP Silvex, ug/l	<0.10	<0.10	<0.10	<0.10	<0.10

47

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-6	CO-MW-N-01	Client
11187-7	CO-MW-F-01	
11187-8	CO-MW-I-01	
11187-9	CO-MW-G-01	
11187-10	CO-MW-D-01	

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
PCB-1221, ug/l	<5.0*	<10*	<10*	<5.0*	<0.50
PCB-1232, ug/l	<5.0*	<10*	<10*	<5.0*	<0.50
PCB-1242, ug/l	<5.0*	<10*	<10*	<5.0*	<0.50
PCB-1248, ug/l	<5.0*	<10*	<10*	<5.0*	<0.50
PCB-1254, ug/l	<5.0*	<10*	<10*	<5.0*	<0.50
PCB-1260, ug/l	<5.0*	<10*	<10*	<5.0*	<0.50
Arsenic, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Chromium, mg/l	<0.010	<0.010	<0.010	0.17	0.011
Zinc, mg/l	0.042	<0.020	<0.020	0.020	0.035

* = Increased detection limit is due to matrix interference.

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LOG NO: T0-11605

Received: 19 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-1	CO-MW-H-01	Client
11605-2	CO-MW-H-02	
11605-3	CO-MW-J-01	
11605-4	CO-MW-K-01	
11605-5	CO-MW-L-01	

PARAMETER	11605-1	11605-2	11605-3	11605-4	11605-5
PCB-1221, ug/l	<25*	<25*	<25*	<10*	<10*
PCB-1232, ug/l	<25*	<25*	<25*	<10*	<10*
PCB-1242, ug/l	<25*	<25*	<25*	<10*	<10*
PCB-1248, ug/l	<25*	<25*	<25*	<10*	<10*
PCB-1254, ug/l	<25*	<25*	<25*	<10*	<10*
PCB-1260, ug/l	<25*	<25*	<25*	<10*	<10*
Arsenic, mg/l	0.030	0.092	0.025	<0.010	0.082
Chromium, mg/l	0.011	0.051	0.031	<0.010	0.038
Zinc, mg/l	<0.020	0.027	0.041	0.024	<0.020

* = Increased detection limit due to matrix interference.

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Received: 19 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-1	CO-MW-H-01	Client
11605-2	CO-MW-H-02	
11605-3	CO-MW-J-01	
11605-4	CO-MW-K-01	
11605-5	CO-MW-L-01	

PARAMETER	11605-1	11605-2	11605-3	11605-4	11605-5
Chlorinated Herbicides (615)					
2,4-D, ug/l	<10*	<40*	<25*	<0.50	<50*
2,4-DB, ug/l	<10*	<40*	<25*	<0.50	<50*
Dicamba, ug/l	<100*	<400*	<250*	<5.0	<500*
Dichlorprop, ug/l	<10*	<40*	<25*	<0.50	<50*
Dinoseb, ug/l	<10*	<40*	<25*	<0.50	<50*
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<200*	<800*	<500*	<10	<1000*
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<200*	<800*	<500*	<10	<1000*
2,4,5-T, ug/l	<6.0*	<24*	<15*	<0.30	<30*
2,4,5-TP Silvex, ug/l	<2.0*	<8.0*	<5.0*	<0.10	<10*

50

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-1	CO-MW-H-01	Client
11605-2	CO-MW-H-02	
11605-3	CO-MW-J-01	
11605-4	CO-MW-K-01	
11605-5	CO-MW-L-01	

PARAMETER	11605-1	11605-2	11605-3	11605-4	11605-5
BN-A Extractables (625)					
Acenaphthene, ug/l	<40	<40	<40	<10	<40
Acenaphthylene, ug/l	<40	<40	<40	<10	<40
Anthracene, ug/l	<40	<40	<40	<10	<40
Aldrin, ug/l	<40	<40	<40	<10	<40
Benzo(a)Anthracene, ug/l	<40	<40	<40	<10	<40
Benzo(b)fluoranthene, ug/l	<40	<40	<40	<10	<40
Benzo (k) Fluoranthene, ug/l	<40	<40	<40	<10	<40
Benzo(a)pyrene, ug/l	<40	<40	<40	<10	<40
Benzo(g,h,i)perylene, ug/l	<40	<40	<40	<10	<40
Benzyl butyl phthalate, ug/l	<40	<40	<40	<10	<40
beta-BHC, ug/l	<40	<40	<40	<10	<40
delta-BHC, ug/l	<40	<40	<40	<10	<40
bis(2-Chloroethyl) ether, ug/l	<40	<40	<40	<10	<40
bis(2-Chloroethoxy) methane, ug/l	<40	<40	<40	<10	<40
bis(2-Ethylhexyl) phthalate, ug/l	<40	<40	<40	<10	<40
Bis(2-chloroisopropyl)ether, ug/l	<40	<40	<40	<10	<40
4-Bromophenyl-phenyl-ether, ug/l	<40	<40	<40	<10	<40
Chlordane, ug/l	<80	<80	<80	<20	<80
2-Chloronaphthalene, ug/l	<40	<40	<40	<10	<40

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Received: 18 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-11	CO-MW-D-02	Client
11187-12	CO-MW-E-01	

PARAMETER	11187-11	11187-12
4,4'-DDE, ug/l	<10	<20*
4,4'-DDT, ug/l	<10	<20*
Dibenz (a,h)anthracene, ug/l	<10	<20*
Di-n-butylphthalate, ug/l	<10	<20*
1,3-Dichlorobenzene, ug/l	<10	<20*
1,2-Dichlorobenzene, ug/l	<10	<20*
1,4-Dichlorobenzene, ug/l	<10	<20*
3,3'-Dichlorobenzidine, ug/l	<20	<40*
Dieldrin, ug/l	<10	<20*
Diethyl Phthalate, ug/l	<10	<20*
Dimethyl phthalate, ug/l	<10	<20*
2,4-Dinitrotoluene, ug/l	<10	<20*
2,6-Dinitrotoluene, ug/l	<10	<20*
Di-n-octylphthalate, ug/l	<10	<20*
Endosulfan sulfate, ug/l	<10	<20*
Endrin Aldehyde, ug/l	<10	<20*
Fluoranthene, ug/l	<10	<20*
Fluorene, ug/l	<10	<20*
Heptachlor, ug/l	<10	<20*
Heptachlor epoxide, ug/l	<10	<20*
Hexachlorobenzene, ug/l	<10	<20*
Hexachlorobutadiene, ug/l	<10	<20*
Hexachloroethane, ug/l	<10	<20*

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-11	CO-MW-D-02	Client
11187-12	CO-MW-E-01	

PARAMETER	11187-11	11187-12
Phosphorus Pesticides (614)		
Azinphos methyl, ug/l	<1.0	<1.0
Demeton-O, ug/l	<0.50	<0.50
Demeton-S, ug/l	<0.50	2.5
Diazinon, ug/l	<0.10	<0.10
Disulfoton, ug/l	<0.10	<0.10
Malathion, ug/l	<0.10	<0.10
Parathion Ethyl, ug/l	<0.050	<0.050
Parathion Methyl, ug/l	<0.050	<0.050
Chlorinated Herbicides (615)		
2,4-D, ug/l	<0.50	<0.50
2,4-DB, ug/l	<0.50	<0.50
Dicamba, ug/l	<5.0	<5.0
Dichlorprop, ug/l	<0.50	<0.50
Dinoseb, ug/l	<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	<10
2,4,5-T, ug/l	<0.30	<0.30
2,4,5-TP Silvex, ug/l	<0.10	<0.10

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-11	CO-MW-D-02	Client
11187-12	CO-MW-E-01	

PARAMETER	11187-11	11187-12
Chlorinated Pesticides (608)		
Aldrin, ug/l	0.014	<0.50*
Alpha-BHC, ug/l	<0.010	<0.50*
Beta-BHC, ug/l	<0.010	0.86
Delta-BHC, ug/l	<0.010	<0.50*
Gamma-BHC, ug/l	<0.010	<0.50*
Chlordane, ug/l	<0.10	<5.0*
4,4'-DDD, ug/l	<0.020	<1.0*
4,4'-DDE, ug/l	<0.020	<1.0*
4,4'-DDT, ug/l	<0.050	<2.5*
Dieldrin, ug/l	<0.020	<1.0*
Endosulfan I, ug/l	0.025	<1.0*
Endosulfan II, ug/l	<0.050	<2.5*
Endosulfan Sulfate, ug/l	<0.10	<5.0*
Endrin, ug/l	<0.020	<1.0*
Endrin Aldehyde, ug/l	<0.10	<5.0*
Heptachlor, ug/l	<0.010	<0.50*
Heptachlor Epoxide, ug/l	<0.020	<1.0*
Toxaphene, ug/l	<1.0	<50*
PCB-1016, ug/l	<0.50	<25*
PCB-1221, ug/l	<0.50	<25*
PCB-1232, ug/l	<0.50	<25*
PCB-1242, ug/l	<0.50	<25*
PCB-1248, ug/l	<0.50	<25*
PCB-1254, ug/l	<0.50	<25*
PCB-1260, ug/l	<0.50	<25*

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-11	CO-MW-D-02	Client
11187-12	CO-MW-E-01	

PARAMETER	11187-11	11187-12
Arsenic, mg/l	<0.010	<0.010
Chromium, mg/l	0.011	0.015
Zinc, mg/l	0.052	0.025

* = Increased detection limit is due to matrix interference.

55

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-1	CO-MW-M-01	Client
11187-2	CO-MW-O-01	
11187-3	CO-MW-P-01	
11187-4	CO-MW-A-01	
11187-5	CO-MW-A-02	

PARAMETER	11187-1	11187-2	11187-3	11187-4	11187-5
Chlorinated Herbicides (615)					
2,4-D, ug/l	<0.50	<10*	<0.50	<0.50	<0.50
2,4-DB, ug/l	<0.50	<10*	<0.50	<0.50	<0.50
Dicamba, ug/l	<5.0	<100*	<5.0	<5.0	<5.0
Dichlorprop, ug/l	<0.50	<10*	<0.50	<0.50	<0.50
Dinoseb, ug/l	<0.50	<10*	<0.50	<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	<200*	<10	<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	<200*	<10	<10	<10
2,4,5-T, ug/l	<0.30	<6.0*	<0.30	<0.30	<0.30
2,4,5-TP Silvex, ug/l	<0.10	<2.0*	<0.10	<0.10	<0.10

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11187-1	CO-MW-M-01	Client
11187-2	CO-MW-O-01	
11187-3	CO-MW-P-01	
11187-4	CO-MW-A-01	
11187-5	CO-MW-A-02	

PARAMETER	11187-1	11187-2	11187-3	11187-4	11187-5
Toxaphene, ug/l	<200	<200	<200	<200	<200
1,2,4-Trichlorobenzene, ug/l	<10	<10	<10	<10	<10
4-Chloro-3-methylphenol, ug/l	<10	<10	<10	<10	<10
2-Chlorophenol, ug/l	<10	<10	<10	<10	<10
2,4-Dichlorophenol, ug/l	<10	<10	<10	<10	<10
2,4-Dimethylphenol, ug/l	<10	<10	<10	<10	<10
2,4-Dinitrophenol, ug/l	<50	<50	<50	<50	<50
2-Methyl-4,6-dinitrophenol, ug/l	<50	<50	<50	<50	<50
2-Nitrophenol, ug/l	<10	<10	<10	<10	<10
4-Nitrophenol, ug/l	<50	<50	<50	<50	<50
Pentachlorophenol, ug/l	<50	<50	<50	<50	<50
Phenol, ug/l	<10	<10	<10	<10	<10
2,4,6-Trichlorophenol, ug/l	<10	<10	<10	<10	<10
Phosphorus Pesticides (614)					
Azinphos methyl, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Demeton-O, ug/l	<0.50	1.1	<0.50	<0.50	<0.50
Demeton-S, ug/l	<0.50	<0.50	<0.50	<0.50	<0.50
Diazinon, ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
Disulfoton, ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
Malathion, ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
Parathion Ethyl, ug/l	<0.050	<0.050	110	<0.050	<0.050
Parathion Methyl, ug/l	<0.050	<0.050	0.16	<0.050	<0.050

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LOG NO: T0-11187

Received: 18 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-1	CO-MW-M-01	Client
11187-2	CO-MW-O-01	
11187-3	CO-MW-P-01	
11187-4	CO-MW-A-01	
11187-5	CO-MW-A-02	

PARAMETER	11187-1	11187-2	11187-3	11187-4	11187-5
Fluorene, ug/l	<10	<10	<10	<10	<10
Heptachlor, ug/l	<10	<10	<10	<10	<10
Heptachlor epoxide, ug/l	<10	<10	<10	<10	<10
Hexachlorobenzene, ug/l	<10	<10	<10	<10	<10
Hexachlorobutadiene, ug/l	<10	<10	<10	<10	<10
Hexachloroethane, ug/l	<10	<10	<10	<10	<10
Indeno (1,2,3-cd)pyrene, ug/l	<10	<10	<10	<10	<10
Isophorone, ug/l	<10	<10	<10	<10	<10
Naphthalene, ug/l	<10	<10	<10	<10	<10
Nitrobenzene, ug/l	<10	<10	<10	<10	<10
N-Nitrosodi-N-Propylamine, ug/l	<10	<10	<10	<10	<10
Aroclor-1016, ug/l	<100	<100	<100	<100	<100
Aroclor-1221, ug/l	<100	<100	<100	<100	<100
Aroclor-1232, ug/l	<100	<100	<100	<100	<100
Aroclor-1242, ug/l	<100	<100	<100	<100	<100
Aroclor-1248, ug/l	<100	<100	<100	<100	<100
Aroclor-1254, ug/l	<100	<100	<100	<100	<100
Aroclor-1260, ug/l	<100	<100	<100	<100	<100
Phenanthrene, ug/l	<10	<10	<10	<10	<10
Pyrene, ug/l	<10	<10	<10	<10	<10

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11187-2	CO-MW-O-01	
11187-3	CO-MW-P-01	
11187-4	CO-MW-A-01	
11187-5	CO-MW-A-02	

PARAMETER	11187-1	11187-2	11187-3	11187-4	11187-5
4-Chlorophenyl-phenyl ether, ug/l	<10	<10	<10	<10	<10
Chrysene, ug/l	<10	<10	<10	<10	<10
4,4'-DDD, ug/l	<10	<10	<10	<10	<10
4,4'-DDE, ug/l	<10	<10	<10	<10	<10
4,4'-DDT, ug/l	<10	<10	<10	<10	<10
Dibenz (a,h)anthracene, ug/l	<10	<10	<10	<10	<10
Di-n-butylphthalate, ug/l	<10	<10	<10	<10	<10
1,3-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10
1,2-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10
1,4-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10
3,3'-Dichlorobenzidine, ug/l	<20	<20	<20	<20	<20
Dieldrin, ug/l	<10	<10	<10	<10	<10
Diethyl Phthalate, ug/l	<10	<10	<10	<10	<10
Dimethyl phthalate, ug/l	<10	<10	<10	<10	<10
2,4-Dinitrotoluene, ug/l	<10	<10	<10	<10	<10
2,6-Dinitrotoluene, ug/l	<10	<10	<10	<10	<10
Di-n-octylphthalate, ug/l	<10	<10	<10	<10	<10
Endosulfan sulfate, ug/l	<10	<10	<10	<10	<10
Endrin Aldehyde, ug/l	<10	<10	<10	<10	<10
Fluoranthene, ug/l	<10	<10	<10	<10	<10

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11187-2	CO-MW-O-01	
11187-3	CO-MW-P-01	
11187-4	CO-MW-A-01	
11187-5	CO-MW-A-02	

PARAMETER	11187-1	11187-2	11187-3	11187-4	11187-5
BN-A Extractables (625)					
Acenaphthene, ug/l	<10	<10	<10	<10	<10
Acenaphthylene, ug/l	<10	<10	<10	<10	<10
Anthracene, ug/l	<10	<10	<10	<10	<10
Aldrin, ug/l	<10	<10	<10	<10	<10
Benzo(a)Anthracene, ug/l	<10	<10	<10	<10	<10
Benzo(b)fluoranthene, ug/l	<10	<10	<10	<10	<10
Benzo (k) Fluoranthene, ug/l	<10	<10	<10	<10	<10
Benzo(a)pyrene, ug/l	<10	<10	<10	<10	<10
Benzo(g,h,i)perylene, ug/l	<10	<10	<10	<10	<10
Benzyl butyl phthalate, ug/l	<10	<10	<10	<10	<10
beta-BHC, ug/l	<10	<10	<10	<10	<10
delta-BHC, ug/l	<10	<10	<10	<10	<10
bis(2-Chloroethyl) ether, ug/l	<10	<10	<10	<10	<10
bis(2-Chloroethoxy) methane, ug/l	<10	<10	<10	<10	<10
bis(2-Ethylhexyl) phthalate, ug/l	<10	<10	<10	<10	<10
Bis(2-chloroisopropyl)ether, ug/l	<10	<10	<10	<10	<10
4-Bromophenyl-phenyl-ether, ug/l	<10	<10	<10	<10	<10
Chlordane, ug/l	<20	<20	<20	<20	<20
2-Chloronaphthalene, ug/l	<10	<10	<10	<10	<10

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11187-2	CO-MW-O-01	
11187-3	CO-MW-P-01	
11187-4	CO-MW-A-01	
11187-5	CO-MW-A-02	

PARAMETER	11187-1	11187-2	11187-3	11187-4	11187-5
601 and 602					
Bromodichloromethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Bromoform, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Bromomethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Benzene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Carbon Tetrachloride, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Chloroethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Chloroform, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Ethylbenzene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Chloromethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Dibromochloromethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
1,4-Dichlorobenzene, ug/l	<1.0	<25	<1.0	<1.0	<1.0
Dichlorodifluoromethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
1,1-Dichloroethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
1,2-Dichloroethane, ug/l	<1.0	<25	<1.0	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<25	<1.0	<1.0	<1.0

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-1	CO-MW-M-01	Client
11187-2	CO-MW-O-01	
11187-3	CO-MW-P-01	
11187-4	CO-MW-A-01	
11187-5	CO-MW-A-02	

PARAMETER	11187-1	11187-2	11187-3	11187-4	11187-5
PCB-1221, ug/l	<0.50	<50*	<25*	<0.50	<0.50
PCB-1232, ug/l	<0.50	<50*	<25*	<0.50	<0.50
PCB-1242, ug/l	<0.50	<50*	<25*	<0.50	<0.50
PCB-1248, ug/l	<0.50	<50*	<25*	<0.50	<0.50
PCB-1254, ug/l	<0.50	<50*	<25*	<0.50	<0.50
PCB-1260, ug/l	<0.50	<50*	<25*	<0.50	<0.50
Arsenic, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Chromium, mg/l	<0.010	<0.010	0.059	0.10	0.043
Zinc, mg/l	0.027	0.044	0.053	0.054	0.12

* = Increased detection limit is due to matrix interference.

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-11	CO-MW-D-02	Client
11187-12	CO-MW-E-01	

PARAMETER	11187-11	11187-12
601 and 602		
Bromodichloromethane, ug/l	<1.0	<100
Bromoform, ug/l	<1.0	<100
Bromomethane, ug/l	<1.0	<100
Benzene, ug/l	<1.0	<100
Carbon Tetrachloride, ug/l	<1.0	<100
Chlorobenzene, ug/l	<1.0	<100
Chloroethane, ug/l	<1.0	<100
2-Chloroethylvinyl Ether, ug/l	<1.0	<100
Chloroform, ug/l	<1.0	<100
Ethylbenzene, ug/l	<1.0	540
Chloromethane, ug/l	<1.0	<100
Dibromochloromethane, ug/l	<1.0	<100
1,2-Dichlorobenzene, ug/l	<1.0	<100
1,3-Dichlorobenzene, ug/l	<1.0	<100
1,4-Dichlorobenzene, ug/l	<1.0	<100
Dichlorodifluoromethane, ug/l	<1.0	<100
1,1-Dichloroethane, ug/l	<1.0	<100
1,2-Dichloroethane, ug/l	<1.0	<100
1,1-Dichloroethene, ug/l	<1.0	<100
cis/trans-1,2-Dichloroethylene, ug/l	<1.0	<100
1,2-Dichloropropane, ug/l	<1.0	<100
Cis-1,3-Dichloropropene, ug/l	<1.0	<100

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-11	CO-MW-D-02	Client
11187-12	CO-MW-E-01	

PARAMETER	11187-11	11187-12
BN-A Extractables (625)		
Acenaphthene, ug/l	<10	<20*
Acenaphthylene, ug/l	<10	<20*
Anthracene, ug/l	<10	<20*
Aldrin, ug/l	<10	<20*
Benzo(a)Anthracene, ug/l	<10	<20*
Benzo(b)fluoranthene, ug/l	<10	<20*
Benzo (k) Fluoranthene, ug/l	<10	<20*
Benzo(a)pyrene, ug/l	<10	<20*
Benzo(g,h,i)perylene, ug/l	<10	<20*
Benzyl butyl phthalate, ug/l	<10	<20*
beta-BHC, ug/l	<10	<20*
delta-BHC, ug/l	<10	<20*
bis(2-Chloroethyl) ether, ug/l	<10	<20*
bis(2-Chloroethoxy) methane, ug/l	<10	<20*
bis(2-Ethylhexyl) phthalate, ug/l	<10	<20*
Bis(2-chloroisopropyl)ether, ug/l	<10	<20*
4-Bromophenyl-phenyl-ether, ug/l	<10	<20*
Chlordane, ug/l	<20	<40*
2-Chloronaphthalene, ug/l	<10	<20*
4-Chlorophenyl-phenyl ether, ug/l	<10	<20*
Chrysene, ug/l	<10	<20*
4,4'-DDD, ug/l	<10	<20*

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LOG NO: T0-11075

Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client

PARAMETER	11075-1
Semivolatile Organics (8270)	
1,3-Dichlorobenzene, ug/kg dw	<34000
1,4-Dichlorobenzene, ug/kg dw	<34000
Hexachloroethane, ug/kg dw	<34000
bis(2-Chloroethyl) ether, ug/kg dw	<34000
1,2-Dichlorobenzene, ug/kg dw	<34000
Bis(2-chloroisopropyl)ether, ug/kg dw	<34000
N-Nitrosodi-N-Propylamine, ug/kg dw	<34000
Nitrobenzene, ug/kg dw	<34000
Hexachlorobutadiene, ug/kg dw	<34000
1,2,4-Trichlorobenzene, ug/kg dw	<34000
Isophorone, ug/kg dw	<34000
Naphthalene, ug/kg dw	<34000
bis(2-Chloroethoxy) methane, ug/kg dw	<34000
Hexachlorocyclopentadiene, ug/kg dw	<34000
2-Chloronaphthalene, ug/kg dw	<34000
Acenaphthylene, ug/kg dw	<34000
Acenaphthene, ug/kg dw	<34000
Dimethylphthalate, ug/kg dw	<34000
2,6-Dinitrotoluene, ug/kg dw	<34000
Fluorene, ug/kg dw	<34000
4-Chlorophenyl-phenyl ether, ug/kg dw	<34000
2,4-Dinitrotoluene, ug/kg dw	<34000
Diethyl Phthalate, ug/kg dw	<34000

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client

PARAMETER	11075-1
N-Nitrosodiphenylamine, ug/kg dw	<34000
Hexachlorobenzene, ug/kg dw	<34000
gamma-BHC, ug/kg dw	<34000
4-Bromophenyl-phenyl-ether, ug/kg dw	<34000
delta-BHC, ug/kg dw	<34000
Phenanthrene, ug/kg dw	<34000
Anthracene, ug/kg dw	<34000
beta-BHC, ug/kg dw	<34000
Heptachlor, ug/kg dw	<34000
alpha-BHC, ug/kg dw	<34000
Aldrin, ug/kg dw	<34000
Dibutyl phthalate, ug/kg dw	<34000
Heptachlor epoxide, ug/kg dw	<34000
Endosulfan I, ug/kg dw	<34000
Fluoranthene, ug/kg dw	<34000
Dieldrin, ug/kg dw	<34000
4,4'-DDE, ug/kg dw	<34000
Pyrene, ug/kg dw	<34000
Endrin, ug/kg dw	<34000
Endosulfan II, ug/kg dw	<34000
4,4'-DDD, ug/kg dw	<34000
Benzidine, ug/kg dw	<270000
4,4'-DDT, ug/kg dw	<34000
Endosulfan sulfate, ug/kg dw	<34000

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11075-1	CO-SB-26-01	Client

PARAMETER	11075-1
Endrin Aldehyde, ug/kg dw	<34000
Butylbenzylphthalate, ug/kg dw	<34000
bis(2-Ethylhexyl) phthalate, ug/kg dw	<34000
Chrysene, ug/kg dw	<34000
Benzo(a)Anthracene, ug/kg dw	<34000
3,3'-Dichlorobenzidine, ug/kg dw	<68000
Di-n-octylphthalate, ug/kg dw	<34000
Benzo(b)fluoranthene, ug/kg dw	<34000
Benzo (k) Fluoranthene, ug/kg dw	<34000
Benzo(a)pyrene, ug/kg dw	<34000
Indeno (1,2,3-cd)pyrene, ug/kg dw	<34000
Dibenz (a,h)anthracene, ug/kg dw	<34000
Benzo(g,h,i)perylene, ug/kg dw	<34000
N-Nitrosodimethylamine, ug/kg dw	<34000
Chlordane, ug/kg dw	87000
Toxaphene, ug/kg dw	<680000
Aroclor-1016, ug/kg dw	<340000
Aroclor-1221, ug/kg dw	<340000
Aroclor-1232, ug/kg dw	<340000
Aroclor-1242, ug/kg dw	<340000
Aroclor-1248, ug/kg dw	<340000
Aroclor-1254, ug/kg dw	<340000
Aroclor-1260, ug/kg dw	<340000
2-Chlorophenol, ug/kg dw	<34000

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client

PARAMETER	11075-1
2-Nitrophenol, ug/kg dw	<34000
Phenol, ug/kg dw	<34000
2,4-Dimethylphenol, ug/kg dw	<34000
2,4-Dichlorophenol, ug/kg dw	<34000
2,4,6-Trichlorophenol, ug/kg dw	<34000
4-Chloro-3-methylphenol, ug/kg dw	<34000
2,4-Dinitrophenol, ug/kg dw	<170000
2-Methyl-4,6-dinitrophenol, ug/kg dw	<170000
Pentachlorophenol, ug/kg dw	<170000
4-Nitrophenol, ug/kg dw	<170000
Benzyl alcohol, ug/kg dw	<34000
2-Methylphenol (o-cresol), ug/kg dw	<34000
4-Methylphenol (p-cresol), ug/kg dw	<34000
Benzoic acid, ug/kg dw	<170000
4-Chloroaniline, ug/kg dw	<34000
2-Methylnaphthalene, ug/kg dw	<34000
2,4,5-Trichlorophenol, ug/kg dw	<34000
2-Nitroaniline, ug/kg dw	<170000
3-Nitroaniline, ug/kg dw	<170000
Dibenzofuran, ug/kg dw	<34000
4-Nitroaniline, ug/kg dw	<170000

68

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client

PARAMETER	11075-1
Organophosphorus Pesticides	
Azinphos methyl, ug/kg dw	<190
Bolstar (Sulprofos), ug/kg dw	<9.6
Chlorpyrifos, ug/kg dw	<1.9
Coumaphos, ug/kg dw	<96
Demeton-O, ug/kg dw	<19
Demeton-S, ug/kg dw	<19
Diazinon, ug/kg dw	<9.6
Dichlorvos, ug/kg dw	<19
Disulfoton, ug/kg dw	<9.6
Ethoprop, ug/kg dw	<1.9
Fensulfothion, ug/kg dw	<96
Fenthion, ug/kg dw	<1.9
Merphos, ug/kg dw	<9.6
Mevinphos, ug/kg dw	<1.9
Naled, ug/kg dw	<19
Methyl Parathion, ug/kg dw	<9.6
Phorate, ug/kg dw	<1.9
Ronnel, ug/kg dw	<1.9
Stirophos (Tetrachlorvinphos), ug/kg dw	<9.6
Tokuthion (Prothiofos), ug/kg dw	<9.6
Trichloronate, ug/kg dw	<96
Additional Compounds:	
Ethion, ug/kg dw	75

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LOG NO: T0-11075

Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client

PARAMETER	11075-1
Chlorinated Herbicides (8150)	
2,4-D, ug/kg dw	<650*
2,4-DB, ug/kg dw	<650*
2,4,5-T, ug/kg dw	<390*
2,4,5-TP Silvex, ug/kg dw	<130*
Dalapon, ug/kg dw	<13000*
Dicamba, ug/kg dw	<6500*
Dichlorprop, ug/kg dw	<650*
Dinoseb, ug/kg dw	<650*
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<13000*
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<13000*

* =Increased Detection limits do to matrix interference.

70

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Brown & Caldwell
201 E. Pine Street, Suite 1416
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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-3	CO-SB-01-01	Client
11143-4	CO-SB-02-01	
11143-5	CO-SB-3S-01	
11143-6	CO-SB-04-01	
11143-7	CO-SB-04-02	

PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Semivolatile Organics (8270)					
1,3-Dichlorobenzene, ug/kg dw	<340	<310	<330	<35000	<17000
1,4-Dichlorobenzene, ug/kg dw	<340	<310	<330	<35000	<17000
Hexachloroethane, ug/kg dw	<340	<310	<330	<35000	<17000
bis(2-Chloroethyl) ether, ug/kg dw	<340	<310	<330	<35000	<17000
1,2-Dichlorobenzene, ug/kg dw	<340	<310	<330	<35000	<17000
Bis(2-chloroisopropyl)ether , ug/kg dw	<340	<310	<330	<35000	<17000
N-Nitrosodi-N-Propylamine, ug/kg dw	<340	<310	<330	<35000	<17000
Nitrobenzene, ug/kg dw	<340	<310	<330	<35000	<17000
Hexachlorobutadiene, ug/kg dw	<340	<310	<330	<35000	<17000
1,2,4-Trichlorobenzene, ug/kg dw	<340	<310	<330	<35000	<17000
Isophorone, ug/kg dw	<340	<310	<330	<35000	<17000
Naphthalene, ug/kg dw	<340	<310	<330	<35000	<17000
bis(2-Chloroethoxy) methane, ug/kg dw	<340	<310	<330	<35000	<17000
Hexachlorocyclopentadiene, ug/kg dw	<340	<310	<330	<35000	<17000
2-Chloronaphthalene, ug/kg dw	<340	<310	<330	<35000	<17000

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REPORT OF RESULTS

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11143-3	CO-SB-01-01	Client
11143-4	CO-SB-02-01	
11143-5	CO-SB-3S-01	
11143-6	CO-SB-04-01	
11143-7	CO-SB-04-02	

PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Acenaphthylene, ug/kg dw	<340	<310	<330	<35000	<17000
Acenaphthene, ug/kg dw	<340	<310	<330	<35000	<17000
Dimethylphthalate, ug/kg dw	<340	<310	<330	<35000	<17000
2,6-Dinitrotoluene, ug/kg dw	<340	<310	<330	<35000	<17000
Fluorene, ug/kg dw	<340	<310	<330	<35000	<17000
4-Chlorophenyl-phenyl ether, ug/kg dw	<340	<310	<330	<35000	<17000
2,4-Dinitrotoluene, ug/kg dw	<340	<310	<330	<35000	<17000
Diethyl Phthalate, ug/kg dw	<340	<310	<330	<35000	<17000
N-Nitrosodiphenylamine, ug/kg dw	<340	<310	<330	<35000	<17000
Hexachlorobenzene, ug/kg dw	<340	<310	<330	<35000	<17000
gamma-BHC, ug/kg dw	550	<310	<330	76000	<17000
4-Bromophenyl-phenyl-ether, ug/kg dw	<340	<310	<330	<35000	<17000
delta-BHC, ug/kg dw	10000	2500	<330	130000	<17000
Phenanthrene, ug/kg dw	<340	<310	<330	<35000	<17000
Anthracene, ug/kg dw	<340	<310	<330	<35000	<17000
beta-BHC, ug/kg dw	11000	1700	<330	48000	<17000
Heptachlor, ug/kg dw	<340	580	<330	<35000	<17000
alpha-BHC, ug/kg dw	420	<310	<330	2100000	<17000

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-8	CO-SB-05-01	Client
11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
Volatile Organics					
Benzyl chloride, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Bromobenzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Bromoform, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon Tetrachloride, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroform, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1-Chlorohexane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
2-Chloroethylvinyl Ether, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Chloromethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorotoluene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromochloromethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromomethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichlorobenzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichlorobenzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,4-Dichlorobenzene, ug/kg dw	<5.0	380	<5.0	<5.0	<5.0

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201 E. Pine Street, Suite 1416
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Project: Chevron Orlando/#5456

REPORT OF RESULTS

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11143-8	CO-SB-05-01	Client
11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
Dichlorodifluoromethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichloropropylene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene Chloride, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1,2-Tetrachloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethylene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloropropane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl Chloride, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Xylenes, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0

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Received: 13 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-8	CO-SB-05-01	Client
11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
Semivolatile Organics (8270)					
1,3-Dichlorobenzene, ug/kg dw	<1700	<340	<3200	<59000	<1700
1,4-Dichlorobenzene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Hexachloroethane, ug/kg dw	<1700	<340	<3200	<59000	<1700
bis(2-Chloroethyl) ether, ug/kg dw	<1700	<340	<3200	<59000	<1700
1,2-Dichlorobenzene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Bis(2-chloroisopropyl)ether , ug/kg dw	<1700	<340	<3200	<59000	<1700
N-Nitrosodi-N-Propylamine, ug/kg dw	<1700	<340	<3200	<59000	<1700
Nitrobenzene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Hexachlorobutadiene, ug/kg dw	<1700	<340	<3200	<59000	<1700
1,2,4-Trichlorobenzene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Isophorone, ug/kg dw	<1700	<340	<3200	<59000	<1700
Naphthalene, ug/kg dw	<1700	<340	<3200	<59000	<1700
bis(2-Chloroethoxy) methane, ug/kg dw	<1700	<340	<3200	<59000	<1700
Hexachlorocyclopentadiene, ug/kg dw	<1700	<340	<3200	<59000	<1700

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11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
2-Chloronaphthalene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Acenaphthylene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Acenaphthene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Dimethylphthalate, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,6-Dinitrotoluene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Fluorene, ug/kg dw	<1700	<340	<3200	<59000	<1700
4-Chlorophenyl-phenyl ether, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,4-Dinitrotoluene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Diethyl Phthalate, ug/kg dw	<1700	<340	<3200	<59000	<1700
N-Nitrosodiphenylamine, ug/kg dw	<1700	<340	<3200	<59000	<1700
Hexachlorobenzene, ug/kg dw	<1700	<340	<3200	<59000	<1700
gamma-BHC, ug/kg dw	<1700	<340	<3200	<59000	<1700
4-Bromophenyl-phenyl-ether, ug/kg dw	<1700	<340	<3200	<59000	<1700
delta-BHC, ug/kg dw	<1700	<340	<3200	320000	<1700
Phenanthrene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Anthracene, ug/kg dw	<1700	<340	<3200	<59000	<1700
beta-BHC, ug/kg dw	<1700	<340	<3200	81000	<1700
Heptachlor, ug/kg dw	<1700	<340	<3200	<59000	<1700

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11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
Benzo(a)Anthracene, ug/kg dw	<1700	<340	<3200	<59000	<1700
3,3'-Dichlorobenzidine, ug/kg dw	<3400	<680	<6400	<120000	<3300
Di-n-octylphthalate, ug/kg dw	<1700	<340	<3200	<59000	<1700
Benzo(b)fluoranthene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Benzo (k) Fluoranthene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Benzo(a)pyrene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Indeno (1,2,3-cd)pyrene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Dibenz (a,h)anthracene, ug/kg dw	<1700	<340	<3200	<59000	<1700
Benzo(g,h,i)perylene, ug/kg dw	<1700	<340	<3200	<59000	<1700
N-Nitrosodimethylamine, ug/kg dw	<1700	<340	<3200	<59000	<1700
Chlordane, ug/kg dw	18000	<680	<6400	160000	5100
Toxaphene, ug/kg dw	<34000	<6800	<64000	<1200000	<33000
Aroclor-1016, ug/kg dw	<17000	<3400	<32000	<590000	<17000
Aroclor-1221, ug/kg dw	<17000	<3400	<32000	<590000	<17000
Aroclor-1232, ug/kg dw	<17000	<3400	<32000	<590000	<17000
Aroclor-1242, ug/kg dw	<17000	<3400	<32000	<590000	<17000
Aroclor-1248, ug/kg dw	<17000	<3400	<32000	<590000	<17000
Aroclor-1254, ug/kg dw	<17000	<3400	<32000	<590000	<17000
Aroclor-1260, ug/kg dw	<17000	<340	<32000	<590000	<17000
2-Chlorophenol, ug/kg dw	<1700	<340	<3200	<59000	<1700

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11143-8	CO-SB-05-01	Client
11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
2-Nitrophenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
Phenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,4-Dimethylphenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,4-Dichlorophenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,4,6-Trichlorophenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
4-Chloro-3-methylphenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,4-Dinitrophenol, ug/kg dw	<8500	<1700	<16000	<300000	<8300
2-Methyl-4,6-dinitrophenol, ug/kg dw	<8500	<1700	<16000	<300000	<8300
Pentachlorophenol, ug/kg dw	<8500	<1700	<16000	<300000	<8300
4-Nitrophenol, ug/kg dw	<8500	<1700	<16000	<300000	<8300
Benzyl alcohol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2-Methylphenol (o-cresol), ug/kg dw	<1700	<340	<3200	<59000	<1700
4-Methylphenol (p-cresol), ug/kg dw	<1700	<340	<3200	<59000	<1700
Benzoic acid, ug/kg dw	<8500	<1700	<16000	<300000	<8300
4-Chloroaniline, ug/kg dw	<1700	<340	<3200	<59000	<1700
2-Methylnaphthalene, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,4,5-Trichlorophenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2-Nitroaniline, ug/kg dw	<8500	<1700	<16000	<300000	<8300
3-Nitroaniline, ug/kg dw	<8500	<1700	<16000	<300000	<8300
Dibenzofuran, ug/kg dw	<1700	<340	<3200	<59000	<1700
4-Nitroaniline, ug/kg dw	<8500	<1700	<16000	<300000	<8300

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REPORT OF RESULTS

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11143-8	CO-SB-05-01	Client
11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
Organophosphorus Pesticides					
Azinphos methyl, ug/kg dw	<200	<200	<170	<210	<210
Bolstar (Sulprofos), ug/kg dw	<10	<9.8	<8.6	<10	<10
Chlorpyrifos, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Coumaphos, ug/kg dw	<100	<98	<86	<100	<100
Demeton-O, ug/kg dw	<20	<20	<17	<21	<21
Demeton-S, ug/kg dw	<20	<20	<17	<21	<21
Diazinon, ug/kg dw	<10	<9.8	<8.6	<10	<10
Dichlorvos, ug/kg dw	<20	<20	<17	<21	<21
Disulfoton, ug/kg dw	<10	<9.8	<8.6	<10	<10
Ethoprop, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Fensulfothion, ug/kg dw	<100	<98	<86	<100	<100
Fenthion, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Merphos, ug/kg dw	<10	<9.8	<8.6	<10	<10
Mevinphos, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Naled, ug/kg dw	<20	<20	<17	<21	<21
Methyl Parathion, ug/kg dw	<10	<9.8	<8.6	<10	<10
Phorate, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Ronnel, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Stirophos (Tetrachlorvinphos), ug/kg dw	<10	<9.8	<8.6	<10	<10

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

2846 Industrial Plaza Drive • Tallahassee, FL 32301 • (904) 878-3994 • Fax (904) 878-9504

LOG NO: T0-11143

Received: 13 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-3	CO-SB-01-01	Client
11143-4	CO-SB-02-01	
11143-5	CO-SB-3S-01	
11143-6	CO-SB-04-01	
11143-7	CO-SB-04-02	

PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Phenol, ug/kg dw	<340	<3100	<330	<350000	<170000
2,4-Dimethylphenol, ug/kg dw	<340	<3100	<330	<350000	<170000
2,4-Dichlorophenol, ug/kg dw	<340	<3100	<330	<350000	<170000
2,4,6-Trichlorophenol, ug/kg dw	<340	<3100	<330	<350000	<170000
4-Chloro-3-methylphenol, ug/kg dw	<340	<3100	<330	<350000	<170000
2,4-Dinitrophenol, ug/kg dw	<1700	<1600	<1600	<170000	<85000
2-Methyl-4,6-dinitrophenol, ug/kg dw	<1700	<1600	<1600	<170000	<85000
Pentachlorophenol, ug/kg dw	<1700	<1600	<1600	<170000	<85000
4-Nitrophenol, ug/kg dw	<1700	<1600	<1600	<170000	<85000
Benzyl alcohol, ug/kg dw	<340	<310	<330	<35000	<17000
2-Methylphenol (o-cresol), ug/kg dw	<340	<310	<330	<35000	<17000
4-Methylphenol (p-cresol), ug/kg dw	<340	<310	<330	<35000	<17000
Benzoic acid, ug/kg dw	<1700	<1600	<1600	<170000	<85000
4-Chloroaniline, ug/kg dw	<340	<310	<330	<35000	<17000
2-Methylnaphthalene, ug/kg dw	<340	<310	<330	<35000	<17000
2,4,5-Trichlorophenol, ug/kg dw	<340	<310	<330	<35000	<17000
2-Nitroaniline, ug/kg dw	<1700	<1600	<1600	<170000	<85000
3-Nitroaniline, ug/kg dw	<1700	<1600	<1600	<170000	<85000
Dibenzofuran, ug/kg dw	<340	<310	<330	<35000	<17000
4-Nitroaniline, ug/kg dw	<1700	<1600	<1600	<170000	<85000

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REPORT OF RESULTS

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11143-3	CO-SB-01-01	Client
11143-4	CO-SB-02-01	
11143-5	CO-SB-3S-01	
11143-6	CO-SB-04-01	
11143-7	CO-SB-04-02	

PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Organophosphorus Pesticides					
Azinphos methyl, ug/kg dw	<200	<180	<190	<210	<200
Bolstar (Sulprofos), ug/kg dw	<10	<8.8	<9.6	<10	<10
Chlorpyrifos, ug/kg dw	<2.0	<1.8	<1.9	<2.1	<2.0
Coumaphos, ug/kg dw	<100	<88	<96	<100	<100
Demeton-O, ug/kg dw	<20	<18	<19	<21	<20
Demeton-S, ug/kg dw	<20	<18	<19	<21	<20
Diazinon, ug/kg dw	<10	<8.8	<9.6	<10	<10
Dichlorvos, ug/kg dw	<20	<18	<19	<21	<20
Disulfoton, ug/kg dw	<10	<8.8	<9.6	<10	<10
Ethoprop, ug/kg dw	<2.0	<1.8	<1.9	<2.1	<2.0
Fensulfothion, ug/kg dw	<100	<88	<96	<100	<100
Fenthion, ug/kg dw	<2.0	<1.8	<1.9	<2.1	<2.0
Merphos, ug/kg dw	<10	<8.8	<9.6	<10	<10
Mevinphos, ug/kg dw	<2.0	<1.8	<1.9	<2.1	<2.0
Naled, ug/kg dw	<20	<18	<19	<21	<20
Methyl Parathion, ug/kg dw	<10	<8.8	<9.6	<10	<10
Phorate, ug/kg dw	<2.0	<1.8	<1.9	<2.1	<2.0
Ronnel, ug/kg dw	<2.0	<1.8	<1.9	<2.1	<2.0
Stirophos (Tetrachlorvinphos), ug/kg dw	<10	<8.8	<9.6	<10	<10

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11143-4	CO-SB-02-01	
11143-5	CO-SB-3S-01	
11143-6	CO-SB-04-01	
11143-7	CO-SB-04-02	

PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Tokuthion (Prothiofos), ug/kg dw	<10	<8.8	<9.6	<10	<10
Trichloronate, ug/kg dw	<100	<88	<96	<100	<100
Additional Compounds:					
Ethion, ug/kg dw	<10	<8.8	<9.6	140	650
Chlorinated Herbicides (8150)					
2,4-D, ug/kg dw	<600*	<550*	<550*	<3000*	<290*
2,4-DB, ug/kg dw	<600*	<550*	<550*	<3000*	<290*
2,4,5-T, ug/kg dw	<360*	<330*	<330*	<18000*	<170*
2,4,5-TP Silvex, ug/kg dw	<120*	<110*	<110*	<590*	<57*
Dalapon, ug/kg dw	<12000*	<11000*	<11000*	<300000*	<5800*
Dicamba, ug/kg dw	<6000*	<5500*	<5500*	<30000*	<2900*
Dichlorprop, ug/kg dw	<600*	<550*	<550*	<3000*	<290*
Dinoseb, ug/kg dw	<600*	<550*	<550*	<3000*	<290*
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<12000*	<11000*	<11000*	<300000*	<5800*
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<12000*	<11000*	<11000*	<300000*	<5800*
Arsenic, mg/kg dw	13	6.3	<0.87	11	27

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REPORT OF RESULTS

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11097-1	CO-SB-17-01	Client
11097-2	CO-SB-17-02	
11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
Semivolatile Organics (8270)					
1,3-Dichlorobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
1,4-Dichlorobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Hexachloroethane, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
bis(2-Chloroethyl) ether, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
1,2-Dichlorobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Bis(2-chloroisopropyl)ether , ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
N-Nitrosodi-N-Prcpylamine, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Nitrobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Hexachlorobutadiene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
1,2,4-Trichlorobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Isophorone, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Naphthalene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
bis(2-Chloroethoxy) methane, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Hexachlorocyclopentadiene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*

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11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
2-Chloronaphthalene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Acenaphthylene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Acenaphthene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Dimethylphthalate, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
2,6-Dinitrotoluene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Fluorene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
4-Chlorophenyl-phenyl ether, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
2,4-Dinitrotoluene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Diethyl Phthalate, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
N-Nitrosodiphenylamine, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Hexachlorobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
gamma-BHC, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
4-Bromophenyl-phenyl-ether, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
delta-BHC, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Phenanthrene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Anthracene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
beta-BHC, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-1	CO-SB-17-01	Client
11097-2	CO-SB-17-02	
11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
Aroclor-1232, ug/kg dw	<400000*	<370000*	<68000*	<170000*	<300000*
Aroclor-1242, ug/kg dw	<400000*	<370000*	<68000*	<170000*	<300000*
Aroclor-1248, ug/kg dw	<400000*	<370000*	<68000*	<170000*	<300000*
Aroclor-1254, ug/kg dw	<400000*	<370000*	<68000*	<170000*	<300000*
Aroclor-1260, ug/kg dw	<400000*	<370000*	<68000*	<170000*	<300000*
2-Chlorophenol, ug/kg dw	<40000*	<370000*	<6800*	<17000*	<30000*
2-Nitrophenol, ug/kg dw	<40000*	<370000*	<6800*	<17000*	<30000*
Phenol, ug/kg dw	<40000*	<370000*	<6800*	<17000*	<30000*
2,4-Dimethylphenol, ug/kg dw	<40000*	<370000*	<6800*	<17000*	<30000*
2,4-Dichlorophenol, ug/kg dw	<40000*	<370000*	<6800*	<17000*	<30000*
2,4,6-Trichlorophenol, ug/kg dw	<40000*	<370000*	<6800*	<17000*	<30000*
4-Chloro-3-methylphenol, ug/kg dw	<40000*	<370000*	<6800*	<17000*	<30000*
2,4-Dinitrophenol, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*
2-Methyl-4,6-dinitrophenol, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*
Pentachlorophenol, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*
4-Nitrophenol, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*
Benzyl alcohol, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
2-Methylphenol (o-cresol), ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*

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201 E. Pine Street, Suite 1416
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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-1	CO-SB-17-01	Client
11097-2	CO-SB-17-02	
11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
4-Methylphenol (p-cresol), ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
Benzoic acid, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*
4-Chloroaniline, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
2-Methylnaphthalene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
2,4,5-Trichlorophenol, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
2-Nitroaniline, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*
3-Nitroaniline, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*
Dibenzofuran, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*
4-Nitroaniline, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*

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11097-1	CO-SB-17-01	Client
11097-2	CO-SB-17-02	
11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
Organophosphorus Pesticides					
Azinphos methyl, ug/kg dw	<220	<200	<210	<210	<200
Bolstar (Sulprofos), ug/kg dw	<11	<10	<11	<10	<10
Chlorpyrifos, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.0
Coumaphos, ug/kg dw	<110	<100	<100	<100	<100
Demeton-O, ug/kg dw	62	82	170	170	210
Demeton-S, ug/kg dw	200	220	57	57	1400
Diazinon, ug/kg dw	<11	<10	<10	<10	<10
Dichlorvos, ug/kg dw	<22	<20	<21	<21	<21
Disulfoton, ug/kg dw	<11	<10	<10	<10	<10
Ethoprop, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.1
Fensulfothion, ug/kg dw	<110	<100	<100	<100	<100
Fenthion, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.0
Merphos, ug/kg dw	<11	<10	<10	<10	<10
Mevinphos, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.1
Naled, ug/kg dw	<22	<20	<2.1	<21	<21
Methyl Parathion, ug/kg dw	<11	<10	<10	<10	<10
Phorate, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.1
Ronnel, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.1
Stirophos (Tetrachlorvinphos), ug/kg dw	<11	<10	<10	<10	<10
Tokuthion (Prothiofos), ug/kg dw	<11	<10	<10	<10	<10
Trichloronate, ug/kg dw	<110	<100	<100	<100	<100

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11097-6	CO-SB-20-01	Client
11097-7	CO-SB-21-01	
11097-8	CO-SB-22-01	
11097-9	CO-SB-22-02	
11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
3,3'-Dichlorobenzidine, ug/kg dw	<700	<69000*	<36000*	<33000*	<79000*
Di-n-octylphthalate, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Benzo(b)fluoranthene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Benzo (k) Fluoranthene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Benzo(a)pyrene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Indeno (1,2,3-cd)pyrene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Dibenz (a,h)anthracene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Benzo(g,h,i)perylene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
N-Nitrosodimethylamine, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Chlordane, ug/kg dw	<700	<69000*	170000	250000	<170000
Toxaphene, ug/kg dw	<7000	<690000*	<360000*	<330000*	<790000*
Aroclor-1016, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*
Aroclor-1221, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*
Aroclor-1232, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*
Aroclor-1242, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*
Aroclor-1248, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*
Aroclor-1254, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*
Aroclor-1260, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*
2-Chlorophenol, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2-Nitrophenol, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*

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LOG NO: T0-11097

Received: 10 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-6	CO-SB-20-01	Client
11097-7	CO-SB-21-01	
11097-8	CO-SB-22-01	
11097-9	CO-SB-22-02	
11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
Semivolatile Organics (8270)					
1,3-Dichlorobenzene, ug/kg dw	<350	<34000*	<1800*	<16000*	<39000*
1,4-Dichlorobenzene, ug/kg dw	<350	<34000*	<1800*	<16000*	<39000*
Hexachloroethane, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
bis(2-Chloroethyl) ether, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
1,2-Dichlorobenzene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Bis(2-chloroisopropyl)ether , ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
N-Nitrosodi-N-Propylamine, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Nitrobenzene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Hexachlorobutadiene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
1,2,4-Trichlorobenzene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Isophorone, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Naphthalene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
bis(2-Chloroethoxy) methane, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Hexachlorocyclopentadiene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2-Chloronaphthalene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*

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11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
Acenaphthylene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Acenaphthene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Dimethylphthalate, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2,6-Dinitrotoluene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Fluorene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
4-Chlorophenyl-phenyl ether, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2,4-Dinitrotoluene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Diethyl Phthalate, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
N-Nitrosodiphenylamine, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Hexachlorobenzene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
gamma-BHC, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
4-Bromophenyl-phenyl-ether, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
delta-BHC, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Phenanthrene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Anthracene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
beta-BHC, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Heptachlor, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
alpha-BHC, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*

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11097-9	CO-SB-22-02	
11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
Organophosphorus Pesticides					
Azinphos methyl, ug/kg dw	<190	<170	<200	<210	<9500*
Bolstar (Sulprofos), ug/kg dw	<9.6	<8.4	<10	<10	<480*
Chlorpyrifos, ug/kg dw	<1.9	<1.7	<2.0	<2.1	1900
Coumaphos, ug/kg dw	<96	<84	<100	<100	<4800*
Demeton-O, ug/kg dw	<19	<17	220	200	490
Demeton-S, ug/kg dw	<19	<17	230	<21	1100
Diazinon, ug/kg dw	<9.6	<8.4	<10	<10	<9.6
Dichlorvos, ug/kg dw	<19	<17	<21	<21	<19
Disulfoton, ug/kg dw	<9.6	<8.4	<10	<10	<9.6
Ethoprop, ug/kg dw	<1.9	<1.7	<2.1	<2.1	<1.9
Fensulfothion, ug/kg dw	<96	<84	<100	<100	<96
Fenthion, ug/kg dw	<1.9	<1.7	<2.1	<2.1	<95*
Merphos, ug/kg dw	<9.6	<8.4	<10	<10	<480*
Mevinphos, ug/kg dw	<1.9	<1.7	<2.1	<2.1	<1.9
Naled, ug/kg dw	<19	<17	<21	50	<19
Methyl Parathion, ug/kg dw	<9.6	<8.4	<10	<10	<480*
Phorate, ug/kg dw	<1.9	<1.7	<2.1	<2.1	28
Ronnel, ug/kg dw	<1.9	<1.7	<2.1	<2.1	<95*
Stirophos (Tetrachlorvinphos), ug/kg dw	<9.6	<8.4	<10	<10	<480*
Tokuthion (Prothiofos), ug/kg dw	<9.6	<8.4	<10	<10	<480*
Trichloronate, ug/kg dw	<96	<84	<100	<100	<4800*

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11097-11	CO-SB-23-02	Client
11097-12	CO-SB-32-01	
11097-13	CO-SB-33-01	
11097-14	CO-SB-29-02	

PARAMETER	11097-11	11097-12	11097-13	11097-14
Volatile Organics				
Benzyl chloride, ug/kg dw	<63000	<6.1	<5.7	<5.8
bis(2-Chloroethoxy) methane, ug/kg dw	<63000	<6.1	<5.7	<5.8
Bis(2-chloroisopropyl)ether, ug/kg dw	<63000	<6.1	<5.7	<5.8
Bromobenzene, ug/kg dw	<63000	<6.1	<5.7	<5.8
Bromodichloromethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
Benzene, ug/kg dw	<63000	<6.1	<5.7	<5.8
Bromoform, ug/kg dw	<63000	<6.1	<5.7	<5.8
Bromomethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
Carbon Tetrachloride, ug/kg dw	<63000	<6.1	<5.7	<5.8
Chloroacetaldehyde, ug/kg dw	<63000	<6.1	<5.7	<5.8
Chlorobenzene, ug/kg dw	<63000	<6.1	<5.7	<5.8
Chloroethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
Chloroform, ug/kg dw	<63000	<6.1	<5.7	<5.8
1-Chlorohexane, ug/kg dw	<63000	<6.1	<5.7	<5.8
2-Chloroethylvinyl Ether, ug/kg dw	<63000	<6.1	<5.7	<5.8
Chloromethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
Chloromethyl methyl ether, ug/kg dw	<63000	<6.1	<5.7	<5.8
Chlorotoluene, ug/kg dw	<63000	<6.1	<5.7	<5.8
Dibromochloromethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
Dibromomethane, ug/kg dw	<63000	<6.1	<5.7	<5.8

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11097-13	CO-SB-33-01	
11097-14	CO-SB-29-02	

PARAMETER	11097-11	11097-12	11097-13	11097-14
1,2-Dichlorobenzene, ug/kg dw	<63000	<6.1	<5.7	<5.8
1,3-Dichlorobenzene, ug/kg dw	<63000	<6.1	<5.7	<5.8
1,4-Dichlorobenzene, ug/kg dw	<63000	<6.1	<5.7	<5.8
Dichlorodifluoromethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
1,1-Dichloroethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
1,2-Dichloroethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
1,1-Dichloroethene, ug/kg dw	<63000	<6.1	<5.7	<5.8
1,2-Dichloropropane, ug/kg dw	<63000	<6.1	<5.7	<5.8
1,3-Dichloropropylene, ug/kg dw	<63000	<6.1	<5.7	<5.8
Ethylbenzene, ug/kg dw	280000	<6.1	<5.7	<5.8
Methylene Chloride, ug/kg dw	<63000	<6.1	<5.7	<5.8
1,1,2,2-Tetrachloroethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
1,1,1,2-Tetrachloroethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
Tetrachloroethylene, ug/kg dw	<63000	<6.1	<5.7	<5.8
Toluene, ug/kg dw	<63000	<6.1	<5.7	<5.8
1,1,1-Trichloroethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
1,1,2-Trichloroethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
Trichloroethene, ug/kg dw	<63000	<6.1	<5.7	<5.8
Trichlorofluoromethane, ug/kg dw	<63000	<6.1	<5.7	<5.8
Trichloropropane, ug/kg dw	<63000	<6.1	<5.7	<5.8
Vinyl Chloride, ug/kg dw	<63000	<6.1	<5.7	<5.8
Xylenes, ug/kg dw	1900000	22	<5.7	24

93

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11097-12	CO-SB-32-01	
11097-13	CO-SB-33-01	
11097-14	CO-SB-29-02	

PARAMETER	11097-11	11097-12	11097-13	11097-14
Semivolatile Organics (8270)				
1,3-Dichlorobenzene, ug/kg dw	<33000*	<340	<340	<310
1,4-Dichlorobenzene, ug/kg dw	<33000*	<340	<340	<310
Hexachloroethane, ug/kg dw	<33000*	<340	<340	<310
bis(2-Chloroethyl) ether, ug/kg dw	<33000*	<340	<340	<310
1,2-Dichlorobenzene, ug/kg dw	<33000*	<340	<340	<310
Bis(2-chloroisopropyl)ether, ug/kg dw	<33000*	<340	<340	<310
N-Nitrosodi-N-Propylamine, ug/kg dw	<33000*	<340	<340	<310
Nitrobenzene, ug/kg dw	<33000*	<340	<340	<310
Hexachlorobutadiene, ug/kg dw	<33000*	<340	<340	<310
1,2,4-Trichlorobenzene, ug/kg dw	<33000*	<340	<340	<310
Isophorone, ug/kg dw	<33000*	<340	<340	<310
Naphthalene, ug/kg dw	<33000*	<340	<340	<310
bis(2-Chloroethoxy) methane, ug/kg dw	<33000*	<340	<340	<310
Hexachlorocyclopentadiene, ug/kg dw	<33000*	<340	<340	<310
2-Chloronaphthalene, ug/kg dw	<33000*	<340	<340	<310
Acenaphthylene, ug/kg dw	<33000*	<340	<340	<310
Acenaphthene, ug/kg dw	<33000*	<340	<340	<310
Dimethylphthalate, ug/kg dw	<33000*	<340	<340	<310
2,6-Dinitrotoluene, ug/kg dw	<33000*	<340	<340	<310
Fluorene, ug/kg dw	<33000*	<340	<340	<310

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PARAMETER	11097-11	11097-12	11097-13	11097-14
4-Chlorophenyl-phenyl ether, ug/kg dw	<33000*	<340	<340	<310
2,4-Dinitrotoluene, ug/kg dw	<33000*	<340	<340	<310
Diethyl Phthalate, ug/kg dw	<33000*	<340	<340	<310
N-Nitrosodiphenylamine, ug/kg dw	<33000*	<340	<340	<310
Hexachlorobenzene, ug/kg dw	<33000*	<340	<340	<310
gamma-BHC, ug/kg dw	<33000*	<340	<340	<310
4-Bromophenyl-phenyl-ether, ug/kg dw	<33000*	<340	<340	<310
delta-BHC, ug/kg dw	<33000*	<340	<340	<310
Phenanthrene, ug/kg dw	<33000*	<340	<340	<310
Anthracene, ug/kg dw	<33000*	<340	<340	<310
beta-BHC, ug/kg dw	<33000*	<340	<340	<310
Heptachlor, ug/kg dw	<33000*	<340	<340	<310
alpha-BHC, ug/kg dw	<33000*	<340	<340	<310
Aldrin, ug/kg dw	<33000*	<340	<340	<310
Dibutyl phthalate, ug/kg dw	<33000*	<340	460	<310
Heptachlor epoxide, ug/kg dw	<33000*	<340	<340	<310
Endosulfan I, ug/kg dw	<33000*	<340	<340	<310
Fluoranthene, ug/kg dw	<33000*	<340	<340	<310
Dieldrin, ug/kg dw	<33000*	<340	<340	<310
4,4'-DDE, ug/kg dw	<33000*	<340	<340	<310
Pyrene, ug/kg dw	<33000*	<340	570	<310

95

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PARAMETER	11097-11	11097-12	11097-13	11097-14
Toxaphene, ug/kg dw	<670000*	<6800	<6800	<6200
Aroclor-1016, ug/kg dw	<330000*	<3400	<3400	<3100
Aroclor-1221, ug/kg dw	<330000*	<3400	<3400	<3100
Aroclor-1232, ug/kg dw	<330000*	<3400	<3400	<3100
Aroclor-1242, ug/kg dw	<330000*	<3400	<3400	<3100
Aroclor-1248, ug/kg dw	<330000*	<3400	<3400	<3100
Aroclor-1254, ug/kg dw	<330000*	<3400	<3400	<3100
Aroclor-1260, ug/kg dw	<330000*	<3400	<3400	<3100
2-Chlorophenol, ug/kg dw	<33000*	<340	<340	<310
2-Nitrophenol, ug/kg dw	<33000*	<340	1200	<310
Phenol, ug/kg dw	<33000*	<340	1400	<310
2,4-Dimethylphenol, ug/kg dw	<33000*	<340	900	<310
2,4-Dichlorophenol, ug/kg dw	<33000*	<340	<340	<310
2,4,6-Trichlorophenol, ug/kg dw	<33000*	<340	<340	<310
4-Chloro-3-methylphenol, ug/kg dw	<33000*	<340	350	<310
2,4-Dinitrophenol, ug/kg dw	<170000*	<1700	<1700	<1600
2-Methyl-4,6-dinitrophenol, ug/kg dw	<170000*	<1700	<1700	<1600
Pentachlorophenol, ug/kg dw	<170000*	<1700	<1700	<1600
4-Nitrophenol, ug/kg dw	<170000*	<1700	<1700	<1600
Benzyl alcohol, ug/kg dw	<33000*	<340	<340	<310
2-Methylphenol (o-cresol), ug/kg dw	<33000*	<340	<340	<310

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11097-13	CO-SB-33-01	
11097-14	CO-SB-29-02	

PARAMETER	11097-11	11097-12	11097-13	11097-14
4-Methylphenol (p-cresol), ug/kg dw	<33000*	<340	<340	<310
Benzoic acid, ug/kg dw	<170000*	<1700	<1700	<1600
4-Chloroaniline, ug/kg dw	<33000*	<340	<340	<310
2-Methylnaphthalene, ug/kg dw	<33000*	<340	<340	<310
2,4,5-Trichlorophenol, ug/kg dw	<33000*	<340	<340	<310
2-Nitroaniline, ug/kg dw	<170000*	<1700	<1700	<1600
3-Nitroaniline, ug/kg dw	<170000*	<1700	<1700	<1600
Dibenzofuran, ug/kg dw	<33000*	<340	<340	<310
4-Nitroaniline, ug/kg dw	<170000*	<1700	<1700	<1600

97

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11097-14	CO-SB-29-02	

PARAMETER	11097-11	11097-12	11097-13	11097-14
Organophosphorus Pesticides				
Azinphos methyl, ug/kg dw	<200	<200	<190	<180
Bolstar (Sulprofos), ug/kg dw	<10	<10	<10	<9.2
Chlorpyrifos, ug/kg dw	1300	<2.0	<2.0	<1.8
Coumaphos, ug/kg dw	<50000*	<100	<100	<92
Demeton-O, ug/kg dw	1500	<20	<20	<18
Demeton-S, ug/kg dw	210	<20	<20	<18
Diazinon, ug/kg dw	<5000*	<10	<10	<9.2
Dichlorvos, ug/kg dw	<10000*	<20	<20	<18
Disulfoton, ug/kg dw	<5000*	<10	<10	<9.2
Ethoprop, ug/kg dw	23	<2.0	<2.0	<1.8
Fensulfothion, ug/kg dw	<50000*	<100	<100	<92
Fenthion, ug/kg dw	<1000*	<2.0	<2.0	<1.8
Merphos, ug/kg dw	<5000*	<10	<10	<9.2
Mevinphos, ug/kg dw	<1000*	<2.0	<2.0	<1.8
Naled, ug/kg dw	680	<20	<20	<18
Methyl Parathion, ug/kg dw	<5000*	<10	<10	<9.2
Phorate, ug/kg dw	58	<2.0	<2.0	<1.8
Ronnel, ug/kg dw	<1000*	<2.0	<2.0	<1.8
Stirophos (Tetrachlorvinphos), ug/kg dw	<5000*	<10	<10	<18
Tokuthion (Prothiofos), ug/kg dw	<5000*	<10	<10	<18
Trichloronate, ug/kg dw	<50000*	<100	<100	<180

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Mr. Russ Bowen
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201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-11	CO-SB-23-02	Client
11097-12	CO-SB-32-01	
11097-13	CO-SB-33-01	
11097-14	CO-SB-29-02	

PARAMETER	11097-11	11097-12	11097-13	11097-14
Chlorinated Herbicides (8150)				
2,4-D, ug/kg dw	<60000*	<100	<100	<500*
2,4-DB, ug/kg dw	<60000*	<100	<100	<500*
2,4,5-T, ug/kg dw	<36000*	<60	<60	<300*
2,4,5-TP Silvex, ug/kg dw	<12000*	<20	<20	<100*
Dalapon, ug/kg dw	<1200000*	<2000	<2000	<10000*
Dicamba, ug/kg dw	<600000*	<1000	<1000	<5000*
Dichlorprop, ug/kg dw	<60000*	<100	<100	<500*
Dinoseb, ug/kg dw	<60000*	<100	<100	<500*
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<1200000*	<2000	<2000	<10000*
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<1200000*	<2000	<2000	<10000*
Arsenic, mg/kg dw	<0.93	<0.75	<0.76	1.1
Chromium, mg/kg dw	13	1.2	0.87	5.0
Zinc, mg/kg dw	7.4	<1.5	<1.5	2.6

* = Increased detection limit is due to matrix interference.

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-15	CO-SB-29-01	Client
11097-16	CO-SB-31-01	

PARAMETER	11097-15	11097-16
Volatile Organics		
Benzyl chloride, ug/kg dw	<5.3	<6.2
bis(2-Chloroethoxy) methane, ug/kg dw	<5.3	<6.2
Bis(2-chloroisopropyl)ether, ug/kg dw	<5.3	<6.2
Bromobenzene, ug/kg dw	<5.3	<6.2
Bromodichloromethane, ug/kg dw	<5.3	<6.2
Benzene, ug/kg dw	<5.3	<6.2
Bromoform, ug/kg dw	<5.3	<6.2
Bromomethane, ug/kg dw	<5.3	<6.2
Carbon Tetrachloride, ug/kg dw	<5.3	<6.2
Chloroacetaldehyde, ug/kg dw	<5.3	<6.2
Chlorobenzene, ug/kg dw	<5.3	<6.2
Chloroethane, ug/kg dw	<5.3	<6.2
Chloroform, ug/kg dw	<5.3	<6.2
1-Chlorohexane, ug/kg dw	<5.3	<6.2
2-Chloroethylvinyl Ether, ug/kg dw	<5.3	<6.2
Chloromethane, ug/kg dw	<5.3	<6.2
Chloromethyl methyl ether, ug/kg dw	<5.3	<6.2
Chlorotoluene, ug/kg dw	<5.3	<6.2
Dibromochloromethane, ug/kg dw	<5.3	<6.2
Dibromomethane, ug/kg dw	<5.3	<6.2
1,2-Dichlorobenzene, ug/kg dw	<5.3	<6.2
1,3-Dichlorobenzene, ug/kg dw	<5.3	<6.2

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-15	CO-SB-29-01	Client
11097-16	CO-SB-31-01	

PARAMETER	11097-15	11097-16
1,4-Dichlorobenzene, ug/kg dw	<5.3	<6.2
Dichlorodifluoromethane, ug/kg dw	<5.3	<6.2
1,1-Dichloroethane, ug/kg dw	<5.3	<6.2
1,2-Dichloroethane, ug/kg dw	<5.3	<6.2
1,1-Dichloroethene, ug/kg dw	<5.3	<6.2
1,2-Dichloropropane, ug/kg dw	<5.3	<6.2
1,3-Dichloropropylene, ug/kg dw	<5.3	<6.2
Ethylbenzene, ug/kg dw	<5.3	<6.2
Methylene Chloride, ug/kg dw	<5.3	<6.2
1,1,2,2-Tetrachloroethane, ug/kg dw	<5.3	<6.2
1,1,1,2-Tetrachloroethane, ug/kg dw	<5.3	<6.2
Tetrachloroethylene, ug/kg dw	<5.3	<6.2
Toluene, ug/kg dw	<5.3	<6.2
1,1,1-Trichloroethane, ug/kg dw	<5.3	<6.2
1,1,2-Trichloroethane, ug/kg dw	<5.3	<6.2
Trichloroethene, ug/kg dw	<5.3	<6.2
Trichlorofluoromethane, ug/kg dw	<5.3	<6.2
Trichloropropane, ug/kg dw	<5.3	<6.2
Vinyl Chloride, ug/kg dw	<5.3	<6.2
Xylenes, ug/kg dw	<5.3	56

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-15	CO-SB-29-01	Client
11097-16	CO-SB-31-01	

PARAMETER	11097-15	11097-16
Semivolatile Organics (8270)		
1,3-Dichlorobenzene, ug/kg dw	<320	<290
1,4-Dichlorobenzene, ug/kg dw	<320	<290
Hexachloroethane, ug/kg dw	<320	<290
bis(2-Chloroethyl) ether, ug/kg dw	<320	<290
1,2-Dichlorobenzene, ug/kg dw	<320	<290
Bis(2-chloroisopropyl)ether, ug/kg dw	<320	<290
N-Nitrosodi-N-Propylamine, ug/kg dw	<320	<290
Nitrobenzene, ug/kg dw	<320	<290
Hexachlorobutadiene, ug/kg dw	<320	<290
1,2,4-Trichlorobenzene, ug/kg dw	<320	<290
Isophorone, ug/kg dw	<320	<290
Naphthalene, ug/kg dw	<320	<290
bis(2-Chloroethoxy) methane, ug/kg dw	<320	<290
Hexachlorocyclopentadiene, ug/kg dw	<320	<290
2-Chloronaphthalene, ug/kg dw	<320	<290
Acenaphthylene, ug/kg dw	<320	<290
Acenaphthene, ug/kg dw	<320	<290
Dimethylphthalate, ug/kg dw	<320	<290
2,6-Dinitrotoluene, ug/kg dw	<320	<290
Fluorene, ug/kg dw	<320	<290
4-Chlorophenyl-phenyl ether, ug/kg dw	<320	<290
2,4-Dinitrotoluene, ug/kg dw	<320	<290

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11097-15	CO-SB-29-01	Client
11097-16	CO-SB-31-01	

PARAMETER	11097-15	11097-16
Diethyl Phthalate, ug/kg dw	<320	<290
N-Nitrosodiphenylamine, ug/kg dw	<320	<290
Hexachlorobenzene, ug/kg dw	<320	<290
gamma-BHC, ug/kg dw	<320	<290
4-Bromophenyl-phenyl-ether, ug/kg dw	<320	<290
delta-BHC, ug/kg dw	<320	<290
Phenanthrene, ug/kg dw	<320	<290
Anthracene, ug/kg dw	<320	<290
beta-BHC, ug/kg dw	<320	<290
Heptachlor, ug/kg dw	<320	<290
alpha-BHC, ug/kg dw	<320	<290
Aldrin, ug/kg dw	<320	<290
Dibutyl phthalate, ug/kg dw	<320	<290
Heptachlor epoxide, ug/kg dw	<320	<290
Endosulfan I, ug/kg dw	<320	<290
Fluoranthene, ug/kg dw	<320	<290
Dieldrin, ug/kg dw	<320	<290
4,4'-DDE, ug/kg dw	<320	<290
Pyrene, ug/kg dw	<320	<290
Endrin, ug/kg dw	<320	<290
Endosulfan II, ug/kg dw	<320	<290
4,4'-DDD, ug/kg dw	<320	<290
Benzidine, ug/kg dw	<2600	<2300

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11097-15	CO-SB-29-01	Client
11097-16	CO-SB-31-01	

PARAMETER	11097-15	11097-16
4,4'-DDT, ug/kg dw	<320	<290
Endosulfan sulfate, ug/kg dw	<320	<290
Endrin Aldehyde, ug/kg dw	<320	<290
Butylbenzylphthalate, ug/kg dw	<320	<290
bis(2-Ethylhexyl) phthalate, ug/kg dw	<320	76000
Chrysene, ug/kg dw	<320	<290
Benzo(a)Anthracene, ug/kg dw	<320	<290
3,3'-Dichlorobenzidine, ug/kg dw	<640	<590
Di-n-octylphthalate, ug/kg dw	<320	<290
Benzo(b)fluoranthene, ug/kg dw	<320	<290
Benzo (k) Fluoranthene, ug/kg dw	<320	<290
Benzo(a)pyrene, ug/kg dw	<320	<290
Indeno (1,2,3-cd)pyrene, ug/kg dw	<320	<290
Dibenz (a,h)anthracene, ug/kg dw	<320	<290
Benzo(g,h,i)perylene, ug/kg dw	<320	<290
N-Nitrosodimethylamine, ug/kg dw	<320	<290
Chlordane, ug/kg dw	<640	<590
Toxaphene, ug/kg dw	<6400	<5900
Aroclor-1016, ug/kg dw	<3200	<2900
Aroclor-1221, ug/kg dw	<3200	<2900
Aroclor-1232, ug/kg dw	<3200	<2900
Aroclor-1242, ug/kg dw	<3200	<2900
Aroclor-1248, ug/kg dw	<3200	<2900

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11097-15	CO-SB-29-01	Client
11097-16	CO-SB-31-01	

PARAMETER	11097-15	11097-16
Aroclor-1254, ug/kg dw	<3200	<2900
Aroclor-1260, ug/kg dw	<3200	<2900
2-Chlorophenol, ug/kg dw	<320	<290
2-Nitrophenol, ug/kg dw	<320	<290
Phenol, ug/kg dw	<320	<290
2,4-Dimethylphenol, ug/kg dw	<320	<290
2,4-Dichlorophenol, ug/kg dw	<320	<290
2,4,6-Trichlorophenol, ug/kg dw	<320	<290
4-Chloro-3-methylphenol, ug/kg dw	<320	<290
2,4-Dinitrophenol, ug/kg dw	<1600	<1500
2-Methyl-4,6-dinitrophenol, ug/kg dw	<1600	<1500
Pentachlorophenol, ug/kg dw	<1600	<1500
4-Nitrophenol, ug/kg dw	<1600	<1500
Benzyl alcohol, ug/kg dw	<320	<290
2-Methylphenol (o-cresol), ug/kg dw	<320	<290
4-Methylphenol (p-cresol), ug/kg dw	<320	<290
Benzoic acid, ug/kg dw	<1600	<1500
4-Chloroaniline, ug/kg dw	<320	<290
2-Methylnaphthalene, ug/kg dw	<320	<290
2,4,5-Trichlorophenol, ug/kg dw	<320	<290
2-Nitroaniline, ug/kg dw	<1600	<1500
3-Nitroaniline, ug/kg dw	<1600	<1500
Dibenzofuran, ug/kg dw	<320	<290
4-Nitroaniline, ug/kg dw	<1600	<1500
Arsenic, mg/kg dw	1.3	<0.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-15	CO-SB-29-01	Client
11097-16	CO-SB-31-01	

PARAMETER	11097-15	11097-16
Chromium, mg/kg dw	5.4	1.4
Zinc, mg/kg dw	2.8	<1.8

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-17	CO-SB-27-01	Client

PARAMETER	11097-17
Arsenic, mg/kg dw	1.4

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-2	CO-SB-12-01	Client
11075-3	CO-SB-13-01	
11075-4	CO-SB-14-01	
11075-5	CO-SB-15-01	
11075-6	CO-SB-16-01	

PARAMETER	11075-2	11075-3	11075-4	11075-5	11075-6
Semivolatile Organics (8270)					
1,3-Dichlorobenzene, ug/kg dw	<350	<360	<350	<370	<35000
1,4-Dichlorobenzene, ug/kg dw	<350	<360	<350	<370	<35000
Hexachloroethane, ug/kg dw	<350	<360	<350	<370	<35000
bis(2-Chloroethyl) ether, ug/kg dw	<350	<360	<350	<370	<35000
1,2-Dichlorobenzene, ug/kg dw	<350	<360	<350	<370	<35000
Bis(2-chloroisopropyl)ether , ug/kg dw	<350	<360	<350	<370	<35000
N-Nitrosodi-N-Propylamine, ug/kg dw	<350	<360	<350	<370	<35000
Nitrobenzene, ug/kg dw	<350	<360	<350	<370	<35000
Hexachlorobutadiene, ug/kg dw	<350	<360	<350	<370	<35000
1,2,4-Trichlorobenzene, ug/kg dw	<350	<360	<350	<370	<35000
Isophorone, ug/kg dw	<350	<360	<350	<370	<35000
Naphthalene, ug/kg dw	<350	<360	<350	<370	<35000
bis(2-Chloroethoxy) methane, ug/kg dw	<350	<360	<350	<370	<35000
Hexachlorocyclopentadiene, ug/kg dw	<350	<360	<350	<370	<35000
2-Chloronaphthalene, ug/kg dw	<350	<360	<350	<370	<35000

108

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-2	CO-SB-12-01	Client
11075-3	CO-SB-13-01	
11075-4	CO-SB-14-01	
11075-5	CO-SB-15-01	
11075-6	CO-SB-16-01	

PARAMETER	11075-2	11075-3	11075-4	11075-5	11075-6
Aldrin, ug/kg dw	<350	<360	<350	<370	<35000
Dibutyl phthalate, ug/kg dw	<350	<360	<350	<370	<35000
Heptachlor epoxide, ug/kg dw	<350	<360	<350	<370	<35000
Endosulfan I, ug/kg dw	<350	<360	<350	<370	117000
Fluoranthene, ug/kg dw	<350	<360	<350	<370	<35000
Dieldrin, ug/kg dw	<350	<360	<350	1200	<35000
4,4'-DDE, ug/kg dw	<350	<360	<350	1100	<35000
Pyrene, ug/kg dw	<350	<360	<350	<370	<35000
Endrin, ug/kg dw	<350	<360	<350	1200	<35000
Endosulfan II, ug/kg dw	<350	<360	<350	<370	<35000
4,4'-DDD, ug/kg dw	<350	<360	<350	<370	<35000
Benzidine, ug/kg dw	<2800	<2900	<2800	<3000	<280000
4,4'-DDT, ug/kg dw	<350	410	<350	4200	<35000
Endosulfan sulfate, ug/kg dw	<350	<360	<350	<370	<35000
Endrin Aldehyde, ug/kg dw	<350	<360	<350	<370	<35000
Butylbenzylphthalate, ug/kg dw	<350	<360	<350	<370	<35000
bis(2-Ethylhexyl) phthalate, ug/kg dw	<350	<360	<350	<370	<35000
Chrysene, ug/kg dw	<350	<360	<350	<370	<35000
Benzo(a)Anthracene, ug/kg dw	<350	<360	<350	<370	<35000

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11075-3	CO-SB-13-01	
11075-4	CO-SB-14-01	
11075-5	CO-SB-15-01	
11075-6	CO-SB-16-01	

PARAMETER	11075-2	11075-3	11075-4	11075-5	11075-6
3,3'-Dichlorobenzidine, ug/kg dw	<700	<720	<700	<1900	<70000
Di-n-octylphthalate, ug/kg dw	<350	<360	<350	<370	<35000
Benzo(b)fluoranthene, ug/kg dw	<350	<360	<350	<370	<35000
Benzo (k) Fluoranthene, ug/kg dw	<350	<360	<350	<370	<35000
Benzo(a)pyrene, ug/kg dw	<350	<360	<350	<370	<35000
Indeno (1,2,3-cd)pyrene, ug/kg dw	<350	<360	<350	<370	<35000
Dibenz (a,h)anthracene, ug/kg dw	<350	<360	<350	<370	<35000
Benzo(g,h,i)perylene, ug/kg dw	<350	<360	<350	<370	<35000
N-Nitrosodimethylamine, ug/kg dw	<350	<360	<350	<370	<35000
Chlordane, ug/kg dw	4600	73000	<700	<740	1100000
Toxaphene, ug/kg dw	<70000*	<72000*	<7000	<74000*	<700000
Aroclor-1016, ug/kg dw	<3500	<3600	<3500	<3700	<350000
Aroclor-1221, ug/kg dw	<3500	<3600	<3500	<3700	<350000
Aroclor-1232, ug/kg dw	<3500	<3600	<3500	<3700	<350000
Aroclor-1242, ug/kg dw	<3500	<3600	<3500	<3700	<350000
Aroclor-1248, ug/kg dw	<3500	<3600	<3500	<3700	<350000
Aroclor-1254, ug/kg dw	<3500	<3600	<3500	<3700	<350000
Aroclor-1260, ug/kg dw	<3500	<3600	<3500	<3700	<350000
2-Chlorophenol, ug/kg dw	<350	<360	<350	<370	<35000
2-Nitrophenol, ug/kg dw	<350	<360	<350	<370	<35000

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-2	CO-SB-12-01	Client
11075-3	CO-SB-13-01	
11075-4	CO-SB-14-01	
11075-5	CO-SB-15-01	
11075-6	CO-SB-16-01	

PARAMETER	11075-2	11075-3	11075-4	11075-5	11075-6
Phenol, ug/kg dw	<350	<360	<350	<370	<35000
2,4-Dimethylphenol, ug/kg dw	<350	<360	<350	<370	<35000
2,4-Dichlorophenol, ug/kg dw	<350	<360	<350	<370	<35000
2,4,6-Trichlorophenol, ug/kg dw	<350	<360	<350	<370	<35000
4-Chloro-3-methylphenol, ug/kg dw	<350	<360	<350	<370	<35000
2,4-Dinitrophenol, ug/kg dw	<1800	<1800	<1800	<1900	<180000
2-Methyl-4,6-dinitrophenol, ug/kg dw	<1800	<1800	<1800	<1900	<180000
Pentachlorophenol, ug/kg dw	<1800	<1800	<1800	<1900	<180000
4-Nitrophenol, ug/kg dw	<1800	<1800	<1800	<1900	<180000
Benzyl alcohol, ug/kg dw	<350	<360	<350	<370	<35000
2-Methylphenol (o-cresol), ug/kg dw	<350	<360	<350	<370	<35000
4-Methylphenol (p-cresol), ug/kg dw	<350	<360	<350	<370	<35000
Benzoic acid, ug/kg dw	<1800	<1800	<1800	<1900	<180000
4-Chloroaniline, ug/kg dw	<350	<360	<350	<370	<35000
2-Methylnaphthalene, ug/kg dw	<350	<360	<350	<370	<35000
2,4,5-Trichlorophenol, ug/kg dw	<350	<360	<350	<370	<35000
2-Nitroaniline, ug/kg dw	<1800	<1800	<1800	<1900	<180000
3-Nitroaniline, ug/kg dw	<1800	<1800	<1800	<1900	<180000
Dibenzofuran, ug/kg dw	<350	<360	<350	<370	<35000
4-Nitroaniline, ug/kg dw	<1800	<1800	<1800	<1900	<180000

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& ENVIRONMENTAL SERVICES, INC.

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LOG NO: T0-11075

Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-2	CO-SB-12-01	Client
11075-3	CO-SB-13-01	
11075-4	CO-SB-14-01	
11075-5	CO-SB-15-01	
11075-6	CO-SB-16-01	

PARAMETER	11075-2	11075-3	11075-4	11075-5	11075-6
Organophosphorus Pesticides					
Azinphos methyl, ug/kg dw	<200	<220	<210	<220	<200
Bolstar (Sulprofos), ug/kg dw	<10	<11	<11	<11	<10
Chlorpyrifos, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0
Coumaphos, ug/kg dw	<100	<110	<110	<110	<100
Demeton-O, ug/kg dw	<20	<22	<21	<22	<20
Demeton-S, ug/kg dw	<20	<22	<21	<22	<20
Diazinon, ug/kg dw	<10	<11	<11	<11	<10
Dichlorvos, ug/kg dw	<20	<22	<21	<22	<20
Disulfoton, ug/kg dw	<10	<11	<11	<11	<10
Ethoprop, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0
Fensulfothion, ug/kg dw	<100	<110	<110	<110	<100
Fenthion, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0
Merphos, ug/kg dw	<10	<11	<11	<11	<10
Mevinphos, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0
Naled, ug/kg dw	<20	<22	<21	<22	<20
Methyl Parathion, ug/kg dw	<10	<11	<11	<11	<10
Phorate, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0
Ronnel, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0
Stirophos (Tetrachlorvinphos), ug/kg dw	<10	<11	<11	<11	<10

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-7	CO-SB-24-01	Client
11075-8	CO-SB-25-01	
11075-9	CO-SB-26-02	
11075-10	CO-SB-28-01	
11075-11	CO-SB-30-01	

PARAMETER	11075-7	11075-8	11075-9	11075-10	11075-11
Semivolatile Organics (8270)					
1,3-Dichlorobenzene, ug/kg dw	<36000	<35000	<35000	<360	<330
1,4-Dichlorobenzene, ug/kg dw	<36000	<35000	<35000	<360	<330
Hexachloroethane, ug/kg dw	<36000	<35000	<35000	<360	<330
bis(2-Chloroethyl) ether, ug/kg dw	<36000	<35000	<35000	<360	<330
1,2-Dichlorobenzene, ug/kg dw	<36000	<35000	<35000	<360	<330
Bis(2-chloroisopropyl)ether , ug/kg dw	<36000	<35000	<35000	<360	<330
N-Nitrosodi-N-Propylamine, ug/kg dw	<36000	<35000	<35000	<360	<330
Nitrobenzene, ug/kg dw	<36000	<35000	<35000	<360	<330
Hexachlorobutadiene, ug/kg dw	<36000	<35000	<35000	<360	<330
1,2,4-Trichlorobenzene, ug/kg dw	<36000	<35000	<35000	<360	<330
Isophorone, ug/kg dw	<36000	<35000	<35000	<360	<330
Naphthalene, ug/kg dw	<36000	<35000	<35000	<360	<330
bis(2-Chloroethoxy) methane, ug/kg dw	<36000	<35000	<35000	<360	<330
Hexachlorocyclopentadiene, ug/kg dw	<36000	<35000	<35000	<360	<330

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11075-9	CO-SB-26-02	
11075-10	CO-SB-28-01	
11075-11	CO-SB-30-01	

PARAMETER	11075-7	11075-8	11075-9	11075-10	11075-11
2-Chloronaphthalene, ug/kg dw	<36000	<35000	<35000	<360	<330
Acenaphthylene, ug/kg dw	<36000	<35000	<35000	<360	<330
Acenaphthene, ug/kg dw	<36000	<35000	<35000	<360	<330
Dimethylphthalate, ug/kg dw	<36000	<35000	<35000	<360	<330
2,6-Dinitrotoluene, ug/kg dw	<36000	<35000	<35000	<360	<330
Fluorene, ug/kg dw	<36000	<35000	<35000	<360	<330
4-Chlorophenyl-phenyl ether, ug/kg dw	<36000	<35000	<35000	<360	<330
2,4-Dinitrotoluene, ug/kg dw	<36000	<35000	<35000	<360	<330
Diethyl Phthalate, ug/kg dw	<36000	<35000	<35000	<360	<330
N-Nitrosodiphenylamine, ug/kg dw	<36000	<35000	<35000	<360	<330
Hexachlorobenzene, ug/kg dw	<36000	<35000	<35000	<360	<330
gamma-BHC, ug/kg dw	<36000	<35000	<35000	<360	<330
4-Bromophenyl-phenyl-ether, ug/kg dw	<36000	<35000	<35000	<360	<330
delta-BHC, ug/kg dw	<36000	<35000	<35000	<360	<330
Phenanthrene, ug/kg dw	<36000	<35000	<35000	<360	<330
Anthracene, ug/kg dw	<36000	<35000	<35000	<360	<330
beta-BHC, ug/kg dw	<36000	<35000	<35000	<360	<330
Heptachlor, ug/kg dw	<36000	<35000	<35000	<360	<330

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11075-9	CO-SB-26-02	
11075-10	CO-SB-28-01	
11075-11	CO-SB-30-01	

PARAMETER	11075-7	11075-8	11075-9	11075-10	11075-11
alpha-BHC, ug/kg dw	<36000	<35000	<35000	<360	<330
Aldrin, ug/kg dw	<36000	<35000	<35000	<360	<330
Dibutyl phthalate, ug/kg dw	<36000	<35000	<35000	<360	<330
Heptachlor epoxide, ug/kg dw	<36000	<35000	<35000	<360	<330
Endosulfan I, ug/kg dw	<36000	<35000	<35000	<360	<330
Fluoranthene, ug/kg dw	<36000	<35000	<35000	<360	<330
Dieldrin, ug/kg dw	<36000	<35000	<35000	760	<330
4,4'-DDE, ug/kg dw	<36000	<35000	<35000	390	<330
Pyrene, ug/kg dw	<36000	<35000	<35000	<360	<330
Endrin, ug/kg dw	<36000	<35000	<35000	<360	<330
Endosulfan II, ug/kg dw	<36000	<35000	<35000	<360	<330
4,4'-DDD, ug/kg dw	<36000	<35000	51000	<360	<330
Benzidine, ug/kg dw	<290000	<280000	<280000	<2900	<2700
4,4'-DDT, ug/kg dw	<36000	<35000	<35000	980	<330
Endosulfan sulfate, ug/kg dw	<36000	<35000	<35000	<360	<330
Endrin Aldehyde, ug/kg dw	<36000	<35000	<35000	<360	<330
Butylbenzylphthalate, ug/kg dw	<36000	<35000	<35000	<360	<330
bis(2-Ethylhexyl) phthalate, ug/kg dw	<36000	<35000	<35000	<360	<330
Chrysene, ug/kg dw	<36000	<35000	<35000	<360	<330

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11075-8	CO-SB-25-01	
11075-9	CO-SB-26-02	
11075-10	CO-SB-28-01	
11075-11	CO-SB-30-01	

PARAMETER	11075-7	11075-8	11075-9	11075-10	11075-11
Benzo(a)Anthracene, ug/kg dw	<36000	<35000	<35000	<360	<330
3,3'-Dichlorobenzidine, ug/kg dw	<72000	<70000	<70000	<720	<670
Di-n-octylphthalate, ug/kg dw	<36000	<35000	<35000	<360	<330
Benzo(b)fluoranthene, ug/kg dw	<36000	<35000	<35000	<360	<330
Benzo (k) Fluoranthene, ug/kg dw	<36000	<35000	<35000	<360	<330
Benzo(a)pyrene, ug/kg dw	<36000	<35000	<35000	<360	<330
Indeno (1,2,3-cd)pyrene, ug/kg dw	<36000	<35000	<35000	<360	<330
Dibenz (a,h)anthracene, ug/kg dw	<36000	<35000	<35000	<360	<330
Benzo(g,h,i)perylene, ug/kg dw	<36000	<35000	<35000	<360	<330
N-Nitrosodimethylamine, ug/kg dw	<36000	<35000	<35000	<360	<330
Chlordane, ug/kg dw	760000	100000	<70000	13000	<670
Toxaphene, ug/kg dw	<720000	<700000	<700000	<72000*	<6700
Aroclor-1016, ug/kg dw	<360000	<350000	<350000	<3600	<3300
Aroclor-1221, ug/kg dw	<360000	<350000	<350000	<3600	<3300
Aroclor-1232, ug/kg dw	<360000	<350000	<350000	<3600	<3300
Aroclor-1242, ug/kg dw	<360000	<350000	<350000	<3600	<3300
Aroclor-1248, ug/kg dw	<360000	<350000	<350000	<3600	<3300
Aroclor-1254, ug/kg dw	<360000	<350000	<350000	<3600	<3300
Aroclor-1260, ug/kg dw	<360000	<350000	<350000	<3600	<3300

116

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REPORT OF RESULTS

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11075-7	CO-SB-24-01	Client
11075-8	CO-SB-25-01	
11075-9	CO-SB-26-02	
11075-10	CO-SB-28-01	
11075-11	CO-SB-30-01	

PARAMETER	11075-7	11075-8	11075-9	11075-10	11075-11
2-Chlorophenol, ug/kg dw	<36000	<35000	<35000	<360	<330
2-Nitrophenol, ug/kg dw	<36000	<35000	<35000	<360	<330
Phenol, ug/kg dw	<36000	<35000	<35000	<360	<330
2,4-Dimethylphenol, ug/kg dw	<36000	<35000	<35000	<360	<330
2,4-Dichlorophenol, ug/kg dw	<36000	<35000	<35000	<360	<330
2,4,6-Trichlorophenol, ug/kg dw	<36000	<35000	<35000	<360	<330
4-Chloro-3-methylphenol, ug/kg dw	<36000	<35000	<35000	<360	<330
2,4-Dinitrophenol, ug/kg dw	<180000	<180000	<180000	<1800	<1700
2-Methyl-4,6-dinitrophenol, ug/kg dw	<180000	<180000	<180000	<1800	<1700
Pentachlorophenol, ug/kg dw	<180000	<180000	<180000	<1800	<1700
4-Nitrophenol, ug/kg dw	<180000	<180000	<180000	<1800	<1700
Benzyl alcohol, ug/kg dw	<36000	<35000	<35000	<360	<330
2-Methylphenol (o-cresol), ug/kg dw	<36000	<35000	<35000	<360	<330
4-Methylphenol (p-cresol), ug/kg dw	<36000	<35000	<35000	<360	<330
Benzoic acid, ug/kg dw	<180000	<180000	<180000	<1800	<1700
4-Chloroaniline, ug/kg dw	<36000	<35000	<35000	<360	<330

117

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11075-7	CO-SB-24-01	Client
11075-8	CO-SB-25-01	
11075-9	CO-SB-26-02	
11075-10	CO-SB-28-01	
11075-11	CO-SB-30-01	

PARAMETER	11075-7	11075-8	11075-9	11075-10	11075-11
2-Methylnaphthalene, ug/kg dw	<36000	<35000	<35000	<360	<330
2,4,5-Trichlorophenol, ug/kg dw	<36000	<35000	<35000	<360	<330
2-Nitroaniline, ug/kg dw	<180000	<180000	<180000	<1800	<1700
3-Nitroaniline, ug/kg dw	<180000	<180000	<180000	<1800	<1700
Dibenzofuran, ug/kg dw	<36000	<35000	<35000	<360	<330
4-Nitroaniline, ug/kg dw	<180000	<180000	<180000	<1800	<1700

118

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11075-8	CO-SB-25-01	
11075-9	CO-SB-26-02	
11075-10	CO-SB-28-01	
11075-11	CO-SB-30-01	

PARAMETER	11075-7	11075-8	11075-9	11075-10	11075-11
Organophosphorus Pesticides					
Azinphos methyl, ug/kg dw	<200	<180	<200	<210	<190
Bolstar (Sulprofos), ug/kg dw	<10	<8.8	<10	<10	<9.7
Chlorpyrifos, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
Coumaphos, ug/kg dw	<100	<88	<100	<100	<97
Demeton-O, ug/kg dw	<20	<18	<20	<21	<20
Demeton-S, ug/kg dw	420	<18	<20	<21	<20
Diazinon, ug/kg dw	<10	<8.8	<10	<10	<9.7
Dichlorvos, ug/kg dw	<20	<18	<20	<21	<20
Disulfoton, ug/kg dw	<10	<8.8	<10	<10	<9.7
Ethoprop, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
Fensulfothion, ug/kg dw	<100	<88	<100	<100	<97
Fenthion, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
Merphos, ug/kg dw	<10	<8.8	<100	<10	<9.7
Mevinphos, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
Naled, ug/kg dw	<20	<18	<20	<21	<20
Methyl Parathion, ug/kg dw	<10	<8.8	<10	<10	<9.7
Phorate, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
Ronnel, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
Stirophos (Tetrachlorvinphos), ug/kg dw	<10	<8.8	<10	<10	<9.7

119

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11075-8	CO-SB-25-01	
11075-9	CO-SB-26-02	
11075-10	CO-SB-28-01	
11075-11	CO-SB-30-01	

PARAMETER	11075-7	11075-8	11075-9	11075-10	11075-11
Tokuthion (Prothiofos), ug/kg dw	<10	<8.8	<10	<10	<9.7
Trichloronate, ug/kg dw	<100	<88	<100	<100	<97
Additional Compounds:					
Ethion, ug/kg dw	54000	31	52	<10	<9.7
Chlorinated Herbicides (8150)					
2,4-D, ug/kg dw	<1100*	<100	<550*	<1100*	<100
2,4-DB, ug/kg dw	<1100*	<100	<550*	<1100*	<100
2,4,5-T, ug/kg dw	<660*	<60	<330*	<660*	<60
2,4,5-TP Silvex, ug/kg dw	<220*	<20	<110*	<220*	<20
Dalapon, ug/kg dw	<22000*	<2000	<11000*	<22000*	<2000
Dicamba, ug/kg dw	<1000*	<1000	<5500*	<11000*	<1000
Dichlorprop, ug/kg dw	<1100*	<100	<550*	<1100*	<100
Dinoseb, ug/kg dw	<1100*	<100	<550*	<1100*	<100
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<22000*	<2000	<1000*	<22000*	<2000
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<22000*	<2000	<1000*	<22000*	<2000

* = Increased detection limits due to matrix interference.

120

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11075-12	CO-SB-10-01	Client
11075-13	CO-SB-11-01	

PARAMETER	11075-12	11075-13
Volatile Organics		
Benzyl chloride, ug/kg dw	<5.4	<110
bis(2-Chloroethoxy) methane, ug/kg dw	<5.4	<110
Bis(2-chloroisopropyl)ether, ug/kg dw	<5.4	<110
Bromobenzene, ug/kg dw	<5.4	<110
Bromodichloromethane, ug/kg dw	<5.4	<110
Benzene, ug/kg dw	<5.4	<110
Bromoform, ug/kg dw	<5.4	<110
Bromomethane, ug/kg dw	<5.4	<110
Carbon Tetrachloride, ug/kg dw	<5.4	<110
Chloroacetaldehyde, ug/kg dw	<5.4	<110
Chlorobenzene, ug/kg dw	140	<110
Chloroethane, ug/kg dw	<5.4	<110
Chloroform, ug/kg dw	<5.4	<110
1-Chlorohexane, ug/kg dw	<5.4	<110
2-Chloroethylvinyl Ether, ug/kg dw	<5.4	<110
Chloromethane, ug/kg dw	<5.4	<110
Chloromethyl methyl ether, ug/kg dw	<5.4	<110
Chlorotoluene, ug/kg dw	<5.4	<110
Dibromochloromethane, ug/kg dw	<5.4	<110
Dibromomethane, ug/kg dw	<5.4	<110
1,2-Dichlorobenzene, ug/kg dw	<5.4	<110
1,3-Dichlorobenzene, ug/kg dw	15	<110

121

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LOG NO: T0-11075

Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-12	CO-SB-10-01	Client
11075-13	CO-SB-11-01	

PARAMETER	11075-12	11075-13
1,4-Dichlorobenzene, ug/kg dw	200	<110
Dichlorodifluoromethane, ug/kg dw	<5.4	<110
1,1-Dichloroethane, ug/kg dw	<5.4	<110
1,2-Dichloroethane, ug/kg dw	<5.4	<110
1,1-Dichloroethene, ug/kg dw	<5.4	<110
1,2-Dichloropropane, ug/kg dw	<5.4	<110
1,3-Dichloropropylene, ug/kg dw	<5.4	<110
Ethylbenzene, ug/kg dw	51	390
Methylene Chloride, ug/kg dw	<5.4	<110
1,1,2,2-Tetrachloroethane, ug/kg dw	<5.4	<110
1,1,1,2-Tetrachloroethane, ug/kg dw	<5.4	<110
Tetrachloroethylene, ug/kg dw	<5.4	<110
Toluene, ug/kg dw	81	<110
1,1,1-Trichloroethane, ug/kg dw	<5.4	<110
1,1,2-Trichloroethane, ug/kg dw	<5.4	<110
Trichloroethene, ug/kg dw	<5.4	<110
Trichlorofluoromethane, ug/kg dw	<5.4	<110
Trichloropropane, ug/kg dw	<5.4	<110
Vinyl Chloride, ug/kg dw	<5.4	<110
Xylenes, ug/kg dw	130	3300

122

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-12	CO-SB-10-01	Client
11075-13	CO-SB-11-01	

PARAMETER	11075-12	11075-13
Semivolatile Organics (8270)		
1,3-Dichlorobenzene, ug/kg dw	<360	<6900*
1,4-Dichlorobenzene, ug/kg dw	<360	<6900*
Hexachloroethane, ug/kg dw	<360	<6900*
bis(2-Chloroethyl) ether, ug/kg dw	<360	<6900*
1,2-Dichlorobenzene, ug/kg dw	<360	<6900*
Bis(2-chloroisopropyl)ether, ug/kg dw	<360	<6900*
N-Nitrosodi-N-Propylamine, ug/kg dw	<360	<6900*
Nitrobenzene, ug/kg dw	<360	<6900*
Hexachlorobutadiene, ug/kg dw	<360	<6900*
1,2,4-Trichlorobenzene, ug/kg dw	<360	<6900*
Isophorone, ug/kg dw	<360	<6900*
Naphthalene, ug/kg dw	<360	<6900*
bis(2-Chloroethoxy) methane, ug/kg dw	<360	<6900*
Hexachlorocyclopentadiene, ug/kg dw	<360	<6900*
2-Chloronaphthalene, ug/kg dw	<360	<6900*
Acenaphthylene, ug/kg dw	<360	<6900*
Acenaphthene, ug/kg dw	<360	<6900*
Dimethylphthalate, ug/kg dw	<360	<6900*
2,6-Dinitrotoluene, ug/kg dw	<360	<6900*
Fluorene, ug/kg dw	<360	<6900*
4-Chlorophenyl-phenyl ether, ug/kg dw	<360	<6900*
2,4-Dinitrotoluene, ug/kg dw	<360	<6900*

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REPORT OF RESULTS

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11075-12	CO-SB-10-01	Client
11075-13	CO-SB-11-01	

PARAMETER	11075-12	11075-13
Diethyl Phthalate, ug/kg dw	<360	<6900*
N-Nitrosodiphenylamine, ug/kg dw	<360	<6900*
Hexachlorobenzene, ug/kg dw	<360	<6900*
gamma-BHC, ug/kg dw	<360	<6900*
4-Bromophenyl-phenyl-ether, ug/kg dw	<360	<6900*
delta-BHC, ug/kg dw	<360	<6900*
Phenanthrene, ug/kg dw	<360	<6900*
Anthracene, ug/kg dw	<360	<6900*
beta-BHC, ug/kg dw	<360	<6900*
Heptachlor, ug/kg dw	<360	<6900*
alpha-BHC, ug/kg dw	<360	<6900*
Aldrin, ug/kg dw	<360	<6900*
Dibutyl phthalate, ug/kg dw	<360	<6900*
Heptachlor epoxide, ug/kg dw	<360	<6900*
Endosulfan I, ug/kg dw	<360	<6900*
Fluoranthene, ug/kg dw	<360	<6900*
Dieldrin, ug/kg dw	<360	<6900*
4,4'-DDE, ug/kg dw	<360	<6900*
Pyrene, ug/kg dw	<360	<6900*
Endrin, ug/kg dw	<360	<6900*
Endosulfan II, ug/kg dw	<360	<6900*
4,4'-DDD, ug/kg dw	<360	<6900*
Benzidine, ug/kg dw	<2900	<55000*

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11075-12	CO-SB-10-01	Client
11075-13	CO-SB-11-01	

PARAMETER	11075-12	11075-13
4,4'-DDT, ug/kg dw	<360	<6900*
Endosulfan sulfate, ug/kg dw	<360	<6900*
Endrin Aldehyde, ug/kg dw	<360	<6900*
Butylbenzylphthalate, ug/kg dw	<360	<6900*
bis(2-Ethylhexyl) phthalate, ug/kg dw	<360	<6900*
Chrysene, ug/kg dw	<360	<6900*
Benzo(a)Anthracene, ug/kg dw	<360	<6900*
3,3'-Dichlorobenzidine, ug/kg dw	<720	<14000*
Di-n-octylphthalate, ug/kg dw	<360	<6900*
Benzo(b)fluoranthene, ug/kg dw	<360	<6900*
Benzo (k) Fluoranthene, ug/kg dw	<360	<6900*
Benzo(a)pyrene, ug/kg dw	<360	<6900*
Indeno (1,2,3-cd)pyrene, ug/kg dw	<360	<6900*
Dibenz (a,h)anthracene, ug/kg dw	<360	<6900*
Benzo(g,h,i)perylene, ug/kg dw	<360	<6900*
N-Nitrosodimethylamine, ug/kg dw	<360	<6900*
Chlordane, ug/kg dw	1300	<14000*
Toxaphene, ug/kg dw	<7200	<140000*
Aroclor-1016, ug/kg dw	<360	<69000*
Aroclor-1221, ug/kg dw	<360	<69000*
Aroclor-1232, ug/kg dw	<360	<69000*
Aroclor-1242, ug/kg dw	<360	<69000*
Aroclor-1248, ug/kg dw	<360	<69000*

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11075-12	CO-SB-10-01	Client
11075-13	CO-SB-11-01	

PARAMETER	11075-12	11075-13
Aroclor-1254, ug/kg dw	<360	<69000*
Aroclor-1260, ug/kg dw	<360	<69000*
2-Chlorophenol, ug/kg dw	<360	<6900*
2-Nitrophenol, ug/kg dw	<360	<6900*
Phenol, ug/kg dw	<360	<6900*
2,4-Dimethylphenol, ug/kg dw	<360	<6900*
2,4-Dichlorophenol, ug/kg dw	<360	<6900*
2,4,6-Trichlorophenol, ug/kg dw	<360	<6900*
4-Chloro-3-methylphenol, ug/kg dw	<360	<6900*
2,4-Dinitrophenol, ug/kg dw	<1800	<34000*
2-Methyl-4,6-dinitrophenol, ug/kg dw	<1800	<34000*
Pentachlorophenol, ug/kg dw	<1800	<34000*
4-Nitrophenol, ug/kg dw	<1800	<34000*
Benzyl alcohol, ug/kg dw	<360	<6900*
2-Methylphenol (o-cresol), ug/kg dw	<360	<6900*
4-Methylphenol (p-cresol), ug/kg dw	<360	<6900*
Benzoic acid, ug/kg dw	<1800	<34000*
4-Chloroaniline, ug/kg dw	<360	<6900*
2-Methylnaphthalene, ug/kg dw	<360	<6900*
2,4,5-Trichlorophenol, ug/kg dw	<360	<6900*
2-Nitroaniline, ug/kg dw	<1800	<34000*
3-Nitroaniline, ug/kg dw	<1800	<34000*
Dibenzofuran, ug/kg dw	<360	<6900*
4-Nitroaniline, ug/kg dw	<1800	<34000*

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11075-12	CO-SB-10-01	Client
11075-13	CO-SB-11-01	

PARAMETER	11075-12	11075-13
Organophosphorus Pesticides		
Azinphos methyl, ug/kg dw	<190	<210
Bolstar (Sulprofos), ug/kg dw	<9.7	<11
Chlorpyrifos, ug/kg dw	<1.9	<2.1
Coumaphos, ug/kg dw	<97	<110
Demeton-O, ug/kg dw	<19	<21
Demeton-S, ug/kg dw	<19	<21
Diazinon, ug/kg dw	<9.7	<11
Dichlorvos, ug/kg dw	<19	<21
Disulfoton, ug/kg dw	<9.7	<11
Ethoprop, ug/kg dw	<1.9	<2.1
Fensulfothion, ug/kg dw	<97	<110
Fenthion, ug/kg dw	<1.9	<2.1
Merphos, ug/kg dw	<9.7	<11
Mevinphos, ug/kg dw	<1.9	<2.1
Naled, ug/kg dw	<19	<21
Methyl Parathion, ug/kg dw	<9.7	<11
Phorate, ug/kg dw	<1.9	<2.1
Ronnel, ug/kg dw	<1.9	<2.1
Stirophos (Tetrachlorvinphos), ug/kg dw	<9.7	<11
Tokuthion (Prothiofos), ug/kg dw	<9.7	<11
Trichloronate, ug/kg dw	<97	<110
Additional Compounds:		
Ethion, ug/kg dw	400	28

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11075-12	CO-SB-10-01	Client
11075-13	CO-SB-11-01	

PARAMETER	11075-12	11075-13
Chlorinated Herbicides (8150)		
2,4-D, ug/kg dw	<500*	<500*
2,4-DB, ug/kg dw	<500*	<500*
2,4,5-T, ug/kg dw	<300*	<300*
2,4,5-TP Silvex, ug/kg dw	<100*	<100*
Dalapon, ug/kg dw	<10000*	<10000*
Dicamba, ug/kg dw	<5000*	<5000*
Dichlorprop, ug/kg dw	<500*	<500*
Dinoseb, ug/kg dw	<500*	<500*
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<10000*	<10000*
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<10000*	<10000*
Arsenic, mg/kg dw	2.8	<1.0
Chromium, mg/kg dw	4.6	1.3
Zinc, mg/kg dw	6.9	3.9

* = Increased detection limit is due to matrix interference.

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-14	CO-SB-9-01	Client
11075-15	CO-SLUDGE-01	

PARAMETER	11075-14	11075-15
Volatile Organics		
Benzyl chloride, ug/kg dw	<6.3	<28*
bis(2-Chloroethoxy) methane, ug/kg dw	<6.3	<28*
Bis(2-chloroisopropyl)ether, ug/kg dw	<6.3	<28*
Bromobenzene, ug/kg dw	<6.3	<28*
Bromodichloromethane, ug/kg dw	<6.3	<28*
Benzene, ug/kg dw	<6.3	<28*
Bromoform, ug/kg dw	<6.3	<28*
Bromomethane, ug/kg dw	<6.3	<28*
Carbon Tetrachloride, ug/kg dw	<6.3	<28*
Chloroacetaldehyde, ug/kg dw	<6.3	<28*
Chlorobenzene, ug/kg dw	<6.3	<28*
Chloroethane, ug/kg dw	<6.3	<28*
Chloroform, ug/kg dw	<6.3	<28*
1-Chlorohexane, ug/kg dw	<6.3	<28*
2-Chloroethylvinyl Ether, ug/kg dw	<6.3	<28*
Chloromethane, ug/kg dw	<6.3	<28*
Chloromethyl methyl ether, ug/kg dw	<6.3	<28*
Chlorotoluene, ug/kg dw	<6.3	<28*
Dibromochloromethane, ug/kg dw	<6.3	<28*
Dibromomethane, ug/kg dw	<6.3	<28*
1,2-Dichlorobenzene, ug/kg dw	<6.3	<28*
1,3-Dichlorobenzene, ug/kg dw	<6.3	<28*

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11075-14	CO-SB-9-01	Client
11075-15	CO-SLUDGE-01	

PARAMETER	11075-14	11075-15
1,4-Dichlorobenzene, ug/kg dw	<6.3	<28*
Dichlorodifluoromethane, ug/kg dw	<6.3	<28*
1,1-Dichloroethane, ug/kg dw	<6.3	<28*
1,2-Dichloroethane, ug/kg dw	<6.3	<28*
1,1-Dichloroethene, ug/kg dw	<6.3	<28*
1,2-Dichloropropane, ug/kg dw	<6.3	<28*
1,3-Dichloropropylene, ug/kg dw	<6.3	<28*
Ethylbenzene, ug/kg dw	<6.3	<28*
Methylene Chloride, ug/kg dw	<6.3	<28*
1,1,2,2-Tetrachloroethane, ug/kg dw	<6.3	<28*
1,1,1,2-Tetrachloroethane, ug/kg dw	<6.3	<28*
Tetrachloroethylene, ug/kg dw	<6.3	<28*
Toluene, ug/kg dw	<6.3	<28*
1,1,1-Trichloroethane, ug/kg dw	<6.3	<28*
1,1,2-Trichloroethane, ug/kg dw	<6.3	<28*
Trichloroethene, ug/kg dw	<6.3	<28*
Trichlorofluoromethane, ug/kg dw	<6.3	<28*
Trichloropropane, ug/kg dw	<6.3	<28*
Vinyl Chloride, ug/kg dw	<6.3	<28*
Xylenes, ug/kg dw	<6.3	<28*

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11075-14	CO-SB-9-01	Client
11075-15	CO-SLUDGE-01	

PARAMETER	11075-14	11075-15
Semivolatile Organics (8270)		
1,3-Dichlorobenzene, ug/kg dw	<3700*	<830000*
1,4-Dichlorobenzene, ug/kg dw	<3700*	<830000*
Hexachloroethane, ug/kg dw	<3700*	<830000*
bis(2-Chloroethyl) ether, ug/kg dw	<3700*	<830000*
1,2-Dichlorobenzene, ug/kg dw	<3700*	<830000*
Bis(2-chloroisopropyl)ether, ug/kg dw	<3700*	<830000*
N-Nitrosodi-N-Propylamine, ug/kg dw	<3700*	<830000*
Nitrobenzene, ug/kg dw	<3700*	<830000*
Hexachlorobutadiene, ug/kg dw	<3700*	<830000*
1,2,4-Trichlorobenzene, ug/kg dw	<3700*	<830000*
Isophorone, ug/kg dw	<3700*	<830000*
Naphthalene, ug/kg dw	<3700*	<830000*
bis(2-Chloroethoxy) methane, ug/kg dw	<3700*	<830000*
Hexachlorocyclopentadiene, ug/kg dw	<3700*	<830000*
2-Chloronaphthalene, ug/kg dw	<3700*	<830000*
Acenaphthylene, ug/kg dw	<3700*	<830000*
Acenaphthene, ug/kg dw	<3700*	<830000*
Dimethylphthalate, ug/kg dw	<3700*	<830000*
2,6-Dinitrotoluene, ug/kg dw	<3700*	<830000*
Fluorene, ug/kg dw	<3700*	<830000*
4-Chlorophenyl-phenyl ether, ug/kg dw	<3700*	<830000*
2,4-Dinitrotoluene, ug/kg dw	<3700*	<830000*

131

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11075-14	CO-SB-9-01	Client
11075-15	CO-SLUDGE-01	

PARAMETER	11075-14	11075-15
Diethyl Phthalate, ug/kg dw	<3700*	<830000*
N-Nitrosodiphenylamine, ug/kg dw	<3700*	<830000*
Hexachlorobenzene, ug/kg dw	<3700*	<830000*
gamma-BHC, ug/kg dw	<3700*	<830000*
4-Bromophenyl-phenyl-ether, ug/kg dw	<3700*	<830000*
delta-BHC, ug/kg dw	<3700*	<830000*
Phenanthrene, ug/kg dw	<3700*	<830000*
Anthracene, ug/kg dw	<3700*	<830000*
beta-BHC, ug/kg dw	<3700*	<830000*
Heptachlor, ug/kg dw	<3700*	<830000*
alpha-BHC, ug/kg dw	<3700*	<830000*
Aldrin, ug/kg dw	<3700*	<830000*
Dibutyl phthalate, ug/kg dw	<3700*	<830000*
Heptachlor epoxide, ug/kg dw	<3700*	<830000*
Endosulfan I, ug/kg dw	<3700*	<830000*
Fluoranthene, ug/kg dw	<3700*	<830000*
Dieldrin, ug/kg dw	<3700*	<830000*
4,4'-DDE, ug/kg dw	<3700*	<830000*
Pyrene, ug/kg dw	<3700*	<830000*
Endrin, ug/kg dw	<3700*	<830000*
Endosulfan II, ug/kg dw	<3700*	<830000*
4,4'-DDD, ug/kg dw	<3700*	<830000*
Benzidine, ug/kg dw	<29000*	<6700000*

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11075-14	CO-SB-9-01	Client
11075-15	CO-SLUDGE-01	

PARAMETER	11075-14	11075-15
4,4'-DDT, ug/kg dw	<3700*	<830000*
Endosulfan sulfate, ug/kg dw	<3700*	<830000*
Endrin Aldehyde, ug/kg dw	<3700*	<830000*
Butylbenzylphthalate, ug/kg dw	<3700*	<830000*
bis(2-Ethylhexyl) phthalate, ug/kg dw	<3700*	<830000*
Chrysene, ug/kg dw	<3700*	<830000*
Benzo(a)Anthracene, ug/kg dw	<3700*	<830000*
3,3'-Dichlorobenzidine, ug/kg dw	<7300*	<1700000*
Di-n-octylphthalate, ug/kg dw	<3700*	<830000*
Benzo(b)fluoranthene, ug/kg dw	<3700*	<830000*
Benzo (k) Fluoranthene, ug/kg dw	<3700*	<830000*
Benzo(a)pyrene, ug/kg dw	<3700*	<830000*
Indeno (1,2,3-cd)pyrene, ug/kg dw	<3700*	<830000*
Dibenz (a,h)anthracene, ug/kg dw	<3700*	<830000*
Benzo(g,h,i)perylene, ug/kg dw	<3700*	<830000*
N-Nitrosodimethylamine, ug/kg dw	<3700*	<830000*
Chlordane, ug/kg dw	<7300*	<1700000*
Toxaphene, ug/kg dw	<73000*	<17000000*
Aroclor-1016, ug/kg dw	<37000*	<8300000*
Aroclor-1221, ug/kg dw	<37000*	<8300000*
Aroclor-1232, ug/kg dw	<37000*	<8300000*
Aroclor-1242, ug/kg dw	<37000*	<8300000*
Aroclor-1248, ug/kg dw	<37000*	<8300000*

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LOG NO: T0-11075

Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-14	CO-SB-9-01	Client
11075-15	CO-SLUDGE-01	

PARAMETER	11075-14	11075-15
Aroclor-1254, ug/kg dw	<37000*	<8300000*
Aroclor-1260, ug/kg dw	<37000*	<8300000*
2-Chlorophenol, ug/kg dw	<3700*	<830000*
2-Nitrophenol, ug/kg dw	<3700*	<830000*
Phenol, ug/kg dw	<3700*	<830000*
2,4-Dimethylphenol, ug/kg dw	<3700*	<830000*
2,4-Dichlorophenol, ug/kg dw	<3700*	<830000*
2,4,6-Trichlorophenol, ug/kg dw	<3700*	<830000*
4-Chloro-3-methylphenol, ug/kg dw	<3700*	<830000*
2,4-Dinitrophenol, ug/kg dw	<18000*	<4200000*
2-Methyl-4,6-dinitrophenol, ug/kg dw	<18000*	<4200000*
Pentachlorophenol, ug/kg dw	<18000*	<4200000*
4-Nitrophenol, ug/kg dw	<18000*	<4200000*
Benzyl alcohol, ug/kg dw	<3700*	<830000*
2-Methylphenol (o-cresol), ug/kg dw	<3700*	<830000*
4-Methylphenol (p-cresol), ug/kg dw	<3700*	<830000*
Benzoic acid, ug/kg dw	<18000*	<4200000*
4-Chloroaniline, ug/kg dw	<3700*	<830000*
2-Methylnaphthalene, ug/kg dw	<3700*	<830000*
2,4,5-Trichlorophenol, ug/kg dw	<3700*	<830000*
2-Nitroaniline, ug/kg dw	<18000*	<4200000*
3-Nitroaniline, ug/kg dw	<18000*	<4200000*
Dibenzofuran, ug/kg dw	<3700*	<830000*
4-Nitroaniline, ug/kg dw	<18000*	<4200000*

* = Increased detection limit is due to matrix interference.

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LOG NO: T0-11187

Received: 18 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11187-13	Lab Blank	Client
11187-14	Accuracy (% Recovery)	
11187-15	Precision (% RPD)	

PARAMETER	11187-13	11187-14	11187-15
601 and 602			
Bromodichloromethane, ug/l	<1.0	---	---
Bromoform, ug/l	<1.0	---	---
Bromomethane, ug/l	<1.0	---	---
Benzene, ug/l	<1.0	92 %	4.3 %
Carbon Tetrachloride, ug/l	<1.0	---	---
Chlorobenzene, ug/l	<1.0	88 %	0 %
Chloroethane, ug/l	<1.0	---	---
2-Chloroethylvinyl Ether, ug/l	<1.0	---	---
Chloroform, ug/l	<1.0	---	---
Ethylbenzene, ug/l	<1.0	---	---
Chloromethane, ug/l	<1.0	---	---
Dibromochloromethane, ug/l	<1.0	---	---
1,2-Dichlorobenzene, ug/l	<1.0	---	---
1,3-Dichlorobenzene, ug/l	<1.0	---	---
1,4-Dichlorobenzene, ug/l	<1.0	---	---
Dichlorodifluoromethane, ug/l	<1.0	---	---
1,1-Dichloroethane, ug/l	<1.0	---	---
1,2-Dichloroethane, ug/l	<1.0	---	---
1,1-Dichloroethene, ug/l	<1.0	92 %	7.6 %
cis/trans-1,2-Dichloroethylene, ug/l	<1.0	---	---
1,2-Dichloropropane, ug/l	<1.0	---	---

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Mr. Russ Bowen
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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11187-13	Lab Blank	Client
11187-14	Accuracy (% Recovery)	
11187-15	Precision (% RPD)	

PARAMETER	11187-13	11187-14	11187-15
Cis-1,3-Dichloropropene, ug/l	<1.0	---	---
Trans-1,3-Dichloropropene, ug/l	<1.0	---	---
Methylene Chloride, ug/l	<1.0	---	---
1,1,2,2-Tetrachloroethane, ug/l	<1.0	---	---
Tetrachloroethylene, ug/l	<1.0	---	---
Toluene, ug/l	<1.0	97 %	4.1 %
1,1,1-Trichloroethane, ug/l	<1.0	---	---
1,1,2-Trichloroethane, ug/l	<1.0	---	---
Trichloroethene, ug/l	<1.0	75 %	0 %
Trichlorofluoromethane, ug/l	<1.0	---	---
Vinyl Chloride, ug/l	<1.0	---	---
Xylenes, ug/l	<1.0	---	---

136

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11187-13	Lab Blank	Client
11187-14	Accuracy (% Recovery)	
11187-15	Precision (% RPD)	

PARAMETER	11187-13	11187-14	11187-15
BN-A Extractables (625)			
Acenaphthene, ug/l	<10	71 %	0 %
Acenaphthylene, ug/l	<10	---	---
Anthracene, ug/l	<10	---	---
Aldrin, ug/l	<10	---	---
Benzo(a)Anthracene, ug/l	<10	---	---
Benzo(b)fluoranthene, ug/l	<10	---	---
Benzo (k) Fluoranthene, ug/l	<10	---	---
Benzo(a)pyrene, ug/l	<10	---	---
Benzo(g,h,i)perylene, ug/l	<10	---	---
Benzyl butyl phthalate, ug/l	<10	---	---
beta-BHC, ug/l	<10	---	---
delta-BHC, ug/l	<10	---	---
bis(2-Chloroethyl) ether, ug/l	<10	---	---
bis(2-Chloroethoxy) methane, ug/l	<10	---	---
bis(2-Ethylhexyl) phthalate, ug/l	<10	---	---
Bis(2-chloroisopropyl)ether, ug/l	<10	---	---
4-Bromophenyl-phenyl-ether, ug/l	<10	---	---
Chlordane, ug/l	<20	---	---
2-Chloronaphthalene, ug/l	<10	---	---
4-Chlorophenyl-phenyl ether, ug/l	<10	---	---
Chrysene, ug/l	<10	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11187-13	Lab Blank	Client
11187-14	Accuracy (% Recovery)	
11187-15	Precision (% RPD)	

PARAMETER	11187-13	11187-14	11187-15
4,4'-DDD, ug/l	<10	---	---
4,4'-DDE, ug/l	<10	---	---
4,4'-DDT, ug/l	<10	---	---
Dibenz (a,h)anthracene, ug/l	<10	---	---
Di-n-butylphthalate, ug/l	<10	---	---
1,3-Dichlorobenzene, ug/l	<10	---	---
1,2-Dichlorobenzene, ug/l	<10	---	---
1,4-Dichlorobenzene, ug/l	<10	69 %	0 %
3,3'-Dichlorobenzidine, ug/l	<20	---	---
Dieldrin, ug/l	<10	---	---
Diethyl Phthalate, ug/l	<10	---	---
Dimethyl phthalate, ug/l	<10	---	---
2,4-Dinitrotoluene, ug/l	<10	90 %	5.6 %
2,6-Dinitrotoluene, ug/l	<10	---	---
Di-n-octylphthalate, ug/l	<10	---	---
Endosulfan sulfate, ug/l	<10	---	---
Endrin Aldehyde, ug/l	<10	---	---
Fluoranthene, ug/l	<10	---	---
Fluorene, ug/l	<10	---	---
Heptachlor, ug/l	<10	---	---
Heptachlor epoxide, ug/l	<10	---	---
Hexachlorobenzene, ug/l	<10	---	---

138

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11187-13	Lab Blank	Client
11187-14	Accuracy (% Recovery)	
11187-15	Precision (% RPD)	

PARAMETER	11187-13	11187-14	11187-15
Hexachlorobutadiene, ug/l	<10	---	---
Hexachloroethane, ug/l	<10	---	---
Indeno (1,2,3-cd)pyrene, ug/l	<10	---	---
Isophorone, ug/l	<10	---	---
Naphthalene, ug/l	<10	---	---
Nitrobenzene, ug/l	<10	---	---
N-Nitrosodi-N-Propylamine, ug/l	<10	97 %	6.2 %
Aroclor-1016, ug/l	<100	---	---
Aroclor-1221, ug/l	<100	---	---
Aroclor-1232, ug/l	<100	---	---
Aroclor-1242, ug/l	<100	---	---
Aroclor-1248, ug/l	<100	---	---
Aroclor-1254, ug/l	<100	---	---
Aroclor-1260, ug/l	<100	---	---
Phenanthrene, ug/l	<10	---	---
Pyrene, ug/l	<10	82 %	6.1 %
Toxaphene, ug/l	<200	---	---
1,2,4-Trichlorobenzene, ug/l	<10	73 %	2.7 %
4-Chloro-3-methylphenol, ug/l	<10	82 %	7.3 %
2-Chlorophenol, ug/l	<10	62 %	1.6 %
2,4-Dichlorophenol, ug/l	<10	---	---
2,4-Dimethylphenol, ug/l	<10	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11187-13	Lab Blank	Client
11187-14	Accuracy (% Recovery)	
11187-15	Precision (% RPD)	

PARAMETER	11187-13	11187-14	11187-15
2,4-Dinitrophenol, ug/l	<50	---	---
2-Methyl-4,6-dinitrophenol, ug/l	<50	---	---
2-Nitrophenol, ug/l	<10	---	---
4-Nitrophenol, ug/l	<50	32 %	6.2 %
Pentachlorophenol, ug/l	<50	82 %	7.3 %
Phenol, ug/l	<10	44 %	2.3 %
2,4,6-Trichlorophenol, ug/l	<10	---	---
Phosphorus Pesticides (614)			
Azinphos methyl, ug/l	<0.10	---	---
Demeton-O, ug/l	<0.50	---	---
Demeton-S, ug/l	<0.50	---	---
Diazinon, ug/l	<0.10	---	---
Disulfoton, ug/l	<0.10	69 %	0.72 %
Malathion, ug/l	<0.10	---	---
Parathion Ethyl, ug/l	<0.050	74 %	1.3 %
Parathion Methyl, ug/l	<0.050	65 %	3.0 %

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11187-13	Lab Blank	Client
11187-14	Accuracy (% Recovery)	
11187-15	Precision (% RPD)	

PARAMETER	11187-13	11187-14	11187-15
Chlorinated Herbicides (615)			
2,4-D, ug/l	<0.50	79 %	15 %
2,4-DB, ug/l	<0.50	---	---
Dicamba, ug/l	<5.0	58 %	14 %
Dichlorprop, ug/l	<0.50	80 %	25 %
Dinoseb, ug/l	<0.50	---	---
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	---	---
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	---	---
2,4,5-T, ug/l	<0.30	---	---
2,4,5-TP Silvex, ug/l	<0.10	72 %	5.6 %

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11187-13	Lab Blank	Client
11187-14	Accuracy (% Recovery)	
11187-15	Precision (% RPD)	

PARAMETER	11187-13	11187-14	11187-15
Chlorinated Pesticides (608)			
Aldrin, ug/l	<0.010	90 %	5.6 %
Alpha-BHC, ug/l	<0.010	---	---
Beta-BHC, ug/l	<0.010	---	---
Delta-BHC, ug/l	<0.010	---	---
Gamma-BHC, ug/l	<0.010	57 %	3.5 %
Chlordane, ug/l	<0.10	---	---
4,4'-DDD, ug/l	<0.020	---	---
4,4'-DDE, ug/l	<0.020	---	---
4,4'-DDT, ug/l	<0.050	124 %	23 %
Dieldrin, ug/l	<0.020	---	---
Endosulfan I, ug/l	<0.020	---	---
Endosulfan II, ug/l	<0.050	---	---
Endosulfan Sulfate, ug/l	<0.10	---	---
Endrin, ug/l	<0.020	---	---
Endrin Aldehyde, ug/l	<0.10	---	---
Heptachlor, ug/l	<0.010	92 %	0 %
Heptachlor Epoxide, ug/l	<0.020	---	---
Toxaphene, ug/l	<1.0	---	---
PCB-1016, ug/l	<0.50	---	---
PCB-1221, ug/l	<0.50	---	---
PCB-1232, ug/l	<0.50	---	---
PCB-1242, ug/l	<0.50	---	---
PCB-1248, ug/l	<0.50	---	---
PCB-1254, ug/l	<0.50	---	---
PCB-1260, ug/l	<0.50	---	---

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LOG NO: T0-11187

Received: 18 OCT 90

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Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11187-13	Lab Blank	Client
11187-14	Accuracy (% Recovery)	
11187-15	Precision (% RPD)	

PARAMETER	11187-13	11187-14	11187-15
Arsenic, mg/l	<0.010	92 %	4.3 %
Chromium, mg/l	<0.010	118 %	3.4 %
Zinc, mg/l	<0.020	99 %	7.1 %

Method: EPA 40 CFR Part 136
HRS Certification #'s:81291,87279,E81005,E87052

Thomas L. Stephens

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LOG NO: T0-11605

Received: 19 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-6	Field Blank	Client
11605-7	Equipment Blank	

PARAMETER	11605-6	11605-7
601 and 602		
Bromodichloromethane, ug/l	<1.0	<1.0
Bromoform, ug/l	<1.0	<1.0
Bromomethane, ug/l	<1.0	<1.0
Benzene, ug/l	<1.0	<1.0
Carbon Tetrachloride, ug/l	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<1.0
Chloroethane, ug/l	<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l	<1.0	<1.0
Chloroform, ug/l	<1.0	<1.0
Ethylbenzene, ug/l	<1.0	<1.0
Chloromethane, ug/l	<1.0	<1.0
Dibromochloromethane, ug/l	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0
1,4-Dichlorobenzene, ug/l	<1.0	<1.0
Dichlorodifluoromethane, ug/l	<1.0	<1.0
1,1-Dichloroethane, ug/l	<1.0	<1.0
1,2-Dichloroethane, ug/l	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<1.0
cis/trans-1,2-Dichloroethylene, ug/l	<1.0	<1.0
1,2-Dichloropropane, ug/l	<1.0	<1.0
Cis-1,3-Dichloropropene, ug/l	<1.0	<1.0

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LOG NO: T0-11605

Received: 19 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-6	Field Blank	Client
11605-7	Equipment Blank	

PARAMETER	11605-6	11605-7
Trans-1,3-Dichloropropene, ug/l	<1.0	<1.0
Methylene Chloride, ug/l	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0
Tetrachloroethylene, ug/l	<1.0	<1.0
Toluene, ug/l	<1.0	<1.0
1,1,1-Trichloroethane, ug/l	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0
Trichloroethene, ug/l	<1.0	<1.0
Trichlorofluoromethane, ug/l	<1.0	<1.0
Vinyl Chloride, ug/l	<1.0	<1.0
Xylenes, ug/l	<1.0	<1.0

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-6	Field Blank	Client
11605-7	Equipment Blank	

PARAMETER	11605-6	11605-7
BN-A Extractables (625)		
Acenaphthene, ug/l	<10	<10
Acenaphthylene, ug/l	<10	<10
Anthracene, ug/l	<10	<10
Aldrin, ug/l	<10	<10
Benzo(a)Anthracene, ug/l	<10	<10
Benzo(b)fluoranthene, ug/l	<10	<10
Benzo (k) Fluoranthene, ug/l	<10	<10
Benzo(a)pyrene, ug/l	<10	<10
Benzo(g,h,i)perylene, ug/l	<10	<10
Benzyl butyl phthalate, ug/l	<10	<10
beta-BHC, ug/l	<10	<10
delta-BHC, ug/l	<10	<10
bis(2-Chloroethyl) ether, ug/l	<10	<10
bis(2-Chloroethoxy) methane, ug/l	<10	<10
bis(2-Ethylhexyl) phthalate, ug/l	<10	<10
Bis(2-chloroisopropyl)ether, ug/l	<10	<10
4-Bromophenyl-phenyl-ether, ug/l	<10	<10
Chlordane, ug/l	<20	<20
2-Chloronaphthalene, ug/l	<10	<10
4-Chlorophenyl-phenyl ether, ug/l	<10	<10
Chrysene, ug/l	<10	<10
4,4'-DDD, ug/l	<10	<10

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-6	Field Blank	Client
11605-7	Equipment Blank	

PARAMETER	11605-6	11605-7
4,4'-DDE, ug/l	<10	<10
4,4'-DDT, ug/l	<10	<10
Dibenz (a,h)anthracene, ug/l	<10	<10
Di-n-butylphthalate, ug/l	<10	<10
1,3-Dichlorobenzene, ug/l	<10	<10
1,2-Dichlorobenzene, ug/l	<10	<10
1,4-Dichlorobenzene, ug/l	<10	<10
3,3'-Dichlorobenzidine, ug/l	<20	<20
Dieldrin, ug/l	<10	<10
Diethyl Phthalate, ug/l	<10	<10
Dimethyl phthalate, ug/l	<10	<10
2,4-Dinitrotoluene, ug/l	<10	<10
2,6-Dinitrotoluene, ug/l	<10	<10
Di-n-octylphthalate, ug/l	<10	<10
Endosulfan sulfate, ug/l	<10	<10
Endrin Aldehyde, ug/l	<10	<10
Fluoranthene, ug/l	<10	<10
Fluorene, ug/l	<10	<10
Heptachlor, ug/l	<10	<10
Heptachlor epoxide, ug/l	<10	<10
Hexachlorobenzene, ug/l	<10	<10
Hexachlorobutadiene, ug/l	<10	<10
Hexachloroethane, ug/l	<10	<10

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LOG NO: T0-11605

Received: 19 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-6	Field Blank	Client
11605-7	Equipment Blank	

PARAMETER	11605-6	11605-7
Indeno (1,2,3-cd)pyrene, ug/l	<10	<10
Isophorone, ug/l	<10	<10
Naphthalene, ug/l	<10	<10
Nitrobenzene, ug/l	<10	<10
N-Nitrosodi-N-Propylamine, ug/l	<10	<10
Aroclor-1016, ug/l	<100	<100
Aroclor-1221, ug/l	<100	<100
Aroclor-1232, ug/l	<100	<100
Aroclor-1242, ug/l	<100	<100
Aroclor-1248, ug/l	<100	<100
Aroclor-1254, ug/l	<100	<100
Aroclor-1260, ug/l	<100	<100
Phenanthrene, ug/l	<10	<10
Pyrene, ug/l	<10	<10
Toxaphene, ug/l	<200	<200
1,2,4-Trichlorobenzene, ug/l	<10	<10
4-Chloro-3-methylphenol, ug/l	<10	<10
2-Chlorophenol, ug/l	<10	<10
2,4-Dichlorophenol, ug/l	<10	<10
2,4-Dimethylphenol, ug/l	<10	<10
2,4-Dinitrophenol, ug/l	<50	<50
2-Methyl-4,6-dinitrophenol, ug/l	<50	<50
2-Nitrophenol, ug/l	<10	<10
4-Nitrophenol, ug/l	<50	<50
Pentachlorophenol, ug/l	<50	<50
Phenol, ug/l	<10	<10
2,4,6-Trichlorophenol, ug/l	<10	<10

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-6	Field Blank	Client
11605-7	Equipment Blank	

PARAMETER	11605-6	11605-7
Phosphorus Pesticides (614)		
Azinphos methyl, ug/l	<1.0	<1.0
Demeton-O, ug/l	<0.50	<0.50
Demeton-S, ug/l	<0.50	<0.50
Diazinon, ug/l	<0.10	<0.10
Disulfoton, ug/l	<0.10	<0.10
Malathion, ug/l	<0.10	<0.10
Parathion Ethyl, ug/l	<0.050	<0.050
Parathion Methyl, ug/l	<0.050	<0.050
Chlorinated Herbicides (615)		
2,4-D, ug/l	<0.50	<0.50
2,4-DB, ug/l	<0.50	<0.50
Dicamba, ug/l	<5.0	<5.0
Dichlorprop, ug/l	<0.50	<0.50
Dinoseb, ug/l	<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	<10
2,4,5-T, ug/l	<0.30	<0.30
2,4,5-TP Silvex, ug/l	<0.10	<0.10

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11605-6	Field Blank	Client
11605-7	Equipment Blank	

PARAMETER	11605-6	11605-7
Chlorinated Pesticides (608)		
Aldrin, ug/l	<0.010	<0.010
Alpha-BHC, ug/l	<0.010	<0.010
Beta-BHC, ug/l	<0.010	<0.010
Delta-BHC, ug/l	<0.010	<0.010
Gamma-BHC, ug/l	<0.010	<0.010
Chlordane, ug/l	<0.10	<0.10
4,4'-DDD, ug/l	<0.020	<0.020
4,4'-DDE, ug/l	<0.020	<0.020
4,4'-DDT, ug/l	<0.050	<0.050
Dieldrin, ug/l	<0.020	<0.020
Endosulfan I, ug/l	<0.020	<0.020
Endosulfan II, ug/l	<0.050	<0.050
Endosulfan Sulfate, ug/l	<0.10	<0.10
Endrin, ug/l	<0.020	<0.020
Endrin Aldehyde, ug/l	<0.10	<0.10
Heptachlor, ug/l	<0.010	<0.010
Heptachlor Epoxide, ug/l	<0.020	<0.020
Toxaphene, ug/l	<1.0	<1.0
PCB-1016, ug/l	<0.50	<0.50
PCB-1221, ug/l	<0.50	<0.50
PCB-1232, ug/l	<0.50	<0.50
PCB-1242, ug/l	<0.50	<0.50
PCB-1248, ug/l	<0.50	<0.50
PCB-1254, ug/l	<0.50	<0.50
PCB-1260, ug/l	<0.50	<0.50

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11605-6	Field Blank	Client
11605-7	Equipment Blank	

PARAMETER	11605-6	11605-7
Arsenic, mg/l	<0.010	<0.010
Chromium, mg/l	<0.010	<0.010
Zinc, mg/l	<0.020	<0.020

* = Increased detection limit due to matrix interference.

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-8	Trip Blank #1	Client
11605-9	Trip Blank #2	

PARAMETER	11605-8	11605-9
601 and 602		
Bromodichloromethane, ug/l	<1.0	<1.0
Bromoform, ug/l	<1.0	<1.0
Bromomethane, ug/l	<1.0	<1.0
Benzene, ug/l	<1.0	<1.0
Carbon Tetrachloride, ug/l	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<1.0
Chloroethane, ug/l	<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l	<1.0	<1.0
Chloroform, ug/l	<1.0	<1.0
Ethylbenzene, ug/l	<1.0	<1.0
Chloromethane, ug/l	<1.0	<1.0
Dibromochloromethane, ug/l	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0
1,4-Dichlorobenzene, ug/l	<1.0	<1.0
Dichlorodifluoromethane, ug/l	<1.0	<1.0
1,1-Dichloroethane, ug/l	<1.0	<1.0
1,2-Dichloroethane, ug/l	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<1.0
cis/trans-1,2-Dichloroethylene, ug/l	<1.0	<1.0
1,2-Dichloropropane, ug/l	<1.0	<1.0
Cis-1,3-Dichloropropene, ug/l	<1.0	<1.0

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-8	Trip Blank #1	Client
11605-9	Trip Blank #2	

PARAMETER	11605-8	11605-9
Trans-1,3-Dichloropropene, ug/l	<1.0	<1.0
Methylene Chloride, ug/l	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0
Tetrachloroethylene, ug/l	<1.0	<1.0
Toluene, ug/l	<1.0	<1.0
1,1,1-Trichloroethane, ug/l	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0
Trichloroethene, ug/l	<1.0	<1.0
Trichlorofluoromethane, ug/l	<1.0	<1.0
Vinyl Chloride, ug/l	<1.0	<1.0
Xylenes, ug/l	<1.0	<1.0

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11605-10	Lab Blank	Client
11605-11	Accuracy (% Recovery)	
11605-12	Precision (% RPD)	

PARAMETER	11605-10	11605-11	11605-12
601 and 602			
Bromodichloromethane, ug/l	<1.0	---	---
Bromoform, ug/l	<1.0	---	---
Bromomethane, ug/l	<1.0	---	---
Benzene, ug/l	<1.0	82 %	1.2 %
Carbon Tetrachloride, ug/l	<1.0	---	---
Chlorobenzene, ug/l	<1.0	100 %	4.0 %
Chloroethane, ug/l	<1.0	---	---
2-Chloroethylvinyl Ether, ug/l	<1.0	---	---
Chloroform, ug/l	<1.0	---	---
Ethylbenzene, ug/l	<1.0	---	---
Chloromethane, ug/l	<1.0	---	---
Dibromochloromethane, ug/l	<1.0	---	---
1,2-Dichlorobenzene, ug/l	<1.0	---	---
1,3-Dichlorobenzene, ug/l	<1.0	---	---
1,4-Dichlorobenzene, ug/l	<1.0	---	---
Dichlorodifluoromethane, ug/l	<1.0	---	---
1,1-Dichloroethane, ug/l	<1.0	---	---
1,2-Dichloroethane, ug/l	<1.0	---	---
1,1-Dichloroethene, ug/l	<1.0	86 %	9.3 %
cis/trans-1,2-Dichloroethylene, ug/l	<1.0	---	---
1,2-Dichloropropane, ug/l	<1.0	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11605-10	Lab Blank	Client
11605-11	Accuracy (% Recovery)	
11605-12	Precision (% RPD)	

PARAMETER	11605-10	11605-11	11605-12
Cis-1,3-Dichloropropene, ug/l	<1.0	---	---
Trans-1,3-Dichloropropene, ug/l	<1.0	---	---
Methylene Chloride, ug/l	<1.0	---	---
1,1,2,2-Tetrachloroethane, ug/l	<1.0	---	---
Tetrachloroethylene, ug/l	<1.0	---	---
Toluene, ug/l	<1.0	90 %	1.1 %
1,1,1-Trichloroethane, ug/l	<1.0	---	---
1,1,2-Trichloroethane, ug/l	<1.0	---	---
Trichloroethene, ug/l	<1.0	77 %	3.9 %
Trichlorofluoromethane, ug/l	<1.0		---
Vinyl Chloride, ug/l	<1.0	---	---
Xylenes, ug/l	<1.0	---	---

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REPORT OF RESULTS

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11605-10	Lab Blank	Client
11605-11	Accuracy (% Recovery)	
11605-12	Precision (% RPD)	

PARAMETER	11605-10	11605-11	11605-12
BN-A Extractables (625)			
Acenaphthene, ug/l	<10	71 %	0 %
Acenaphthylene, ug/l	<10	---	---
Anthracene, ug/l	<10	---	---
Aldrin, ug/l	<10	---	---
Benzo(a)Anthracene, ug/l	<10	---	---
Benzo(b)fluoranthene, ug/l	<10	---	---
Benzo (k) Fluoranthene, ug/l	<10	---	---
Benzo(a)pyrene, ug/l	<10	---	---
Benzo(g,h,i)perylene, ug/l	<10	---	---
Benzyl butyl phthalate, ug/l	<10	---	---
beta-BHC, ug/l	<10	---	---
delta-BHC, ug/l	<10	---	---
bis(2-Chloroethyl) ether, ug/l	<10	---	---
bis(2-Chloroethoxy) methane, ug/l	<10	---	---
bis(2-Ethylhexyl) phthalate, ug/l	<10	---	---
Bis(2-chloroisopropyl)ether, ug/l	<10	---	---
4-Bromophenyl-phenyl-ether, ug/l	<10	---	---
Chlordane, ug/l	<20	---	---
2-Chloronaphthalene, ug/l	<10	---	---
4-Chlorophenyl-phenyl ether, ug/l	<10	---	---
Chrysene, ug/l	<10	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11605-10	Lab Blank	Client
11605-11	Accuracy (% Recovery)	
11605-12	Precision (% RPD)	

PARAMETER	11605-10	11605-11	11605-12
4,4'-DDD, ug/l	<10	---	---
4,4'-DDE, ug/l	<10	---	---
4,4'-DDT, ug/l	<10	---	---
Dibenz (a,h)anthracene, ug/l	<10	---	---
Di-n-butylphthalate, ug/l	<10	---	---
1,3-Dichlorobenzene, ug/l	<10	---	---
1,2-Dichlorobenzene, ug/l	<10	---	---
1,4-Dichlorobenzene, ug/l	<10	69 %	0 %
3,3'-Dichlorobenzidine, ug/l	<20	---	---
Dieldrin, ug/l	<10	---	---
Diethyl Phthalate, ug/l	<10	---	---
Dimethyl phthalate, ug/l	<10	---	---
2,4-Dinitrotoluene, ug/l	<10	90 %	5.6 %
2,6-Dinitrotoluene, ug/l	<10	---	---
Di-n-octylphthalate, ug/l	<10	---	---
Endosulfan sulfate, ug/l	<10	---	---
Endrin Aldehyde, ug/l	<10	---	---
Fluoranthene, ug/l	<10	---	---
Fluorene, ug/l	<10	---	---
Heptachlor, ug/l	<10	---	---
Heptachlor epoxide, ug/l	<10	---	---
Hexachlorobenzene, ug/l	<10	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11605-10	Lab Blank	Client
11605-11	Accuracy (% Recovery)	
11605-12	Precision (% RPD)	

PARAMETER	11605-10	11605-11	11605-12
Hexachlorobutadiene, ug/l	<10	---	---
Hexachloroethane, ug/l	<10	---	---
Indeno (1,2,3-cd)pyrene, ug/l	<10	---	---
Isophorone, ug/l	<10	---	---
Naphthalene, ug/l	<10	---	---
Nitrobenzene, ug/l	<10	---	---
N-Nitrosodi-N-Propylamine, ug/l	<10	97 %	6.2 %
Aroclor-1016, ug/l	<100	---	---
Aroclor-1221, ug/l	<100	---	---
Aroclor-1232, ug/l	<100	---	---
Aroclor-1242, ug/l	<100	---	---
Aroclor-1248, ug/l	<100	---	---
Aroclor-1254, ug/l	<100	---	---
Aroclor-1260, ug/l	<100	---	---
Phenanthrene, ug/l	<10	---	---
Pyrene, ug/l	<10	82 %	6.1 %
Toxaphene, ug/l	<200	---	---
1,2,4-Trichlorobenzene, ug/l	<10	73 %	2.7 %
4-Chloro-3-methylphenol, ug/l	<10	82 %	7.3 %
2-Chlorophenol, ug/l	<10	62 %	1.6 %
2,4-Dichlorophenol, ug/l	<10	---	---
2,4-Dimethylphenol, ug/l	<10	---	---

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11605-10	Lab Blank	Client
11605-11	Accuracy (% Recovery)	
11605-12	Precision (% RPD)	

PARAMETER	11605-10	11605-11	11605-12
2,4-Dinitrophenol, ug/l	<50	---	---
2-Methyl-4,6-dinitrophenol, ug/l	<50	---	---
2-Nitrophenol, ug/l	<10	---	---
4-Nitrophenol, ug/l	<50	32 %	6.2 %
Pentachlorophenol, ug/l	<50	82 %	7.3 %
Phenol, ug/l	<10	44 %	2.3 %
2,4,6-Trichlorophenol, ug/l	<10	---	---
Phosphorus Pesticides (614)			
Azinphos methyl, ug/l	<1.0	---	---
Demeton-O, ug/l	<0.50	---	---
Demeton-S. ug/l	<0.50	---	---
Diazinon, ug/l	<0.10	99 %	2.0 %
Disulfoton, ug/l	<0.10	---	---
Malathion, ug/l	<0.10	82 %	10 %
Parathion Ethyl, ug/l	<0.050	107 %	93 %
Parathion Methyl, ug/l	<0.050	---	---

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11605-10	Lab Blank	Client
11605-11	Accuracy (% Recovery)	
11605-12	Precision (% RPD)	

PARAMETER	11605-10	11605-11	11605-12
Chlorinated Herbicides (615)			
2,4-D, ug/l	<0.50	79 %	15 %
2,4-DB, ug/l	<0.50	---	---
Dicamba, ug/l	<5.0	58 %	14 %
Dichlorprop, ug/l	<0.50	80 %	25 %
Dinoseb, ug/l	<0.50	---	---
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	---	---
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	---	---
2,4,5-T, ug/l	<0.30	---	---
2,4,5-TP Silvex, ug/l	<0.10	72 %	5.6 %

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11605-10	Lab Blank	Client
11605-11	Accuracy (% Recovery)	
11605-12	Precision (% RPD)	

PARAMETER	11605-10	11605-11	11605-12
Chlorinated Pesticides (608)			
Aldrin, ug/l	<0.010	83 %	1.2 %
Alpha-BHC, ug/l	<0.010	---	---
Beta-BHC, ug/l	<0.010	---	---
Delta-BHC, ug/l	<0.010	---	---
Gamma-BHC, ug/l	<0.010	---	---
Chlordane, ug/l	<0.10	---	---
4,4'-DDD, ug/l	<0.020	---	---
4,4'-DDE, ug/l	<0.020	---	---
4,4'-DDT, ug/l	<0.050	68 %	0 %
Dieldrin, ug/l	<0.020	62 %	0 %
Endosulfan I, ug/l	<0.020	---	---
Endosulfan II, ug/l	<0.050	---	---
Endosulfan Sulfate, ug/l	<0.10	---	---
Endrin, ug/l	<0.020	91 %	0 %
Endrin Aldehyde, ug/l	<0.10	---	---
Heptachlor, ug/l	<0.010	84 %	2.3 %
Heptachlor Epoxide, ug/l	<0.020	---	---
Toxaphene, ug/l	<1.0	---	---
PCB-1016, ug/l	<0.50	---	---
PCB-1221, ug/l	<0.50	---	---
PCB-1232, ug/l	<0.50	---	---
PCB-1242, ug/l	<0.50	---	---
PCB-1248, ug/l	<0.50	---	---
PCB-1254, ug/l	<0.50	---	---
PCB-1260, ug/l	<0.50	---	---

161

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2846 Industrial Plaza Drive • Tallahassee, FL 32301 • (904) 878-3994 • Fax (904) 878-9504

LOG NO: T0-11605

Received: 19 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY
11605-10	Lab Blank	Client
11605-11	Accuracy (% Recovery)	
11605-12	Precision (% RPD)	

PARAMETER	11605-10	11605-11	11605-12
Arsenic, mg/l	<0.010	114 %	4.3 %
Chromium, mg/l	<0.010	94 %	2.1 %
Zinc, mg/l	<0.020	100 %	2.0 %

Method: EPA 40 CFR Part 136
HRS Certification #'s:81291,87279,E81005,E87052

Thomas L. Stephens

162

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2846 Industrial Plaza Drive • Tallahassee, FL 32301 • (904) 878-3994 • Fax (904) 878-9504

LOG NO: T0-11612

Received: 20 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11612-1	CO-SS-NB-01	Client

PARAMETER	11612-1
Volatile Organics	
Benzyl chloride, ug/kg dw	<6.1
bis(2-Chloroethoxy) methane, ug/kg dw	<6.1
Bis(2-chloroisopropyl)ether, ug/kg dw	<6.1
Bromobenzene, ug/kg dw	<6.1
Bromodichloromethane, ug/kg dw	<6.1
Benzene, ug/kg dw	<6.1
Bromoform, ug/kg dw	<6.1
Bromomethane, ug/kg dw	<6.1
Carbon Tetrachloride, ug/kg dw	<6.1
Chloroacetaldehyde, ug/kg dw	<6.1
Chlorobenzene, ug/kg dw	<6.1
Chloroethane, ug/kg dw	<6.1
Chloroform, ug/kg dw	<6.1
1-Chlorohexane, ug/kg dw	<6.1
2-Chloroethylvinyl Ether, ug/kg dw	<6.1
Chloromethane, ug/kg dw	<6.1
Chloromethyl methyl ether, ug/kg dw	<6.1
Chlorotoluene, ug/kg dw	<6.1
Dibromochloromethane, ug/kg dw	<6.1
Dibromomethane, ug/kg dw	<6.1
1,2-Dichlorobenzene, ug/kg dw	<6.1
1,3-Dichlorobenzene, ug/kg dw	<6.1
1,4-Dichlorobenzene, ug/kg dw	<6.1

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11612-1	CO-SS-NB-01	Client

PARAMETER	11612-1
Dichlorodifluoromethane, ug/kg dw	<6.1
1,1-Dichloroethane, ug/kg dw	<6.1
1,2-Dichloroethane, ug/kg dw	<6.1
1,1-Dichloroethene, ug/kg dw	<6.1
1,2-Dichloropropane, ug/kg dw	<6.1
1,3-Dichloropropylene, ug/kg dw	<6.1
Ethylbenzene, ug/kg dw	<6.1
Methylene Chloride, ug/kg dw	<6.1
1,1,2,2-Tetrachloroethane, ug/kg dw	<6.1
1,1,1,2-Tetrachloroethane, ug/kg dw	<6.1
Tetrachloroethylene, ug/kg dw	<6.1
Toluene, ug/kg dw	<6.1
1,1,1-Trichloroethane, ug/kg dw	<6.1
1,1,2-Trichloroethane, ug/kg dw	<6.1
Trichloroethene, ug/kg dw	<6.1
Trichlorofluoromethane, ug/kg dw	<6.1
Trichloropropane, ug/kg dw	<6.1
Vinyl Chloride, ug/kg dw	<6.1
Xylenes, ug/kg dw	<6.1

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11612-1	CO-SS-NB-01	Client

PARAMETER	11612-1
Organophosphorus Pesticides	
Azinphos methyl, ug/kg dw	<180
Bolstar (Sulprofos), ug/kg dw	<9.2
Chlorpyrifos, ug/kg dw	<1.9
Coumaphos, ug/kg dw	<92
Demeton-O, ug/kg dw	<19
Demeton-S, ug/kg dw	<19
Diazinon, ug/kg dw	<9.2
Dichlorvos, ug/kg dw	<19
Disulfoton, ug/kg dw	<9.2
Ethoprop, ug/kg dw	<1.9
Fensulfothion, ug/kg dw	<92
Fenthion, ug/kg dw	<1.9
Merphos, ug/kg dw	<9.2
Mevinphos, ug/kg dw	<1.9
Naled, ug/kg dw	<19
Methyl Parathion, ug/kg dw	<9.2
Phorate, ug/kg dw	<1.9
Ronnel, ug/kg dw	<1.9
Stirophos (Tetrachlorvinphos), ug/kg dw	<9.2
Tokuthion (Prothiofos), ug/kg dw	<9.2
Trichloronate, ug/kg dw	<92

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11612-1	CO-SS-NB-01	Client

PARAMETER	11612-1
Chlorinated Herbicides (8150)	
2,4-D, ug/kg dw	<120
2,4-DB, ug/kg dw	<120
2,4,5-T, ug/kg dw	<72
2,4,5-TP Silvex, ug/kg dw	24
Dalapon, ug/kg dw	<2400
Dicamba, ug/kg dw	<1200
Dichlorprop, ug/kg dw	<120
Dinoseb, ug/kg dw	<120
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<2400
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<2400
Arsenic, mg/kg dw	<0.82
Chromium, mg/kg dw	4.9
Zinc, mg/kg dw	4.1

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Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	SAMPLED BY
11612-2	Lab Blank	Client
11612-3	Accuracy (% Recovery)	
11612-4	Precision (% RPD)	

PARAMETER	11612-2	11612-3	11612-4
Volatile Organics			
Benzyl chloride, ug/kg dw	<6.6	---	---
bis(2-Chloroethoxy) methane, ug/kg dw	<6.6	---	---
Bis(2-chloroisopropyl)ether, ug/kg dw	<6.6	---	---
Bromobenzene, ug/kg dw	<6.6	---	---
Bromodichloromethane, ug/kg dw	<6.6	---	---
Benzene, ug/kg dw	<6.6	105 %	5.7 %
Bromoform, ug/kg dw	<6.6	---	---
Bromomethane, ug/kg dw	<6.6	---	---
Carbon Tetrachloride, ug/kg dw	<6.6	---	---
Chloroacetaldehyde, ug/kg dw	<6.6	---	---
Chlorobenzene, ug/kg dw	<6.6	105 %	6.7 %
Chloroethane, ug/kg dw	<6.6	---	---
Chloroform, ug/kg dw	<6.6	---	---
1-Chlorohexane, ug/kg dw	<6.6	---	---
2-Chloroethylvinyl Ether, ug/kg dw	<6.6	---	---
Chloromethane, ug/kg dw	<6.6	---	---
Chloromethyl methyl ether, ug/kg dw	<6.6	---	---
Chlorotoluene, ug/kg dw	<6.6	---	---
Dibromochloromethane, ug/kg dw	<6.6	---	---
Dibromomethane, ug/kg dw	<6.6	---	---
1,2-Dichlorobenzene, ug/kg dw	<6.6	---	---

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	SAMPLED BY
11612-2	Lab Blank	Client
11612-3	Accuracy (% Recovery)	
11612-4	Precision (% RPD)	

PARAMETER	11612-2	11612-3	11612-4
1,3-Dichlorobenzene, ug/kg dw	<6.6	---	---
1,4-Dichlorobenzene, ug/kg dw	<6.6	---	---
Dichlorodifluoromethane, ug/kg dw	<6.6	---	---
1,1-Dichloroethane, ug/kg dw	<6.6	---	---
1,2-Dichloroethane, ug/kg dw	<6.6	---	---
1,1-Dichloroethene, ug/kg dw	<6.6	68 %	26 %
1,2-Dichloropropane, ug/kg dw	<6.6	---	---
1,3-Dichloropropylene, ug/kg dw	<6.6	---	---
Ethylbenzene, ug/kg dw	<6.6	---	---
Methylene Chloride, ug/kg dw	<6.6	---	---
1,1,2,2-Tetrachloroethane, ug/kg dw	<6.6	---	---
1,1,1,2-Tetrachloroethane, ug/kg dw	<6.6	---	---
Tetrachloroethylene, ug/kg dw	<6.6	---	---
Toluene, ug/kg dw	<6.6	85 %	2.4 %
1,1,1-Trichloroethane, ug/kg dw	<6.6	---	---
1,1,2-Trichloroethane, ug/kg dw	<6.6	---	---
Trichloroethene, ug/kg dw	<6.6	98 %	3.1 %
Trichlorofluoromethane, ug/kg dw	<6.6	---	---
Trichloropropane, ug/kg dw	<6.6	---	---
Vinyl Chloride, ug/kg dw	<6.6	---	---
Xylenes, ug/kg dw	<6.6	---	---

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	SAMPLED BY
11612-2	Lab Blank	Client
11612-3	Accuracy (% Recovery)	
11612-4	Precision (% RPD)	

PARAMETER	11612-2	11612-3	11612-4
Organophosphorus Pesticides			
Azinphos methyl, ug/kg dw	<200	---	---
Bolstar (Sulprofos), ug/kg dw	<10	---	---
Chlorpyrifos, ug/kg dw	<2.0	108 %	3.7 %
Coumaphos, ug/kg dw	<100	---	---
Demeton-O, ug/kg dw	<20	---	---
Demeton-S, ug/kg dw	<20	---	---
Diazinon, ug/kg dw	<10	96 %	9.4 %
Dichlorvos, ug/kg dw	<20	---	---
Disulfoton, ug/kg dw	<10	116 %	3.4 %
Ethoprop, ug/kg dw	<2.0	---	---
Fensulfothion, ug/kg dw	<100	---	---
Fenthion, ug/kg dw	<2.0	---	---
Merphos, ug/kg dw	<10	---	---
Mevinphos, ug/kg dw	<2.0	---	---
Naled, ug/kg dw	<20	---	---
Methyl Parathion, ug/kg dw	<10	---	---
Phorate, ug/kg dw	<2.0	---	---
Ronnel, ug/kg dw	<2.0	---	---
Stirophos (Tetrachlorvinphos), ug/kg dw	<10	---	---
Tokuthion (Prothiofos), ug/kg dw	<10	---	---
Trichloronate, ug/kg dw	<100	---	---

169

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2846 Industrial Plaza Drive • Tallahassee, FL 32301 • (904) 878-3994 • Fax (904) 878-9504

LOG NO: T0-11143

Received: 13 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11143-13	Field Blank	Client
11143-14	Equipment Blank	

PARAMETER	11143-13	11143-14
Volatile Organics		
Benzyl chloride, ug/l	<1.0	<1.0
Bromobenzene, ug/l	<1.0	<1.0
Bromodichloromethane, ug/l	<1.0	<1.0
Benzene, ug/l	<1.0	<1.0
Bromoform, ug/l	<1.0	<1.0
Bromomethane, ug/l	<1.0	<1.0
Carbon Tetrachloride, ug/l	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<1.0
Chloroethane, ug/l	<1.0	<1.0
Chloroform, ug/l	<1.0	<1.0
1-Chlorohexane, ug/l	<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l	<1.0	<1.0
Chloromethane, ug/l	<1.0	<1.0
Chlorotoluene, ug/l	<1.0	<1.0
Dibromochloromethane, ug/l	<1.0	<1.0
Dibromomethane, ug/l	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0
1,4-Dichlorobenzene, ug/l	<1.0	<1.0
Dichlorodifluoromethane, ug/l	<1.0	<1.0
1,1-Dichloroethane, ug/l	<1.0	<1.0
1,2-Dichloroethane, ug/l	<1.0	<1.0

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LOG NO: T0-11143

Received: 13 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11143-13	Field Blank	Client
11143-14	Equipment Blank	

PARAMETER	11143-13	11143-14
1,1-Dichloroethene, ug/l	<1.0	<1.0
1,2-Dichloropropane, ug/l	<1.0	<1.0
1,3-Dichloropropylene, ug/l	<1.0	<1.0
Ethylbenzene, ug/l	<1.0	<1.0
Methylene Chloride, ug/l	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0
1,1,1,2-Tetrachloroethane, ug/l	<1.0	<1.0
Tetrachloroethylene, ug/l	<1.0	<1.0
Toluene, ug/l	<1.0	<1.0
1,1,1-Trichloroethane, ug/l	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0
Trichloroethene, ug/l	<1.0	<1.0
Trichlorofluoromethane, ug/l	<1.0	<1.0
Trichloropropane, ug/l	<1.0	<1.0
Vinyl Chloride, ug/l	<1.0	<1.0
Xylenes, ug/l	<1.0	<1.0

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Received: 13 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11143-13	Field Blank	Client
11143-14	Equipment Blank	

PARAMETER	11143-13	11143-14
Semivolatile Organics (8270)		
1,3-Dichlorobenzene, ug/l	<10	<10
1,4-Dichlorobenzene, ug/l	<10	<10
Hexachloroethane, ug/l	<10	<10
bis(2-Chloroethyl) ether, ug/l	<10	<10
1,2-Dichlorobenzene, ug/l	<10	<10
Bis(2-chloroisopropyl)ether, ug/l	<10	<10
N-Nitrosodi-N-Propylamine, ug/l	<10	<10
Nitrobenzene, ug/l	<10	<10
Hexachlorobutadiene, ug/l	<10	<10
1,2,4-Trichlorobenzene, ug/l	<10	<10
Isophorone, ug/l	<10	<10
Naphthalene, ug/l	<10	<10
bis(2-Chloroethoxy) methane, ug/l	<10	<10
Hexachlorocyclopentadiene, ug/l	<10	<10
2-Chloronaphthalene, ug/l	<10	<10
Acenaphthylene, ug/l	<10	<10
Acenaphthene, ug/l	<10	<10
Dimethylphthalate, ug/l	<10	<10
2,6-Dinitrotoluene, ug/l	<10	<10
Fluorene, ug/l	<10	<10
4-Chlorophenyl-phenyl ether, ug/l	<10	<10
2,4-Dinitrotoluene, ug/l	<10	<10

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11143-13	Field Blank	Client
11143-14	Equipment Blank	

PARAMETER	11143-13	11143-14
Diethyl Phthalate, ug/l	<10	<10
N-Nitrosodiphenylamine, ug/l	<10	<10
Hexachlorobenzene, ug/l	<10	<10
gamma-BHC, ug/l	<10	<10
4-Bromophenyl-phenyl-ether, ug/l	<10	<10
delta-BHC, ug/l	<10	<10
Phenanthrene, ug/l	<10	<10
Anthracene, ug/l	<10	<10
beta-BHC, ug/l	<10	<10
Heptachlor, ug/l	<10	<10
alpha-BHC, ug/l	<10	<10
Aldrin, ug/l	<10	<10
Dibutyl phthalate, ug/l	<10	<10
Heptachlor epoxide, ug/l	<10	<10
Endosulfan I, ug/l	<10	<10
Fluoranthene, ug/l	<10	<10
Dieldrin, ug/l	<10	<10
4,4'-DDE, ug/l	<10	<10
Pyrene, ug/l	<10	<10
Endrin, ug/l	<10	<10
Endosulfan II, ug/l	<10	<10
4,4'-DDD, ug/l	<10	<10
Benzidine, ug/l	<80	<80

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11143-13	Field Blank	Client
11143-14	Equipment Blank	

PARAMETER	11143-13	11143-14
4,4'-DDT, ug/l	<10	<10
Endosulfan sulfate, ug/l	<10	<10
Endrin Aldehyde, ug/l	<10	<10
Butylbenzylphthalate, ug/l	<10	<10
bis(2-Ethylhexyl) phthalate, ug/l	99	<10
Chrysene, ug/l	<10	<10
Benzo(a)Anthracene, ug/l	<10	<10
3,3'-Dichlorobenzidine, ug/l	<20	<20
Di-n-octylphthalate, ug/l	<10	<10
Benzo(b)fluoranthene, ug/l	<10	<10
Benzo (k) Fluoranthene, ug/l	<10	<10
Benzo(a)pyrene, ug/l	<10	<10
Indeno (1,2,3-cd)pyrene, ug/l	<10	<10
Dibenz (a,h)anthracene, ug/l	<10	<10
Benzo(g,h,i)perylene, ug/l	<10	<10
N-Nitrosodimethylamine, ug/l	<10	<10
Chlordane, ug/l	<20	<20
Toxaphene, ug/l	<200	<200
Aroclor-1016, ug/l	<100	<100
Aroclor-1221, ug/l	<100	<100
Aroclor-1232, ug/l	<100	<100
Aroclor-1242, ug/l	<100	<100
Aroclor-1248, ug/l	<100	<100

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LOG NO: T0-11143

Received: 13 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11143-13	Field Blank	Client
11143-14	Equipment Blank	

PARAMETER	11143-13	11143-14
Aroclor-1254, ug/l	<100	<100
Aroclor-1260, ug/l	<100	<100
2-Chlorophenol, ug/l	<10	<10
2-Nitrophenol, ug/l	<10	<10
Phenol, ug/l	<10	<10
2,4-Dimethylphenol, ug/l	<10	<10
2,4-Dichlorophenol, ug/l	<10	<10
2,4,6-Trichlorophenol, ug/l	<10	<10
4-Chloro-3-methylphenol, ug/l	<10	<10
2,4-Dinitrophenol, ug/l	<50	<50
2-Methyl-4,6-dinitrophenol, ug/l	<50	<50
Pentachlorophenol, ug/l	<50	<50
4-Nitrophenol, ug/l	<50	<50
Benzyl alcohol, ug/l	51	<10
2-Methylphenol (o-cresol), ug/l	<10	<10
4-Methylphenol (p-cresol), ug/l	<10	<10
Benzoic acid, ug/l	<50	<50
4-Chloroaniline, ug/l	<10	<10
2-Methylnaphthalene, ug/l	<10	<10
2,4,5-Trichlorophenol, ug/l	<10	<10
2-Nitroaniline, ug/l	<50	<50
3-Nitroaniline, ug/l	<50	<50
Dibenzofuran, ug/l	<10	<10
4-Nitroaniline, ug/l	<50	<50

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11143-13	Field Blank	Client
11143-14	Equipment Blank	

PARAMETER	11143-13	11143-14
Organophosphorus Pesticides		
Azinphos methyl, ug/l	<1.0	<1.0
Bolstar (Sulprofos), ug/l	<0.050	<0.050
Chlorpyrifos, ug/l	<0.010	<0.010
Coumaphos, ug/l	<0.050	<0.50
Demeton-O, ug/l	<0.10	<0.10
Demeton-S, ug/l	<0.10	<0.10
Diazinon, ug/l	<0.050	<0.050
Dichlorvos, ug/l	<0.10	<0.10
Disulfoton, ug/l	<0.050	<0.050
Ethoprop, ug/l	<0.010	<0.010
Fensulfothion, ug/l	<0.50	<0.50
Fenthion, ug/l	<0.010	<0.010
Merphos, ug/l	<0.050	<0.050
Mevinphos, ug/l	<0.010	<0.010
Naled, ug/l	<0.10	<0.10
Methyl Parathion, ug/l	<0.050	<0.050
Phorate, ug/l	<0.010	<0.010
Ronnel, ug/l	<0.010	<0.010
Stirophos (Tetrachlorvinphos), ug/l	<0.050	<0.050
Tokuthion (Prothiofos), ug/l	<0.050	<0.050
Trichloronate, ug/l	<0.50	<0.50
Additional Compounds:		
Ethion, ug/l	<0.050	<0.050

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11143-13	Field Blank	Client
11143-14	Equipment Blank	

PARAMETER	11143-13	11143-14
Chlorinated Herbicides (8150)		
2,4-D, ug/l	<0.50	<0.50
2,4-DB, ug/l	<0.50	<0.50
2,4,5-T, ug/l	<0.30	<0.30
2,4,5-TP Silvex, ug/l	<0.10	<0.10
Dalapon, ug/l	<10	<10
Dicamba, ug/l	<5.0	<5.0
Dichlorprop, ug/l	<0.50	<0.50
Dinoseb, ug/l	<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	<10
Arsenic, mg/l	<0.010	<0.010
Chromium, mg/l	<0.010	<0.010
Zinc, mg/l	<0.020	<0.020

Method: EPA 40 CFR Part 136
Method: EPA SW-846
HRS Certification #'s:81291,87279,E81005,E87052

Thomas L. Stephens

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2846 Industrial Plaza Drive • Tallahassee, FL 32301 • (904) 878-3994 • Fax (904) 878-9504

LOG NO: T0-11097

Received: 10 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11097-18	Equipment Blank	Client
11097-19	Field Blank	

PARAMETER	11097-18	11097-19
Volatile Organics		
Benzyl chloride, ug/l	<1.0	<1.0
bis(2-Chloroethoxy) methane, ug/l	<1.0	<1.0
Bis(2-chloroisopropyl)ether, ug/l	<1.0	<1.0
Bromobenzene, ug/l	<1.0	<1.0
Bromodichloromethane, ug/l	<1.0	<1.0
Benzene, ug/l	<1.0	<1.0
Bromoform, ug/l	<1.0	<1.0
Bromomethane, ug/l	<1.0	<1.0
Carbon Tetrachloride, ug/l	<1.0	<1.0
Chloroacetaldehyde, ug/l	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<1.0
Chloroethane, ug/l	<1.0	<1.0
Chloroform, ug/l	<1.0	3.0
1-Chlorohexane, ug/l	<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l	<1.0	<1.0
Chloromethane, ug/l	<1.0	<1.0
Chloromethyl methyl ether, ug/l	<1.0	<1.0
Chlorotoluene, ug/l	<1.0	<1.0
Dibromochloromethane, ug/l	<1.0	<1.0
Dibromomethane, ug/l	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11097-18	Equipment Blank	Client
11097-19	Field Blank	

PARAMETER	11097-18	11097-19
1,4-Dichlorobenzene, ug/l	<1.0	<1.0
Dichlorodifluoromethane, ug/l	<1.0	<1.0
1,1-Dichloroethane, ug/l	<1.0	<1.0
1,2-Dichloroethane, ug/l	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<1.0
1,2-Dichloropropane, ug/l	<1.0	<1.0
1,3-Dichloropropylene, ug/l	<1.0	<1.0
Ethylbenzene, ug/l	<1.0	<1.0
Methylene Chloride, ug/l	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0
1,1,1,2-Tetrachloroethane, ug/l	<1.0	<1.0
Tetrachloroethylene, ug/l	<1.0	<1.0
Toluene, ug/l	<1.0	<1.0
1,1,1-Trichloroethane, ug/l	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0
Trichloroethene, ug/l	<1.0	<1.0
Trichlorofluoromethane, ug/l	<1.0	<1.0
Trichloropropane, ug/l	<1.0	<1.0
Vinyl Chloride, ug/l	<1.0	<1.0
Xylenes, ug/l	<1.0	<1.0

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11097-18	Equipment Blank	Client
11097-19	Field Blank	

PARAMETER	11097-18	11097-19
Semivolatile Organics (8270)		
1,3-Dichlorobenzene, ug/l	<10	<10
1,4-Dichlorobenzene, ug/l	<10	<10
Hexachloroethane, ug/l	<10	<10
bis(2-Chloroethyl) ether, ug/l	<10	<10
1,2-Dichlorobenzene, ug/l	<10	<10
Bis(2-chloroisopropyl)ether, ug/l	<10	<10
N-Nitrosodi-N-Propylamine, ug/l	<10	<10
Nitrobenzene, ug/l	<10	<10
Hexachlorobutadiene, ug/l	<10	<10
1,2,4-Trichlorobenzene, ug/l	<10	<10
Isophorone, ug/l	<10	<10
Naphthalene, ug/l	<10	<10
bis(2-Chloroethoxy) methane, ug/l	<10	<10
Hexachlorocyclopentadiene, ug/l	<10	<10
2-Chloronaphthalene, ug/l	<10	<10
Acenaphthylene, ug/l	<10	<10
Acenaphthene, ug/l	<10	<10
Dimethylphthalate, ug/l	<10	<10
2,6-Dinitrotoluene, ug/l	<10	<10
Fluorene, ug/l	<10	<10
4-Chlorophenyl-phenyl ether, ug/l	<10	<10
2,4-Dinitrotoluene, ug/l	<10	<10

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11097-18	Equipment Blank	Client
11097-19	Field Blank	

PARAMETER	11097-18	11097-19
Diethyl Phthalate, ug/l	<10	<10
N-Nitrosodiphenylamine, ug/l	<10	<10
Hexachlorobenzene, ug/l	<10	<10
gamma-BHC, ug/l	<10	<10
4-Bromophenyl-phenyl-ether, ug/l	<10	<10
delta-BHC, ug/l	<10	<10
Phenanthrene, ug/l	<10	<10
Anthracene, ug/l	<10	<10
beta-BHC, ug/l	<10	<10
Heptachlor, ug/l	<10	<10
alpha-BHC, ug/l	<10	<10
Aldrin, ug/l	<10	<10
Dibutyl phthalate, ug/l	<10	<10
Heptachlor epoxide, ug/l	<10	<10
Endosulfan I, ug/l	<10	<10
Fluoranthene, ug/l	<10	<10
Dieldrin, ug/l	<10	<10
4,4'-DDE, ug/l	<10	<10
Pyrene, ug/l	<10	<10
Endrin, ug/l	<10	<10
Endosulfan II, ug/l	<10	<10
4,4'-DDD, ug/l	<10	<10
Benzidine, ug/l	<80	<80

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REPORT OF RESULTS

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11097-18	Equipment Blank	Client
11097-19	Field Blank	

PARAMETER	11097-18	11097-19
4,4'-DDT, ug/l	<10	<10
Endosulfan sulfate, ug/l	<10	<10
Endrin Aldehyde, ug/l	<10	<10
Butylbenzylphthalate, ug/l	<10	<10
bis(2-Ethylhexyl) phthalate, ug/l	<10	<10
Chrysene, ug/l	<10	<10
Benzo(a)Anthracene, ug/l	<10	<10
3,3'-Dichlorobenzidine, ug/l	<20	<20
Di-n-octylphthalate, ug/l	<10	<10
Benzo(b)fluoranthene, ug/l	<10	<10
Benzo (k) Fluoranthene, ug/l	<10	<10
Benzo(a)pyrene, ug/l	<10	<10
Indeno (1,2,3-cd)pyrene, ug/l	<10	<10
Dibenz (a,h)anthracene, ug/l	<10	<10
Benzo(g,h,i)perylene, ug/l	<10	<10
N-Nitrosodimethylamine, ug/l	<10	<10
Chlordane, ug/l	<20	<20
Toxaphene, ug/l	<200	<200
Aroclor-1016, ug/l	<100	<100
Aroclor-1221, ug/l	<100	<100
Aroclor-1232, ug/l	<100	<100
Aroclor-1242, ug/l	<100	<100
Aroclor-1248, ug/l	<100	<100

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11097-18	Equipment Blank	Client
11097-19	Field Blank	

PARAMETER	11097-18	11097-19
Aroclor-1254, ug/l	<100	<100
Aroclor-1260, ug/l	<100	<100
2-Chlorophenol, ug/l	<10	<10
2-Nitrophenol, ug/l	<10	<10
Phenol, ug/l	<10	<10
2,4-Dimethylphenol, ug/l	<10	<10
2,4-Dichlorophenol, ug/l	<10	<10
2,4,6-Trichlorophenol, ug/l	<10	<10
4-Chloro-3-methylphenol, ug/l	<10	<10
2,4-Dinitrophenol, ug/l	<50	<50
2-Methyl-4,6-dinitrophenol, ug/l	<50	<50
Pentachlorophenol, ug/l	<50	<50
4-Nitrophenol, ug/l	<50	<50
Benzyl alcohol, ug/l	<10	<10
2-Methylphenol (o-cresol), ug/l	<10	<10
4-Methylphenol (p-cresol), ug/l	<10	<10
Benzoic acid, ug/l	<50	<50
4-Chloroaniline, ug/l	<10	<10
2-Methylnaphthalene, ug/l	<10	<10
2,4,5-Trichlorophenol, ug/l	<10	<10
2-Nitroaniline, ug/l	<50	<50
3-Nitroaniline, ug/l	<50	<50
Dibenzofuran, ug/l	<10	<10
4-Nitroaniline, ug/l	<50	<50

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11097-18	Equipment Blank	Client
11097-19	Field Blank	

PARAMETER	11097-18	11097-19
Organophosphorus Pesticides		
Azinphos methyl, ug/l	<1.0	<1.0
Bolstar (Sulprofos), ug/l	<0.050	<0.050
Chlorpyrifos, ug/l	<0.010	<0.010
Coumaphos, ug/l	<0.50	<0.50
Demeton-O, ug/l	<0.10	<0.10
Demeton-S, ug/l	<0.10	<0.10
Diazinon, ug/l	<0.050	<0.050
Dichlorvos, ug/l	<0.10	<0.10
Disulfoton, ug/l	<0.050	<0.050
Ethoprop, ug/l	<0.010	<0.010
Fensulfothion, ug/l	<0.50	<0.50
Fenthion, ug/l	<0.010	<0.010
Merphos, ug/l	<0.050	<0.050
Mevinphos, ug/l	<0.010	<0.010
Naled, ug/l	<0.10	<0.10
Methyl Parathion, ug/l	<0.050	<0.050
Phorate, ug/l	<0.010	<0.010
Ronnel, ug/l	<0.010	<0.010
Stirophos (Tetrachlorvinphos), ug/l	<0.050	<0.050
Tokuthion (Prothiofos), ug/l	<0.050	<0.050
Trichloronate, ug/l	<0.50	<0.50

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11097-18	Equipment Blank	Client
11097-19	Field Blank	

PARAMETER	11097-18	11097-19
Chlorinated Herbicides (8150)		
2,4-D, ug/l	<0.50	<0.50
2,4-DB, ug/l	<0.50	<0.50
2,4,5-T, ug/l	<0.30	<0.30
2,4,5-TP Silvex, ug/l	<0.10	<0.10
Dalapon, ug/l	<10	<10
Dicamba, ug/l	<5.0	<5.0
Dichlorprop, ug/l	<0.50	<0.50
Dinoseb, ug/l	<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	<10
Arsenic, mg/l	<0.010	<0.010
Chromium, mg/l	<0.010	<0.010
Zinc, mg/l	<0.020	<0.020

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11097-20	Trip Blank	Client

PARAMETER	11097-20
Volatile Organics	
Benzyl chloride, ug/l	<1.0
bis(2-Chloroethoxy) methane, ug/l	<1.0
Bis(2-chloroisopropyl)ether, ug/l	<1.0
Bromobenzene, ug/l	<1.0
Bromodichloromethane, ug/l	<1.0
Benzene, ug/l	<1.0
Bromoform, ug/l	<1.0
Bromomethane, ug/l	<1.0
Carbon Tetrachloride, ug/l	<1.0
Chloroacetaldehyde, ug/l	<1.0
Chlorobenzene, ug/l	<1.0
Chloroethane, ug/l	<1.0
Chloroform, ug/l	<1.0
1-Chlorohexane, ug/l	<1.0
2-Chloroethylvinyl Ether, ug/l	<1.0
Chloromethane, ug/l	<1.0
Chloromethyl methyl ether, ug/l	<1.0
Chlorotoluene, ug/l	<1.0
Dibromochloromethane, ug/l	<1.0
Dibromomethane, ug/l	<1.0
1,2-Dichlorobenzene, ug/l	<1.0
1,3-Dichlorobenzene, ug/l	<1.0
1,4-Dichlorobenzene, ug/l	<1.0

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11097-20	Trip Blank	Client

PARAMETER	11097-20
Dichlorodifluoromethane, ug/l	<1.0
1,1-Dichloroethane, ug/l	<1.0
1,2-Dichloroethane, ug/l	<1.0
1,1-Dichloroethene, ug/l	<1.0
1,2-Dichloropropane, ug/l	<1.0
1,3-Dichloropropylene, ug/l	<1.0
Ethylbenzene, ug/l	<1.0
Methylene Chloride, ug/l	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0
1,1,1,2-Tetrachloroethane, ug/l	<1.0
Tetrachloroethylene, ug/l	<1.0
Toluene, ug/l	<1.0
1,1,1-Trichloroethane, ug/l	<1.0
1,1,2-Trichloroethane, ug/l	<1.0
Trichloroethene, ug/l	<1.0
Trichlorofluoromethane, ug/l	<1.0
Trichloropropane, ug/l	<1.0
Vinyl Chloride, ug/l	<1.0
Xylenes, ug/l	<1.0

Method: EPA 40 CFR Part 136
Method: EPA SW-846
HRS Certification #'s:81291,87279,E81005,E87052

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LOG NO: T0-11143

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11143-1	T-01	Client
11143-2	T-04	

PARAMETER	11143-1	11143-2
Aromatic Volatiles (8020)		
Benzene, ug/kg dw	<5.0	<5.0
Chlorobenzene, ug/kg dw	<5.0	<5.0
1,2-Dichlorobenzene, ug/kg dw	<5.0	<5.0
1,3-Dichlorobenzene, ug/kg dw	<5.0	<5.0
1,4-Dichlorobenzene, ug/kg dw	<5.0	<5.0
Ethylbenzene, ug/kg dw	<5.0	<5.0
Toluene, ug/kg dw	<5.0	<5.0
Xylenes, ug/kg dw	<5.0	<5.0
Petroleum Hydrocarbons (418.1), mg/kg dw	<10	<10

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LOG NO: T0-11612

Received: 20 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	SAMPLED BY
11612-2	Lab Blank	Client
11612-3	Accuracy (% Recovery)	
11612-4	Precision (% RPD)	

PARAMETER	11612-2	11612-3	11612-4
Chlorinated Herbicides (8150)			
2,4-D, ug/kg dw	<100	102 %	17 %
2,4-DB, ug/kg dw	<100	---	---
2,4,5-T, ug/kg dw	<60	---	---
2,4,5-TP Silvex, ug/kg dw	<20	109 %	17 %
Dalapon, ug/kg dw	<2000	---	---
Dicamba, ug/kg dw	<1000	122 %	36 %
Dichlorprop, ug/kg dw	<100	126 %	0.79 %
Dinoseb, ug/kg dw	<100	---	---
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<2000	---	---
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<2000	---	---
Arsenic, mg/kg dw	<1.0	114 %	
Chromium, mg/kg dw	<1.0	95 %	0 %
Zinc, mg/kg dw	2.0	91 %	1.1 %

Method: EPA 40 CFR Part 136
Method: EPA SW-846
HRS Certification #'s:81291,87279,E81005,E87052

Thomas L. Stephens

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LOG NO: T0-11075

Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-16	Field Blank	Client
11075-17	Equipment Blank	

PARAMETER	11075-16	11075-17
Volatile Organics		
Benzyl chloride, ug/l	<1.0	<1.0
bis(2-Chloroethoxy) methane, ug/l	<1.0	<1.0
Bis(2-chloroisopropyl)ether, ug/l	<1.0	<1.0
Bromobenzene, ug/l	<1.0	<1.0
Bromodichloromethane, ug/l	<1.0	<1.0
Benzene, ug/l	<1.0	<1.0
Bromoform, ug/l	<1.0	<1.0
Bromomethane, ug/l	<1.0	<1.0
Carbon Tetrachloride, ug/l	<1.0	<1.0
Chloroacetaldehyde, ug/l	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<1.0
Chloroethane, ug/l	<1.0	<1.0
Chloroform, ug/l	<1.0	<1.0
1-Chlorohexane, ug/l	<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l	<1.0	<1.0
Chloromethane, ug/l	<1.0	<1.0
Chloromethyl methyl ether, ug/l	<1.0	<1.0
Chlorotoluene, ug/l	<1.0	<1.0
Dibromochloromethane, ug/l	<1.0	<1.0
Dibromomethane, ug/l	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0

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Received: 08 OCT 90

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Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-16	Field Blank	Client
11075-17	Equipment Blank	

PARAMETER	11075-16	11075-17
1,4-Dichlorobenzene, ug/l	<1.0	<1.0
Dichlorodifluoromethane, ug/l	<1.0	<1.0
1,1-Dichloroethane, ug/l	<1.0	<1.0
1,2-Dichloroethane, ug/l	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<1.0
1,2-Dichloropropane, ug/l	<1.0	<1.0
1,3-Dichloropropylene, ug/l	<1.0	<1.0
Ethylbenzene, ug/l	<1.0	<1.0
Methylene Chloride, ug/l	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0
1,1,1,2-Tetrachloroethane, ug/l	<1.0	<1.0
Tetrachloroethylene, ug/l	<1.0	<1.0
Toluene, ug/l	<1.0	<1.0
1,1,1-Trichloroethane, ug/l	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0
Trichloroethene, ug/l	<1.0	<1.0
Trichlorofluoromethane, ug/l	<1.0	<1.0
Trichloropropane, ug/l	<1.0	<1.0
Vinyl Chloride, ug/l	<1.0	<1.0
Xylenes, ug/l	<1.0	<1.0

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Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-16	Field Blank	Client
11075-17	Equipment Blank	

PARAMETER	11075-16	11075-17
Semivolatile Organics (8270)		
1,3-Dichlorobenzene, ug/l	<10	<10
1,4-Dichlorobenzene, ug/l	<10	<10
Hexachloroethane, ug/l	<10	<10
bis(2-Chloroethyl) ether, ug/l	<10	<10
1,2-Dichlorobenzene, ug/l	<10	<10
Bis(2-chloroisopropyl)ether, ug/l	<10	<10
N-Nitrosodi-N-Propylamine, ug/l	<10	<10
Nitrobenzene, ug/l	<10	<10
Hexachlorobutadiene, ug/l	<10	<10
1,2,4-Trichlorobenzene, ug/l	<10	<10
Isophorone, ug/l	<10	<10
Naphthalene, ug/l	<10	<10
bis(2-Chloroethoxy) methane, ug/l	<10	<10
Hexachlorocyclopentadiene, ug/l	<10	<10
2-Chloronaphthalene, ug/l	<10	<10
Acenaphthylene, ug/l	<10	<10
Acenaphthene, ug/l	<10	<10
Dimethylphthalate, ug/l	<10	<10
2,6-Dinitrotoluene, ug/l	<10	<10
Fluorene, ug/l	<10	<10
4-Chlorophenyl-phenyl ether, ug/l	<10	<10
2,4-Dinitrotoluene, ug/l	<10	<10

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Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-16	Field Blank	Client
11075-17	Equipment Blank	

PARAMETER	11075-16	11075-17
Diethyl Phthalate, ug/l	<10	<10
N-Nitrosodiphenylamine, ug/l	<10	<10
Hexachlorobenzene, ug/l	<10	<10
gamma-BHC, ug/l	<10	<10
4-Bromophenyl-phenyl-ether, ug/l	<10	<10
delta-BHC, ug/l	<10	<10
Phenanthrene, ug/l	<10	<10
Anthracene, ug/l	<10	<10
beta-BHC, ug/l	<10	<10
Heptachlor, ug/l	<10	<10
alpha-BHC, ug/l	<10	<10
Aldrin, ug/l	<10	<10
Dibutyl phthalate, ug/l	<10	<10
Heptachlor epoxide, ug/l	<10	<10
Endosulfan I, ug/l	<10	<10
Fluoranthene, ug/l	<10	<10
Dieldrin, ug/l	<10	<10
4,4'-DDE, ug/l	<10	<10
Pyrene, ug/l	<10	<10
Endrin, ug/l	<10	<10
Endosulfan II, ug/l	<10	<10
4,4'-DDD, ug/l	<10	<10
Benzidine, ug/l	<80	<80

Laboratory locations in Savannah, GA • Mobile, AL • Tallahassee, FL • Deerfield Beach, FL

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Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-16	Field Blank	Client
11075-17	Equipment Blank	

PARAMETER	11075-16	11075-17
4,4'-DDT, ug/l	<10	<10
Endosulfan sulfate, ug/l	<10	<10
Endrin Aldehyde, ug/l	<10	<10
Butylbenzylphthalate, ug/l	<10	<10
bis(2-Ethylhexyl) phthalate, ug/l	<10	<10
Chrysene, ug/l	<10	<10
Benzo(a)Anthracene, ug/l	<10	<10
3,3'-Dichlorobenzidine, ug/l	<20	<20
Di-n-octylphthalate, ug/l	<10	<10
Benzo(b)fluoranthene, ug/l	<10	<10
Benzo (k) Fluoranthene, ug/l	<10	<10
Benzo(a)pyrene, ug/l	<10	<10
Indeno (1,2,3-cd)pyrene, ug/l	<10	<10
Dibenz (a,h)anthracene, ug/l	<10	<10
Benzo(g,h,i)perylene, ug/l	<10	<10
N-Nitrosodimethylamine, ug/l	<10	<10
Chlordane, ug/l	<20	<20
Toxaphene, ug/l	<200	<200
Aroclor-1016, ug/l	<100	<100
Aroclor-1221, ug/l	<100	<100
Aroclor-1232, ug/l	<100	<100
Aroclor-1242, ug/l	<100	<100
Aroclor-1248, ug/l	<100	<100

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Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-16	Field Blank	Client
11075-17	Equipment Blank	

PARAMETER	11075-16	11075-17
Aroclor-1254, ug/l	<100	<100
Aroclor-1260, ug/l	<100	<100
2-Chlorophenol, ug/l	<10	<10
2-Nitrophenol, ug/l	<10	<10
Phenol, ug/l	<10	<10
2,4-Dimethylphenol, ug/l	<10	<10
2,4-Dichlorophenol, ug/l	<10	<10
2,4,6-Trichlorophenol, ug/l	<10	<10
4-Chloro-3-methylphenol, ug/l	<10	<10
2,4-Dinitrophenol, ug/l	<50	<50
2-Methyl-4,6-dinitrophenol, ug/l	<50	<50
Pentachlorophenol, ug/l	<50	<50
4-Nitrophenol, ug/l	<50	<50
Benzyl alcohol, ug/l	<10	<10
2-Methylphenol (o-cresol), ug/l	<10	<10
4-Methylphenol (p-cresol), ug/l	<10	<10
Benzoic acid, ug/l	<50	<50
4-Chloroaniline, ug/l	<10	<10
2-Methylnaphthalene, ug/l	<10	<10
2,4,5-Trichlorophenol, ug/l	<10	<10
2-Nitroaniline, ug/l	<50	<50
3-Nitroaniline, ug/l	<50	<50
Dibenzofuran, ug/l	<10	<10
4-Nitroaniline, ug/l	<50	<50

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Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-16	Field Blank	Client
11075-17	Equipment Blank	

PARAMETER	11075-16	11075-17
Organophosphorus Pesticides		
Azinphos methyl, ug/l	<1.0	<1.0
Bolstar (Sulprofos), ug/l	<0.050	<0.050
Chlorpyrifos, ug/l	<0.010	<0.010
Coumaphos, ug/l	<0.50	<0.50
Demeton-O, ug/l	<0.10	<0.10
Demeton-S, ug/l	<0.10	<0.10
Diazinon, ug/l	<0.050	<0.050
Dichlorvos, ug/l	<0.10	<0.10
Disulfoton, ug/l	<0.050	<0.050
Ethoprop, ug/l	<0.010	<0.010
Fensulfothion, ug/l	<0.50	<0.50
Fenthion, ug/l	<0.010	<0.010
Merphos, ug/l	<0.050	<0.050
Mevinphos, ug/l	<0.010	<0.010
Naled, ug/l	<0.10	<0.10
Methyl Parathion, ug/l	<0.050	<0.050
Phorate, ug/l	<0.010	<0.010
Ronnel, ug/l	<0.010	<0.010
Stirophos (Tetrachlorvinphos), ug/l	<0.050	<0.050
Tokuthion (Prothiofos), ug/l	<0.050	<0.050
Trichloronate, ug/l	<0.50	<0.50

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Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-16	Field Blank	Client
11075-17	Equipment Blank	

PARAMETER	11075-16	11075-17
Chlorinated Herbicides (8150)		
2,4-D, ug/l	<0.50	<0.50
2,4-DB, ug/l	<0.50	<0.50
2,4,5-T, ug/l	<0.30	<0.30
2,4,5-TP Silvex, ug/l	<0.10	<0.10
Dalapon, ug/l	<10	<10
Dicamba, ug/l	<5.0	<5.0
Dichlorprop, ug/l	<0.50	<0.50
Dinoseb, ug/l	<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	<10
Arsenic, mg/l	<0.010	<0.010
Chromium, mg/l	<0.010	<0.010
Zinc, mg/l	<0.020	<0.020

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LOG NO: T0-11075

Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-18	Trip Blank	Client

PARAMETER	11075-18
Volatile Organics	
Benzyl chloride, ug/l	<1.0
bis(2-Chloroethoxy) methane, ug/l	<1.0
Bis(2-chloroisopropyl)ether, ug/l	<1.0
Bromobenzene, ug/l	<1.0
Bromodichloromethane, ug/l	<1.0
Benzene, ug/l	<1.0
Bromoform, ug/l	<1.0
Bromomethane, ug/l	<1.0
Carbon Tetrachloride, ug/l	<1.0
Chloroacetaldehyde, ug/l	<1.0
Chlorobenzene, ug/l	<1.0
Chloroethane, ug/l	<1.0
Chloroform, ug/l	<1.0
1-Chlorohexane, ug/l	<1.0
2-Chloroethylvinyl Ether, ug/l	<1.0
Chloromethane, ug/l	<1.0
Chloromethyl methyl ether, ug/l	<1.0
Chlorotoluene, ug/l	<1.0
Dibromochloromethane, ug/l	<1.0
Dibromomethane, ug/l	<1.0
1,2-Dichlorobenzene, ug/l	<1.0
1,3-Dichlorobenzene, ug/l	<1.0
1,4-Dichlorobenzene, ug/l	<1.0

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LOG NO: T0-11075

Received: 08 OCT 90

Mr. Russ Bowen
Brown & Caldwell
201 E. Pine Street, Suite 1416
Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-18	Trip Blank	Client

PARAMETER	11075-18
Dichlorodifluoromethane, ug/l	<1.0
1,1-Dichloroethane, ug/l	<1.0
1,2-Dichloroethane, ug/l	<1.0
1,1-Dichloroethene, ug/l	<1.0
1,2-Dichloropropane, ug/l	<1.0
1,3-Dichloropropylene, ug/l	<1.0
Ethylbenzene, ug/l	<1.0
Methylene Chloride, ug/l	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0
1,1,1,2-Tetrachloroethane, ug/l	<1.0
Tetrachloroethylene, ug/l	<1.0
Toluene, ug/l	<1.0
1,1,1-Trichloroethane, ug/l	<1.0
1,1,2-Trichloroethane, ug/l	<1.0
Trichloroethene, ug/l	<1.0
Trichlorofluoromethane, ug/l	<1.0
Trichloropropane, ug/l	<1.0
Vinyl Chloride, ug/l	<1.0
Xylenes, ug/l	<1.0

Method: EPA 40 CFR Part 136
Method: EPA SW-846
HRS Certification #'s:81291,87279,E81005,E87052

Thomas L. Stephens

199

Reference 4

R-586-7-0-14

Accepted 7/27/90
D Rayfield, SAS, EPA

FINAL
SCREENING SITE INSPECTION REPORT
FOR
CHEVRON CHEMICALS, INC.
ORLANDO, ORANGE COUNTY, FLORIDA
EPA ID #FLD004064242

SISB/SAS
RECEIVED
JUL 23 1990
EPA - REGION IV
ATLANTA, GA.

Prepared Under
TDD No. F4-8808-22
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Revision 0

FOR THE

WASTE MANAGEMENT DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

July 2, 1990

NUS CORPORATION
SUPERFUND DIVISION

Prepared By	Reviewed By	Approved By
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TABLES

Number		Page No.
Table 1	Sample Codes, Descriptions, Locations, and Rationale	15
Table 2	Organic Analyses - Surface Soil/Subsurface Samples	18
Table 3	Inorganic Analyses - Surface Soil/Subsurface Samples	21
Table 4	Organic Analyses - Groundwater Samples	22
Table 5	Inorganic Analyses - Groundwater Samples	26

FIGURES

Number		Page No.
Figure 1	Site Location Map	3
Figure 2	Site Layout Map	4
Figure 3	Geologic Cross Section	8
Figure 4	FASP Sample Locations	12
Figure 5	CLP Sample Locations	14

EXECUTIVE SUMMARY

The Chevron Chemical Company facility is located at 3100 Orange Blossom Trail in Orlando, Orange County, Florida. The Chevron Chemical Company operated a blending facility for pesticides and crop sprays from 1950 until 1976. The Central Florida Mack Truck Company utilized the facility for truck service from 1976 to 1987. Two wash ponds were used by Chevron to retain residue generated from the washing of chemical barrels. Use of these ponds was discontinued and eventually excavated upon sale of the property to the truck company. In 1983, Dames & Moore conducted an environmental study at the facility. The results indicated that pesticides, as well as arsenic were present in groundwater samples. Another study performed in 1987 by Jammal & Associates concluded that the shallow aquifer was also contaminated with synthetic and volatile organic compounds.

The former Chevron facility lies in the Atlantic Coastal Plain Physiographic Province in central Florida. The Orlando area lies in the highland region which is an area of karst terrain, characterized by hummocky, undulating topography along with numerous lakes and depressions. The area is underlain mostly by marine limestone, dolomite, shale, sand, and anhydrite to about 6,500 feet below land surface (bls). The underlying limestones and dolomites are divided into four geologic formations: the Hawthorn Group, the Ocala Group, the Avon Park Limestone, and the Lake City Limestone.

The water resources of the Orlando area are directly related to topography. The area is underlain by three aquifers: a surficial aquifer, a shallow artesian aquifer system, and the Floridan aquifer. Groundwater flow is generally to the east. The unconfined, surficial aquifer extends over most of Orange County. The water table for this aquifer ranges from 5 to 10 feet bls. Most wells in this aquifer are 20 to 30 feet deep and yield sufficient water for domestic use (5-10 gpm). The shallow artesian or "shallow rock" aquifer system is found in the upper section of the Hawthorn Group. Aquifers in this system occur locally within the confining beds of the Hawthorn and are usually found at depths ranging from 60 to 150 feet bls. Recharge to the shallow artesian aquifer system is by downward leakage from the surficial aquifer and by upward leakage from the Floridan. The Floridan aquifer is located 150 feet bls and extends down to 2,000 feet bls. The base of potable water in the aquifer is located approximately 1,750 feet bls. The Floridan has two major producing zones that are separated by a relatively impermeable zone. The upper producing zone extends from 150 to approximately 600 feet bls. The lower zone extends from about 1,100 to 1,500 feet bls. There are less permeable layers of clayey sand and lenses of clay between the Floridan and land surface which form a confining layer with a hydraulic conductivity on the order of 1×10^{-5} to 1×10^{-7} cm/sec.

Orlando is an area of recharge for the Floridan aquifer. Recharge is by direct infiltration of rainfall in outcrop areas and by downward leakage from the overlying aquifers. Both sinkholes and drainage wells present in the Orlando area can provide direct routes between these aquifers by breaching the layers of low permeability.

Targets potentially affected include the population associated with both the groundwater and onsite exposure pathways. Contamination in groundwater from both public and private wells is a threat due to the close proximity of these wells to the facility. An estimated 111,377 homes in the Orange County area depend upon groundwater supplies for potable purposes. The presence of contaminated soil also presents a threat due to the dense population surrounding the facility.

The nature of contaminants found during this investigation is consistent with past operations conducted at this facility. Pesticides and petroleum products were present in both soil and groundwater samples. The presence of pesticides and petroleum products in samples collected from locations both on site and downgradient from the operation areas suggest that these contaminants may have begun to migrate off the site.

In summary, the extensive contamination present does pose a threat to area residents associated with the groundwater and onsite exposure pathways. In consideration of groundwater flow direction and sample locations, the laboratory data suggest that contaminants may be migrating offsite. Based on these findings, FIT 4 recommends that Phase I of a Listing Site Inspection be initiated.

1.0 INTRODUCTION

The NUS Corporation Region 4 Field Investigation Team (FIT) was tasked by the United States Environmental Protection Agency (EPA), Waste Management Division to conduct a Screening Site Inspection (SSI) at the Chevron Chemical/Ortho site in Orlando, Orange County, Florida. The inspection will be performed under the authority of the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). Tasks will be performed to satisfy the requirements stated in Phase II of Technical Directive Document (TDD) number F4-8802-22. The field investigation was conducted during the week of June 12, 1989.

1.1 OBJECTIVES

The objectives of this inspection will be to determine the nature of contaminants present at the site and to determine if a release of these substances has occurred or may occur. Further, this inspection will seek to determine the possible pathways by which contamination could migrate from the site and the populations and environments it would potentially affect. Through these objectives, a recommendation will be made regarding future activities at the site.

1.2 SCOPE OF WORK

The objectives were achieved through the completion of a number of specific tasks. These activities were to:

- Obtain and review background materials relevant to HRS scoring of the site
- Obtain information on local water systems
- Evaluate target populations associated with the groundwater, surface water, air and onsite exposure pathways
- Collect a total of 15 environmental samples

2.0 SITE CHARACTERIZATION

2.1 SITE BACKGROUND AND HISTORY

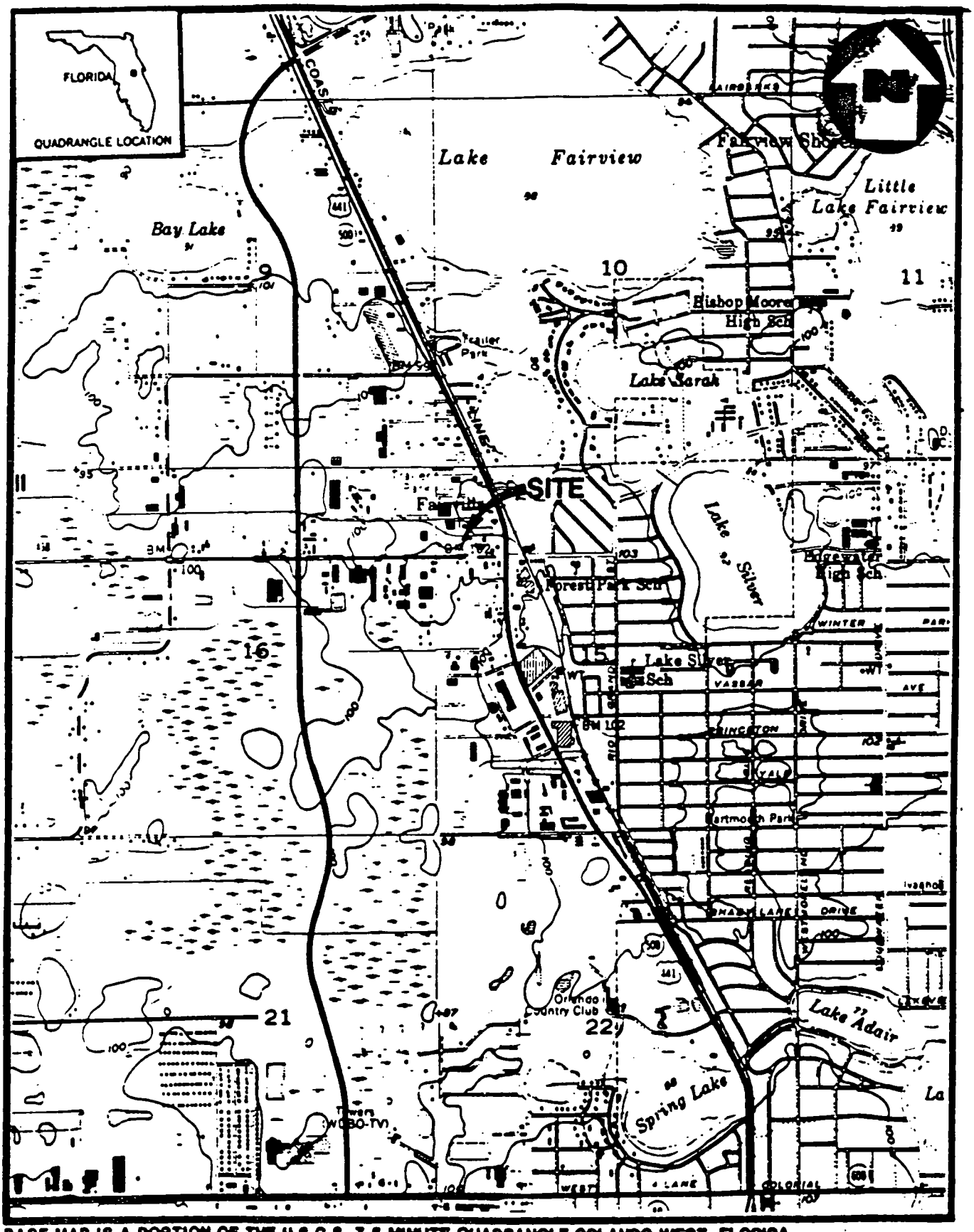
The Chevron Chemical plant formerly occupied the site at 3100 Orange Blossom Trail in Orlando, Orange County, Florida.. This plant operated as a chemical blending facility for pesticides and other crop sprays between the years of 1950 and 1976 (Figure 1). The site was operated by the Central Florida Mack Truck Company and utilized as a Mack truck service facility from 1976 until 1987 (Ref. 1). Chevron created two washing ponds to contain the water and residue generated from the washing of chemical barrels. Use of the washing ponds was terminated in 1976 when the facility was sold to Central Florida Mack Truck. The ponds were excavated to a depth of approximately 14 feet below land surface and filled with soil, empty chlordane drums, automobile wreckage, and cement. The truck company proceeded with operations involving waste oil and antifreeze until 1987.

In 1983 Chevron Chemical Company employed the consulting firm of Dames & Moore to conduct a contamination study at the site. The results indicated that pesticides, as well as arsenic were present in groundwater samples exceeding levels set by the state and the U.S. Environmental Protection Agency. In 1987 Central Florida Mack Truck Company employed another consulting firm (Jammal & Associates) to evaluate the contamination at the facility. The report concluded that the shallow aquifer is contaminated with synthetic and volatile organic compounds (Ref. 2). The facility, currently operated as Affordable Storage, rents warehouse space to the public (Ref. 3).

2.2 SITE DESCRIPTION

2.2.1 Site Features

The facility occupies a lot measuring approximately 700 feet by 370 feet and is void of topographic relief. Onsite buildings and structures are located around a large paved asphalt area in the center of the property. These structures include an office, a large metal warehouse, two water storage tanks, and an organic compound volatizer used for evaporation purposes. Two former pesticide washing ponds were filled with debris and have been covered with cement slabs. An abandoned railroad track lies adjacent to the metal warehouse (Figure 2). Access to the facility by the public is not restricted (Ref. 4).

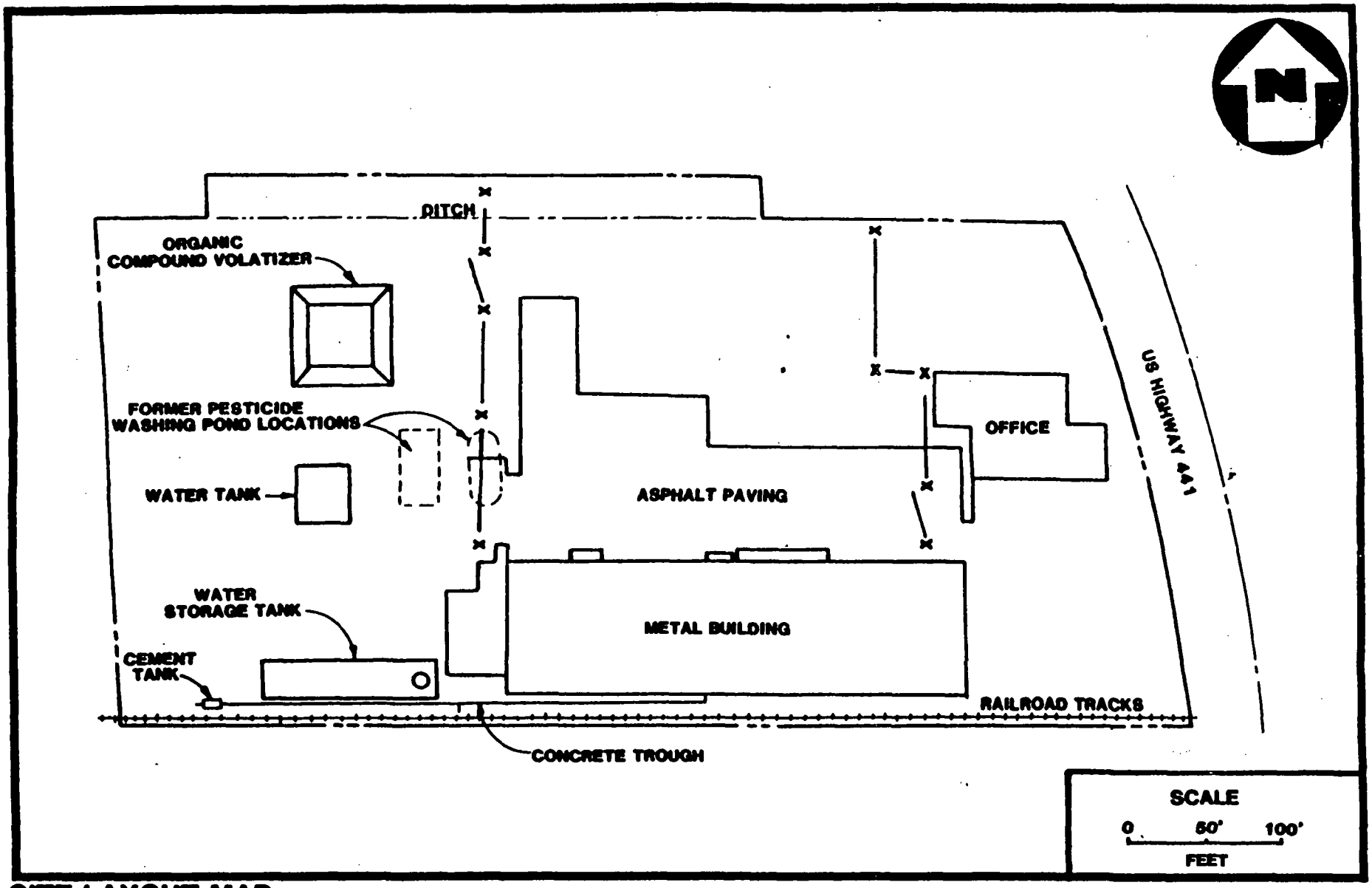


BASE MAP IS A PORTION OF THE U.S.G.S. 7.5 MINUTE QUADRANGLE ORLANDO WEST, FLORIDA.

SITE LOCATION MAP
CHEVRON CHEMICAL / ORTHO
ORLANDO, ORANGE COUNTY, FLORIDA

FIGURE 1

NUS CORPORATION



SITE LAYOUT MAP
CHEVRON CHEMICAL / ORTHO
ORLANDO, ORANGE COUNTY, FLORIDA

FIGURE 2

NUS CORPORATION

2.2.2 Waste Characteristics

Past operations by Chevron were restricted to blending pesticides and crop sprays of which the exact composition and concentrations are unknown. Wash residue from the chemical drums used during this process was placed in two unlined ponds approximately 20 feet by 60 feet in length and 3 feet in depth. The use of these ponds was terminated in 1976 (Ref. 2).

Central Florida Mack Truck Company was involved in truck maintenance and produced waste which included antifreeze and waste oil. The exact quantities and disposal methods are unknown; however, some of this waste was apparently dumped directly onto the grounds at the facility (Ref. 2).

3.0 REGIONAL POPULATIONS AND ENVIRONMENTS

3.1 POPULATION AND LAND USE

3.1.1 Demography

The population within a 1-mile radius of the facility predominantly resides in an urban area (approximate population: 3,582 people) located 0.25 mile to the southeast across U.S. Highway 441 (Ref. 5). The Silver Star Vocational School is 0.25 mile east of the site on Silver Star Boulevard (Ref. 6). An estimated 46,060 residents live within a 4-mile radius of the facility (Ref. 5).

3.1.2 Land Use

Land to the west is used primarily for industrial purposes, while the area east of U.S. Highway 441 is comprised of single-family housing units. Two trailer parks, one of which is adjacent to the site, are located to the north. Four schools and a recreational area (Dartmouth Park) reside within the 1-mile radius (Ref. 6). There is no known agricultural use of land or land-related sensitive environments within 4 miles of the facility (Refs. 6, 7).

3.2 SURFACE WATER

3.2.1 Climatology

The region experiences a subtropical climate with average temperatures ranging from 61° to 82° F during the months of January and August, respectively. Average annual net precipitation is 22 inches with the greatest rainfall occurring during the months of February through May, and the driest period occurring during the months of September and October (Ref. 8).

3.2.2 Overland Drainage

Surface water runoff from the site drains southwest across the abandoned railroad track to property occupied by North Bros. Insulation Company. Low-lying areas here commonly flood during periods of heavy rain. The insulation company has, in the past, complained of oily debris in surface water flowing from the Chevron facility (Ref. 4). The lack of topographic relief restricts the surface water

runoff from migrating past the immediate site vicinity and adjacent properties. This water would eventually percolate into the ground around the facility (Ref. 6).

3.2.3 Potentially Affected Water Bodies

Due to restricted overland drainage, the potential for contaminant migration to surrounding water bodies poses an unlikely threat (Ref. 6).

3.3 GROUNDWATER

3.3.1 Hydrogeology

The former Chevron/Ortho facility lies in the Atlantic Coastal Plain Physiographic Province in central Florida. The area of Orange County is subdivided into three topographic regions: 1) low-lying regions where altitudes are generally less than 35 feet, 2) intermediate regions with altitudes between 35 and 100 feet, and 3) highland regions with altitudes generally greater than 105 feet (Ref. 9, p. 7). The Orlando area lies in the highland region, which is an area of karst terrain, characterized by hummocky, undulating topography and numerous lakes and depressions but few surface streams (Refs. 9, p. 9; 10, p. 14).

The area is underlain mostly by marine limestone, dolomite, shale, sand, and anhydrite to about 6,500 feet below land surface (bls) (Ref. 9, p. 14). The youngest sediments in the area are Recent to Pliocene age undifferentiated deposits of sand with varying amounts of clay and shell and with an average thickness of 40 feet (Ref. 9, p. 82). The underlying limestones and dolomites are divided into four geologic formations: the Hawthorn Group, the Ocala Group, the Avon Park Limestone, and the Lake City Limestone (Figure 3).

The Miocene age Hawthorn Group extends from approximately 40 to 130 feet bls and is composed of thick, sandy clays and limestone layers (Ref. 9, p. 16). The fine, granular limestone of the Ocala Group unconformably underlies the Hawthorn and is approximately 125 feet thick (Ref. 9, p. 20). The underlying Avon Park and Lake City limestones consist of alternating layers of hard, crystalline dolomite and fossiliferous limestone. Only few wells penetrate into these Eocene-age formations, and the contact between them is indistinct, but the Avon Park Limestone is estimated between 400 and 600 feet thick, and the Lake City Limestone is considered to be over 700 feet thick (Ref. 9, p. 18).

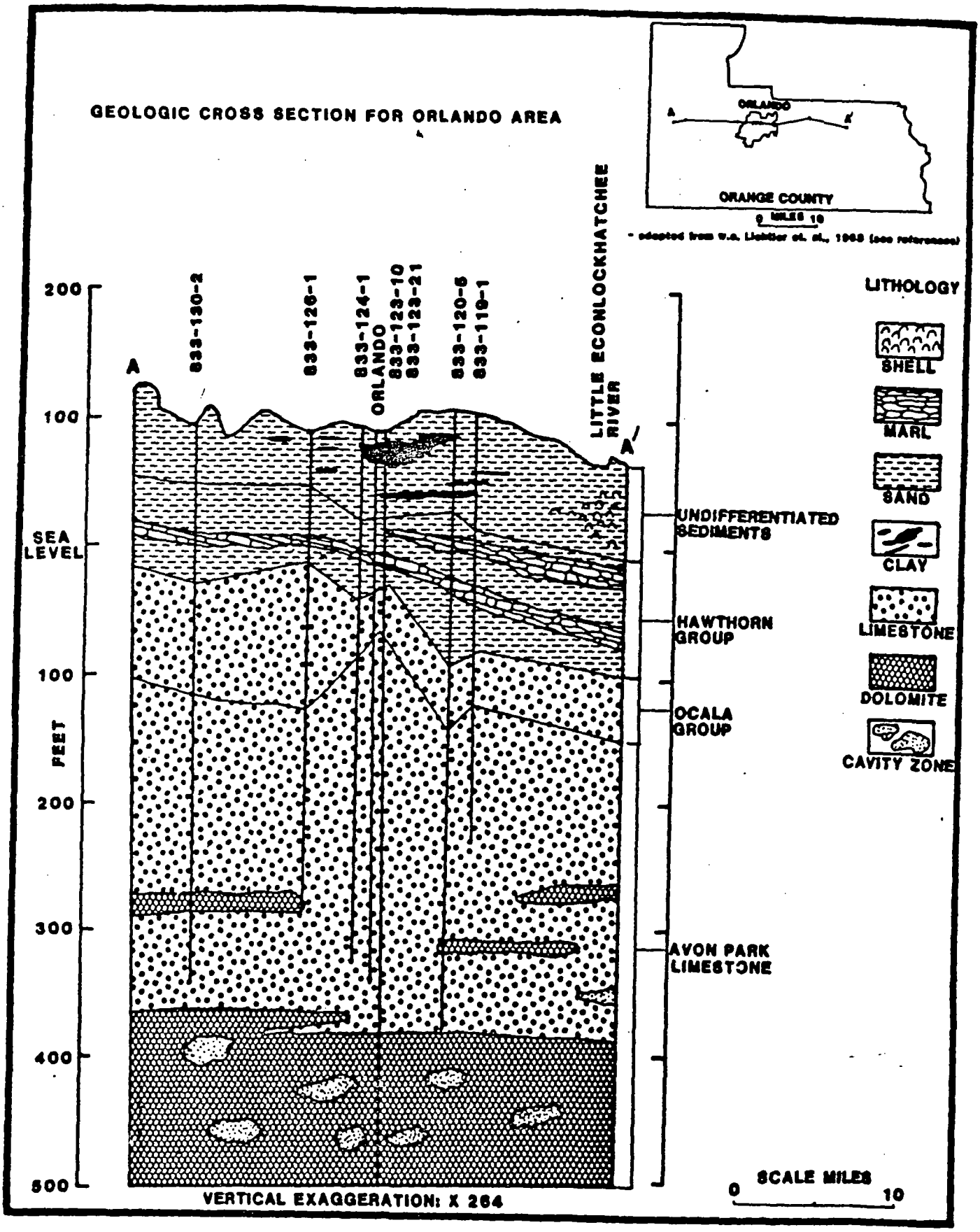


FIGURE 3

NUS CORPORATION

The water resources of the Orlando area are directly related to topography (Ref. 9, p. 9). The area is underlain by three aquifers: a surficial aquifer, a shallow artesian aquifer system, and the Floridan aquifer. Groundwater flow is generally to the east (Ref. 9, pp. 104, 106).

The unconfined, surficial aquifer, located in the undifferentiated Recent to Pliocene deposits, extends over most of Orange County. The water table for this aquifer ranges from 5 to 10 feet bls (Ref. 2, p. 92). Most wells in this aquifer are 20 to 30 feet deep and yield sufficient water for domestic use (5-10 gpm) (Ref. 9, p. 83).

The shallow artesian or "shallow rock" aquifer system is found in the upper section of the Hawthorn Group and consists of discontinuous shell beds, sand and gravel zones, and thin limestone lenses (Ref. 9, p. 88). Aquifers in this system occur locally within the confining beds of the Hawthorn and are usually found at depths ranging from 60 to 150 feet bls (Ref. 9, p. 88). Recharge to the shallow artesian aquifer system is by downward leakage from the surficial aquifer and by upward leakage from the Floridan (Ref. 9, p. 90).

The Floridan aquifer is the primary aquifer in this area, supplying most of Florida with fresh water. The top of the Floridan aquifer is located 150 feet bls and extends down to 2,000 feet bls (Ref. 9, p. 91). The base of potable water in the aquifer is located approximately 1,750 feet bls (Ref. 9, p. 124). The Floridan is composed of a continuous sequence of limestone and dolomite and has two major producing zones that are separated by a relatively impermeable zone. The upper producing zone extends from 150 to approximately 600 feet bls. The lower zone extends from about 1,100 to 1,500 feet bls (Ref. 9, p. 94). There are less permeable layers of clayey sand and lenses of clay between the Floridan and land surface which form a confining layer with a hydraulic conductivity on the order of 1×10^{-5} to 1×10^{-7} cm/sec for unconsolidated deposits of this type (Ref. 11, p. 29).

Orlando is an area of recharge for the Floridan aquifer. Recharge is by direct infiltration of rainfall in outcrop areas and by downward leakage from the overlying aquifers. Also, there are more than 300 drainage wells in the county that artificially recharge the aquifer (Ref. 9, p. 112). Net annual precipitation for this area is 7 inches, and the 1-year, 24-hour rainfall is 4 inches (Refs. 8, pp. 43, 63; 12, p. 93).

Infiltration of water from overlying aquifers provides a route for contaminants to enter the aquifers. Sinkholes, which are common in Orlando, can provide more direct routes for contaminant transport, by breaching the layers of low permeability (Ref. 9, p. 13). Approximately six sinkholes are located within a 2-mile radius of the facility (Ref. 13). Due to the lack of a significant number of surface

streams, most surface drainage flows into sinkholes and other closed depressions. Drainage wells also provide a direct route for contamination into the Floridan aquifer (Ref. 9, p. 128).

3.3.2 Aquifer Use

Sinkholes in the area can result in a direct route for contaminant transport to the three underlying aquifers; therefore, the entire population utilizing these aquifers is considered to be at risk (Ref. 13). All area residents in Orange County are dependent upon groundwater as a sole source for potable water. Two municipal systems operate wells located within a 4-mile radius. The Orlando Utilities Commission Water Department has three wells located 2.2 miles southeast at the intersection of Highland Drive and Orange Avenue. Water from these wells (approximate depth of 1,320 feet) is combined into their system for distribution to 89,000 homes in Orlando and surrounding counties (Ref. 14).

The Winter Park Utilities Water Department has two wells located 2.2 miles to the northeast at the intersection of Wymore Road and Lee Road. Water from these wells (approximate depth of 1,200 feet) is also combined with water from other wells for distribution to 21,000 homes in the Orlando area (Ref. 15).

Private wells do exist despite the extensive municipal water systems present within the 4-mile radius. An exact count of these private wells was not available; however, it is estimated that approximately 10 percent of the area residents within this radius use private wells (Ref. 16). This would result in approximately 1,377 area homes dependent upon private wells for potable water. This figure is 10 percent of the population as estimated by 1980 census data. The actual population count may be greater or less than the value shown. The nearest well (based on GEMS) is located 2,700 feet from the facility (Ref. 5).

3.4 SUMMARY OF POTENTIALLY AFFECTED POPULATIONS AND ENVIRONMENTS

Pathways of concern would include both groundwater and onsite exposure pathways. Surface water pathway potential for contaminant release is not a concern based on the restricted migration pathway. Groundwater is the primary pathway of concern due to the close proximity of the municipal and private wells to the facility. Groundwater from these wells supplies an estimated 111,377 homes in the Orange County area. Both air and onsite exposure pathways are a concern due to the presence of contaminated soils. Approximately 3,582 people are located within a 1-mile radius of the site.

4.0 FIELD INVESTIGATION

4.1 FIELD ANALYTICAL SCREENING PROGRAM

FIT 4 Field Analytical Support Project (FASP) was used in conjunction with other considerations, such as file material and site observations, to aid in determining sample locations. Soil gas probes were analyzed with both the OVA and HNu. Readings above background in one specific area alerted the project manager to a previously unidentified area of contamination. The decision was made to collect an additional CLP sample from this suspected contaminated area (Ref. 17).

Initially FASP installed 39 soil gas probes at 40-foot intervals and designated them into five separate groups, specifically the A, B, C, D, and RR group series (Figure 4). All of the D series probes registered organic vapor readings on both instruments. The decision was then made by the project manager to relocate CLP samples (CC-SB-05 and CC-TW-05) to this area. Readings of at least 1000 ppm on the OVA from probes 2B, 3B, 2C, and 3C alerted the project manager to a previously unidentified area of contamination. The proposed location for samples CC-SB-06 and CC-TW-06 were relocated to this suspected contaminated area. The RR series produced high OVA readings; however, the readings on the HNu were considerably lower (Ref. 17).

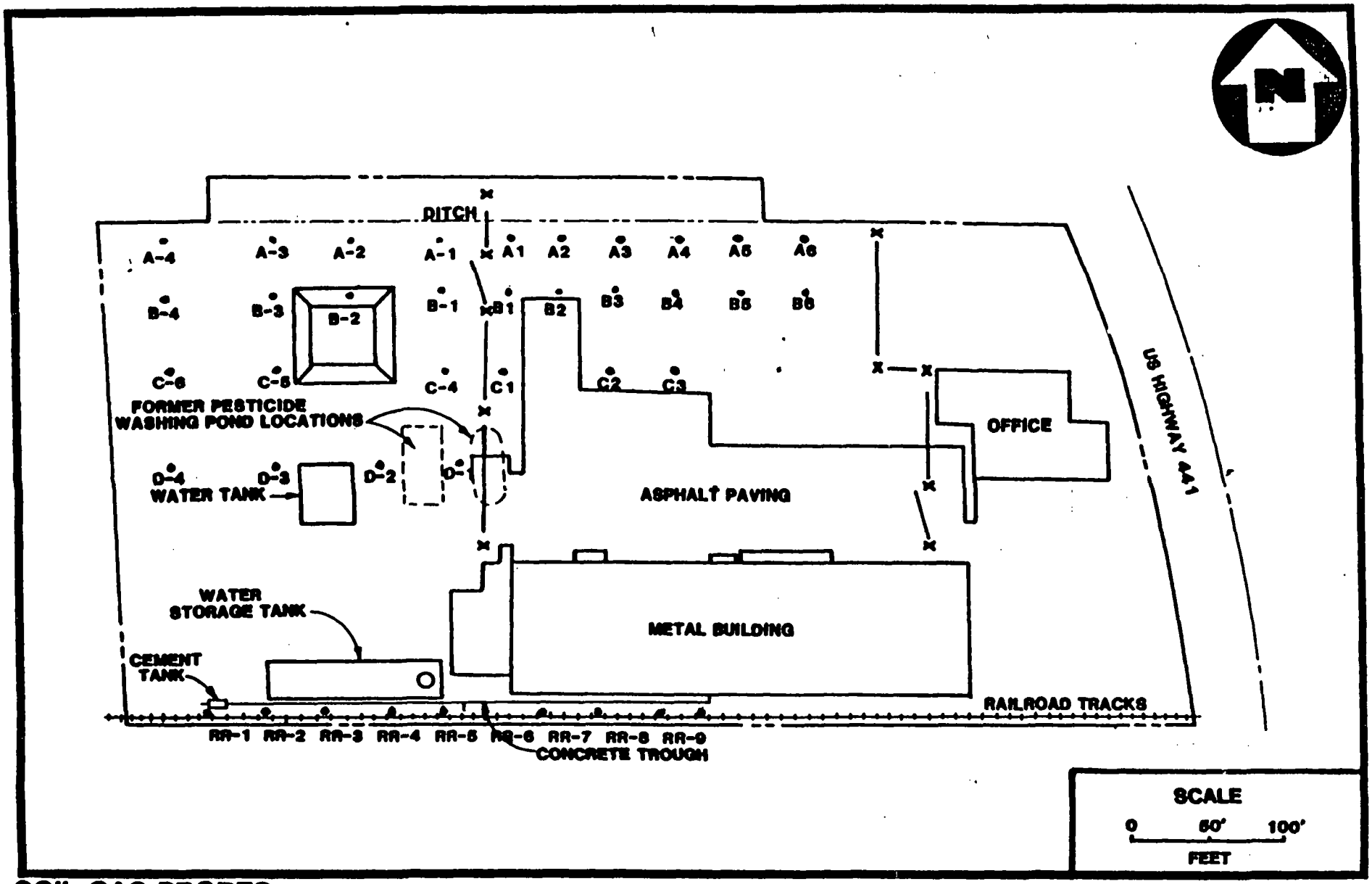
4.2 SAMPLE COLLECTION

4.2.1 Sample Collection Methodology

All sample collection, sample preservation, and chain-of-custody procedures used during this investigation were in accordance with standard operating procedures as specified in Sections 3 and 4 of the Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual; United States Environmental Protection Agency, Region IV, Environmental Services Division (ESD), April 1, 1986.

4.2.2 Split Samples

Split samples were offered to North Bros. Insulation but were declined by Mr. John Dionne. Chevron representatives were not present during this inspection; therefore, no split samples were offered.



SOIL GAS PROBES
CHEVRON CHEMICAL / ORTHO
ORLANDO, ORANGE COUNTY, FLORIDA

FIGURE 4

NUS CORPORATION

4.2.3 Description of Samples and Sample Locations

The surface soil, subsurface soil, and groundwater samples from locations CC-SS-01, CC-SB-01, and CC-TW-01 were collected 85 feet southwest of the facility as upgradient background samples. Eight onsite samples consisting of surface soil, subsurface soil, and groundwater were collected from areas associated with the potential for waste discharge. Four samples, consisting of subsurface soil and groundwater, were collected downgradient from the abovementioned areas to evaluate contaminant migration. All CLP sample locations are shown in Figure 5 and described in Table 1.

4.2.4 Field Measurements

Field measurements on the water samples collected during this investigation consisted of temperature, pH, and conductivity. This data is listed in Table 1.

4.3 SAMPLE ANALYSIS

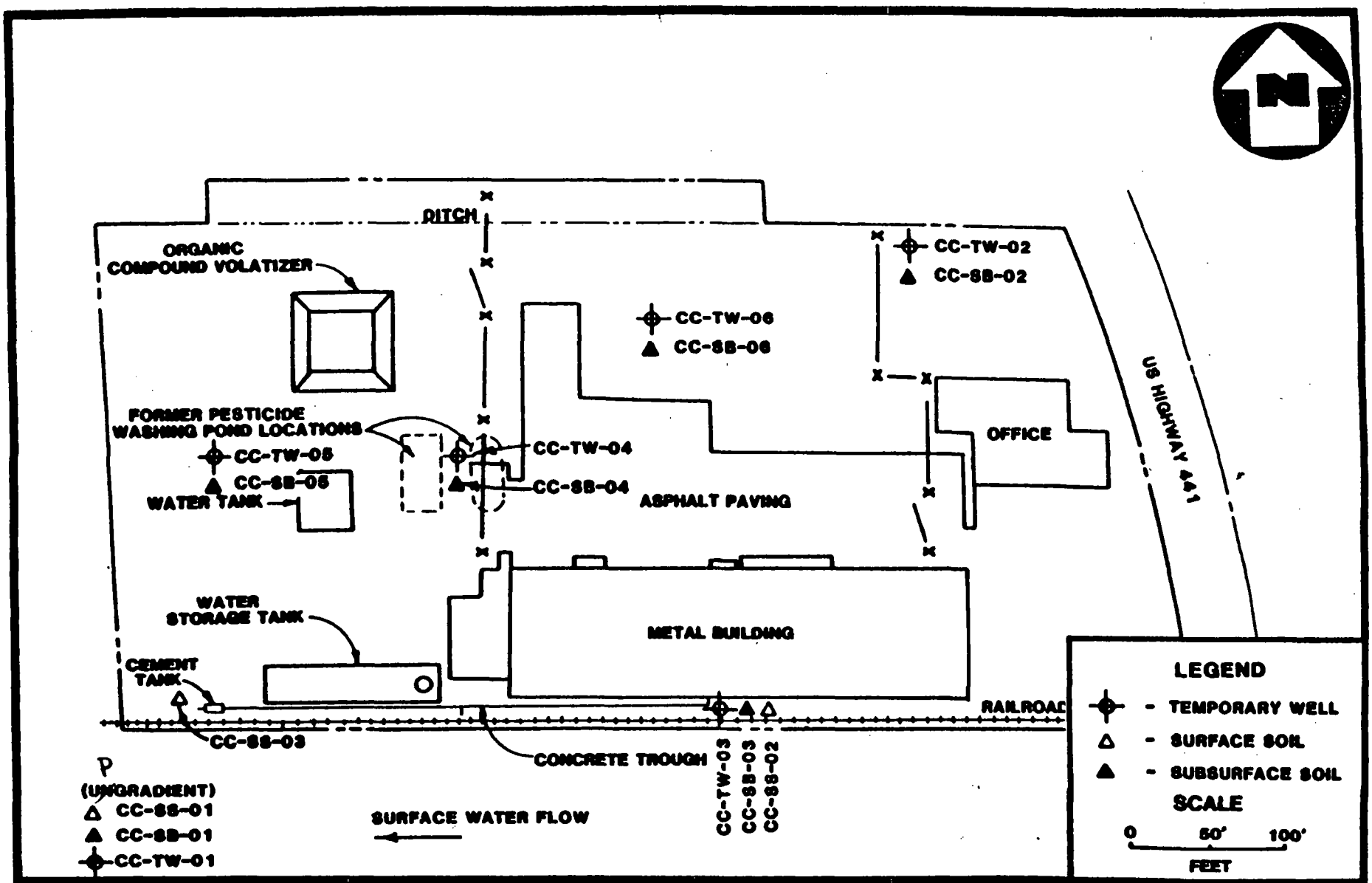
4.3.1 Analytical Support and Methodology

All samples collected were analyzed under the Contract Laboratory Program (CLP) and analyzed for all parameters listed in the Target Compound List (TCL). Organic analysis of soil and water samples was performed by Gulf South Environmental Labs in New Orleans, Louisiana. Inorganic analysis of soil and water was performed by Laucks Testing Labs, Inc. in Seattle, Washington.

All laboratory analyses and laboratory quality assurance procedures used during this investigation were in accordance with standard procedures and protocols as specified in the Analytical Support Branch Operations and Quality Assurance Manual, United States Environmental Protection Agency, Region IV, Environmental Services Division, revised June 1, 1985; or as specified by the existing United States Environmental Protection Agency standard procedures and protocols for the contract analytical laboratory program.

4.3.2 Analytical Data Quality

All analytical data were subjected to a quality assurance review as described in the EPA Environmental Services Division laboratory data evaluation guidelines. As shown in the tables, some of the organic and inorganic parameters were assigned estimated concentrations as indicated with the letter "J". This indicates that the qualitative analysis was acceptable, but the reported concentration should not be considered accurate. A few other compounds were noted as being



SAMPLE LOCATION MAP
CHEVRON CHEMICAL / ORTHO
ORLANDO, ORANGE COUNTY, FLORIDA

FIGURE 5

NUS CORPORATION

TABLE 1

SAMPLE CODES, DESCRIPTIONS, AND FIELD MEASUREMENTS
CHEVRON CHEMICALS, INC.
ORLANDO, ORANGE COUNTY, FLORIDA

Sample Code	Description	Collection Date	Collection Time	pH	Conductivity (umhos/cm)	Temp. (°C)
CC-SS-01	Background surface soil sample taken 300 feet southwest of the metal building	6/13/89	0766	N/A	N/A	N/A
CC-SS-02	Onsite surface soil sample taken from discharge area south of the metal building	6/13/89	1110	N/A	N/A	N/A
CC-SS-03	Onsite surface soil sample taken from area surrounding cement tank	6/13/89	1140	N/A	N/A	N/A
CC-SB-01	Background subsurface soil sample taken at same location as CC-SS-01	6/13/89	0810	N/A	N/A	N/A
CC-SB-02	Downgradient subsurface soil sample taken from area 200 feet northeast of the metal building	6/14/89	1205	N/A	N/A	N/A
CC-SB-03	Onsite subsurface soil sample taken at same location as CC-SS-02	6/14/89	0930	N/A	N/A	N/A
CC-SB-04	Onsite subsurface soil sample taken at area between former washing ponds	6/13/89	1330	N/A	N/A	N/A
CC-SB-05	Onsite subsurface soil sample taken 75' west of water tank	6/13/89	1535	N/A	N/A	N/A
CC-SB-06	Downgradient subsurface soil sample taken 175' north of the metal building	6/13/89	1000	N/A	N/A	N/A
CC-TW-01	Background groundwater sample taken at same location as CC-SB-01	6/13/89	0835	5.9	162	28

TABLE 1

SAMPLE CODES, DESCRIPTIONS, AND FIELD MEASUREMENTS
CHEVRON CHEMICALS, INC.
ORLANDO, ORANGE COUNTY, FLORIDA

Sample Code	Description	Collection Date	Collection Time	pH	Conductivity (umhos/cm)	Temp. (°C)
CC-TW-02	Downgradient groundwater sample taken at same location as CC-SB-02	6/14/89	1235	6.2	533	27
CC-TW-03	Onsite groundwater sample taken at same location as CC-SB-03	6/14/89	1025	6.4	863	29
CC-TW-04	Onsite groundwater sample taken at same location as CC-SB-04	6/13/89	1445	6.1	3380	30
CC-TW-05	Onsite groundwater sample taken at same location as CC-SB-05	6/13/89	1600	5.6	82	29
CC-TW-06	Downgradient groundwater sample taken at same location as CC-SB-06	6/13/89	1120	8.2	1610	28

detected based on the presumptive evidence of their presence as indicated by the letter "N". This means that the compound was tentatively identified, and its detection cannot be used as a positive identification as to its presence. The complete analytical data sheets are provided in Appendix C.

4.3.3 Presentation of Analytical Results

All the surface soil samples collected at suspected onsite source areas contained the pesticides gamma-BHC, DDE, DDD, endrin, gamma-chlordane, and alpha-chlordane at levels significantly above the background samples. The pesticide product 4,4-DDD was present at the greatest concentration in surface soil sample CC-SS-02 (located at the suspected discharge area) at 820,000 ug/kg. Petroleum solvents were also detected in these samples at significant concentrations. The subsurface soil samples collected in the same locations as the surface soil samples contained similar pesticides and petroleum solvents as the surface soil samples.

Sample CC-SB-04, collected near the former wash pond, contained xylene at a concentration of 1 percent. In contrast, the background sample collected from the adjacent property to the southwest contained no organic constituents in excess of detection limits. Sample CC-SS-03, located near the cement tank, contained several polyaromatic hydrocarbons commonly found in creosol which may be attributable to the adjacent railroad ties. Inorganic analysis of the onsite samples revealed similar concentrations as compared to the background sample. The few parameters which did exceed 3 to 5 times the background levels cannot readily be attributed to past site operations. These parameters would include aluminum, barium, copper, iron, sodium, and zinc. The analytical data for the soil samples is presented in Tables 2 and 3.

Groundwater samples were contaminated with a greater variety of petroleum products (much more so than the soil samples) and pesticides. The pesticide chlordane and the petroleum product xylene were present in the greatest concentrations in sample CC-TW-04 at 390 ug/l and 18,000 ug/l, respectively. This sample was collected adjacent to the former wash ponds. Several samples exhibited inorganic parameters which were in excess of 3 to 5 times the levels found in the background sample. However, the past operating history does not provide any suggestions as to their elevated levels at the facility. The analytical data is presented in Tables 4 and 5.

4.4 SUMMARY OF FIELD INVESTIGATION

The decision to relocate samples CC-SB-05, CC-TW-05, CC-SB-06, and CC-TW-06 proved to be beneficial. The laboratory analysis of the CLP samples confirmed the presence of volatiles as indicated during the FASP screening procedure.

TABLE 2

SUMMARY OF ORGANIC ANALYTICAL RESULTS
SURFACE AND SUBSURFACE SOIL SAMPLES
CHEVRON CHEMICAL/ORTHO
ORLANDO, FLORIDA

PARAMETERS (ug/kg)	Background		Onsite						
	CC-SS-01	CC-SB-01	CC-SS-02	CC-SS-03	CC-SB-02	CC-SB-03	CC-SB-04	CC-SB-05	CC-SB-06
PURGEABLE COMPOUNDS									
TOLUENE	-	-	12,000J	-	210	-	-	-	-
CHLOROBENZENE	-	-	-	-	22	-	-	-	-
ETHYL BENZENE	-	-	-	-	17	28,000	-	-	1000
TOTAL XYLENES	-	-	300,000	-	28	270,000	1,000,000	78	5200
EXTRACTABLE COMPOUNDS									
1,4-DICHLOROBENZENE	-	-	-	-	-	-	12,000J	-	510
1,2-DICHLOROBENZENE	-	-	-	-	-	-	-		220J
(3-AND/OR 4-)METHYLPHENOL	-	-	-	240J	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	-	-	-	-	-	-	-	-	790
NAPHTHALENE	-	-	5900J	-	-	13,000J	35,000	-	430
2-METHYLNAPHTHALENE	-	-	8200J	-	-	30,000J	85,000J	-	3200J
FLUORENE	-	-	-	-	-	-	-	-	190J
PHENANTHRENE	-	-	-	270J		-	-	-	570
ANTHRACENE	-	-	-	51J	-	-	-	-	-
FLUORANTHENE	150J	-	-	180J	-	-	-	-	-
PYRENE	120J	-	-	250J	-		-	-	-
BENZO(A)ANTHRACENE	-	-	-	130J	-	-	-	-	-

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value
N Presumptive evidence of presence of material
C Confirmed by GCMS

TABLE 2

SUMMARY OF ORGANIC ANALYTICAL RESULTS
SURFACE AND SUBSURFACE SOIL SAMPLES
CHEVRON CHEMICAL/ORTHO
ORLANDO, FLORIDA

PARAMETERS (ug/kg)	Background		Onsite						
	CC-SS-01	CC-SB-01	CC-SS-02	CC-SS-03	CC-SB-02	CC-SB-03	CC-SB-04	CC-SB-05	CC-SB-06
CHRYSENE	-	-	-	180J	-				200J
BENZO(B AND/OR K)FLUORANTHENE	-	-	-	370J	-			-	-
ETHYLMETHYLBENZENE	-	-	40,000JN	-	-	40,000JN	-	100JN	-
TRIMETHYLBENZENE	-	-	40,000JN	-	200JN	70,000JN	100,000JN	300JN	-
CHORDENE	-	-	20,000JN	-	-	-	-		-
DDMU	-	-	50,000JN	-	-		-	-	-
NONACHLOR	-	-	70,000JN	-		-	600,000JN	200JN	-
METHYL(METHYLETHYL)PHENANTHRENE	-	-	-	-	400JN	-	-	-	-
ETHION	-	-	-	-	-	90,000JN	300,000JN	-	3000JN
CARBOPHENOTHION	-	-	-	-	-	-	80,000JN	-	800JN
DIMETHYLNAPHTHALENE	-	-	-	-	-	-	-	100JN	-
ASPON	-	-	-	-	-	-	-	500JN	-
TETRAMETHYLBUTYLPHENOL	-	-	-	-	-	-	-	-	800JN
TETRAHYDROISOINDOLEDIONE	-	-	-	-	-	-	-	-	-
UNIDENTIFIED COMPOUNDS/NO	2000J/2	-	400,000J/12	500J/1	600J/1	900,000J/16	2,000,000/14	-	30,000J/18
PESTICIDE/PCB COMPOUNDS									
ALPHA-BHC	-	-	25,000	-	24C	3300J	23,000C	-	-
BETA-BHC	-	-	-	31	14	-	4400J	-	230

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value
N Presumptive evidence of presence of material
C Confirmed by GCMS

TABLE 2

SUMMARY OF ORGANIC ANALYTICAL RESULTS
SURFACE AND SUBSURFACE SOIL SAMPLES
CHEVRON CHEMICAL/ORTHO
ORLANDO, FLORIDA

PARAMETERS (ug/kg)	Background		Onsite						
	CC-SS-01	CC-SB-01	CC-SS-02	CC-SS-03	CC-SB-02	CC-SB-03	CC-SB-04	CC-SB-05	CC-SB-06
DELTA-BHC	-	-	-	-	51C	-	-	-	-
GAMMA-BHC (LINDANE)	-	-	-	-	-	4800J	85,000C	-	-
HEPTACHLOR	-	-	-	-	-	18,000C	66,000C	190	-
ALDRIN	-	-	-	-	-	14,000J	-	-	940JN
HEPTACHLOR EPOXIDE	-	-	-	310	-	-	-	-	-
DIELDRIN	-	-	-	300JN	-	-	72,000J	96J	2000J
4,4'-DDE (P,P'-DDE)	-	-	320,000C	500J	-	-	71,000J	-	4100J
ENDRIN	-	-	130,000	-	-	-	-	-	-
ENDOSULFAN II (BETA)	-	-	-	87	-	-	-	-	-
4,4'-DDD (P,P'-DDD)	-	-	820,000C	270JN	-	150,000C	350,000C	93J	8400J
4,4'-DDT (P,P'-DDT)	-	-	230,000J	67J	-	74,000J	170,000JC	65J	-
GAMMA-CHLORDANE /2	-	-	240,000C	3900C	-	45,000JC	200,000C	1000C	6700C
ALPHA-CHLORDANE /2	-	-	480,000C	2500C	-	76,000JC	220,000C	690JC	5800C

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value
N Presumptive evidence of presence of material
C Confirmed by GCMS

TABLE 3

SUMMARY OF INORGANIC ANALYTICAL RESULTS
SURFACE AND SUBSURFACE SOIL SAMPLES
CHEVRON CHEMICAL/ORTHO
ORLANDO, FLORIDA

PARAMETERS (mg/kg)	Background		Onsite						
	CC-SS-01	CC-SB-01	CC-SS-02	CC-SS-03	CC-SB-02	CC-SB-03	CC-SB-04	CC-SB-05	CC-SB-06
ALUMINUM	2200J	12,000J	2700J	4600J	18,000J	21,000J	13,000J	16,000J	18,000J
ARSENIC	-	-	2 5	7 2	-	1 7	2 2		-
BARIUM	6 9	16	34	42	93	8 9	18	18	28
CADMIUM	-	-	-	2 2J	-	-	-		-
CALCIUM	200,000J	1100J	2200J	19,000J	800J	440J	480J	250J	3000J
CHROMIUM	9 1J	11J	13J	11J	11J	16J	13J	9 4J	13J
COBALT	-	-	-	-	2 8J	-	-	-	4 8J
COPPER	7 1	-	85	47	-	7	-	-	3 8
IRON	1200J	310J	2100J	7500J	1200J	550J	390J	320J	650J
LEAD	75	4 3	110	140	10	17	19	25	13
MAGNESIUM	1500	-		520	-	-	-		-
MANGANESE	28J	-	36J	46J	2 8J	11J	3 6J	1 6J	3 1J
MERCURY	-	-	-	-	-	-	-	0 19	0 28
POTASSIUM	-	-	-	-	500	710	-	-	690
SODIUM	98	-	370	-	71	660	57	-	570
VANADIUM	6 9	-	5 7	6 4	6	-	-	-	-
ZINC	62	-	260	110	5 3	42	-	4	15

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value

TABLE 4

SUMMARY OF ORGANIC ANALYTICAL RESULTS
GROUNDWATER SAMPLES
CHEVRON CHEMICAL/ORTHO
ORLANDO, FLORIDA

PARAMETERS (ug/l)	Background	Onsite				
	CC-TW-01	CC-TW-02	CC-TW-03	CC-TW-04	CC-TW-05	CC-TW-06
PURGEABLE COMPOUNDS						
CARBON DISULFIDE	-	58J	-	-	-	-
1,1-DICHLOROETHENE	-	-	-	-	-	44J
1,2-DICHLOROETHANE	-	-	-	-	-	35J
1,2-DICHLOROPROPANE	-	4J	-	-	-	23J
1,1,2-TRICHLOROETHANE	-	-	-	430	-	62
BENZENE	-	29	-	-	-	-
TOLUENE	-	-	730N	-	-	-
CHLOROBENZENE	-	150	140	-	-	180
ETHYL BENZENE	-	220	720	3600	4J	600
TOTAL XYLENES	-	550J	4400	18,000	170	2900
EXTRACTABLE COMPOUNDS						
1,4-DICHLOROBENZENE	-	12	-	55	-	56
1,2-DICHLOROBENZENE	-	-	-	-	-	18
2-METHYLPHENOL	-	-	23	-	-	-
(3-AND/OR 4-)METHYLPHENOL	-	-	32	260	-	56
ISOPHORONE	-	-	20	750	-	-
1,2,4-TRICHLOROBENZENE	-	-	-	-	-	21

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value
N Presumptive evidence of presence of material

TABLE 4

SUMMARY OF ORGANIC ANALYTICAL RESULTS
GROUNDWATER SAMPLES
CHEVRON CHEMICAL/ORTHO
ORLANDO, FLORIDA

PARAMETERS (ug/l)	Background	Onsite				
	CC-TW-01	CC-TW-02	CC-TW-03	CC-TW-04	CC-TW-05	CC-TW-06
NAPHTHALENE	-	13	100	190	9J	63
2-METHYLNAPHTHALENE	-	10	56	200	11	75
2,4,5-TRICHLOROPHENOL	-	-	23J	-	-	-
ETHYLMETHYLBENZENE	-	200JN	900JN/2	1000JN	200JN/2	100JN/2
TRIMETHYLBENZENE	-	1000JN/3	2000JN/3	2000JN/3	400JN/3	100JN/2
TETRAMETHYLBENZENE	-	-	-	-	-	30JN
ETHION	-	-	-	2000JN	-	100JN
CARBOPHENOTHION	-	-	-	600JN	-	50JN
DIMETHYLNAPHTHALENE	-	-	-	-	-	60JN
TETRAMETHYLBUTYLPHENOL	-	10JN	-	-	-	-
PROMETON	10JN	-	-	-	-	-
PROPYLBENZENE	-	40JN	-	-	-	-
DIHYDROINDENE	-	70JN	200JN	-	20JN	-
METHYLEHTOXYPHENOL METHYLCARBAMATE	-	300JN	-	-	-	-
DIMETHYLBENZALDEHYDE	-	20JN	-	-	-	-
DIMETHYLETHYLPHENOL	-	20JN	-	-	-	-
DIMETHYLBENZOIC ACID	-	10JN	-	-	-	-
DIMETHYLETHYLPHENOXY PROPANOL	-	200JN	-	-	-	-

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value
N Presumptive evidence of presence of material

TABLE 4

SUMMARY OF ORGANIC ANALYTICAL RESULTS
GROUNDWATER SAMPLES
CHEVRON CHEMICAL/ORTHO
ORLANDO, FLORIDA

PARAMETERS (ug/l)	Background	Onsite				
	CC-TW-01	CC-TW-02	CC-TW-03	CC-TW-04	CC-TW-05	CC-TW-06
METHYLPROPYLBENZENE	-	-	30JN	-	20JN	-
ETHYLDIMETHYLBENZENE	-	-	50JN	-	9JN	-
PHENYLETHANONE	-	-	50JN	-	-	-
DIMETHYLPHENOL	-	-	40JN	-	-	-
ETHYLMETHYLPHENOL	-	-	30JN		-	-
DIHYDROINDENONE	-	30JN	200JN	-	-	-
1-METHYLNAPHTHALENE	-	-	50JN	-	-	20JN
DIETHYLDISULFIDE	-	-	-	600JN	-	-
TETRAHYDROISOINDOLEDIONE	-	-	-	10,000JN		50JN
UNIDENTIFIED COMPOUNDS/NO	-	-	500J/7	-	-	500J/9
PESTICIDE/PCB COMPOUNDS						
ALPHA-BHC	-	17	3 6	35	-	-
BETA-BHC	-	- 5 5	-	-	-	5 9
DELTA-BHC	-	20	5.7	-	0 92	2.1
GAMMA-BHC (LINDANE)	-	1 2	-	-	0 79	1
HEPTACHLOR	-	1 1	-	98	0 59	-
ALDRIN	-	3 1	-	22	-	-
HEPTACHLOR EPOXIDE	-	-	5 7	30	0 58	-

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value
N Presumptive evidence of presence of material

TABLE 4

SUMMARY OF ORGANIC ANALYTICAL RESULTS
GROUNDWATER SAMPLES
CHEVRON CHEMICAL/ORTHO
ORLANDO, FLORIDA

PARAMETERS (ug/l)	Background	Onsite				
	CC-TW-01	CC-TW-02	CC-TW-03	CC-TW-04	CC-TW-05	CC-TW-06
DIELDRIN	-	-	-	72	0 93	-
4,4'-DDE (P,P'-DDE)	-	1 3	-	52	-	-
ENDRIN	-	-	-	140	0 87	-
ENDOSULFAN II (BETA)	-	0 51	-	-	-	-
4,4'-DDD (P,P'-DDD)	-	-	5 4	-	1 3	-
4,4'-DDT (P,P'-DDT)	-	-	-	140	-	-
GAMMA-CHLORDANE /2	-	3 1	-	530	2 8	12
ALPHA-CHLORDANE /2	-	-	-	390	2 2	2 6

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value
N Presumptive evidence of presence of material

TABLE 5

SUMMARY OF INORGANIC ANALYTICAL RESULTS
GROUNDWATER SAMPLES
CHEVRON CHEMICAL COMPANY
ORLANDO, FLORIDA

PARAMETERS (ug/l)	Background	Onsite				
	CC-TW-01	CC-TW-02	CC-TW-03	CC-TW-04	CC-TW-05	CC-TW-06
ALUMINUM	56,000	190,000	90,000	15,000	39,000	150,000
ARSENIC	-	12J	110J	320J	-	81J
BARIUM	130	880	-	-	32	710
CALCIUM	25,000	54,000	4200	45,000	5400	8700
CHROMIUM	39	130	110	82	28	120
COBALT	-	15	16	20	-	-
COPPER	10	110	32	-	63	55
IRON	2200	9600	4700	7500	670	9300
LEAD	6J	9J	37J	60J	41J	10J
MAGNESIUM	-	7800	-	11,000	-	2900
MANGANESE	5	64	85	250	15	39
MERCURY	0 60J	0 71J	0 60J	-	-	-
POTASSIUM	-	21,000	120,000	350,000	8600	84,000
SODIUM	4600	46,000	80,000	150,000	3700	170,000
VANADIUM	15	140	-	110	-	180
ZINC	-	-	490	39	25	320

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value

The analytical data presented is consistent with the general historical information regarding the former pesticide blending operation and the truck servicing facility. Although no information is available regarding specific pesticides and/or petroleum products used at the facility, the nature of the contaminants found would be compatible with these types of operations. Pesticides and petroleum products found in the groundwater samples were also present in soil samples. Based on past disposal practices, it is conceivable that contaminant migration may have occurred through multiple media. Specifically, the downward filtration of water through the contaminated soil may be responsible for transporting contaminants to the underlying aquifers. In consideration of groundwater flow direction, the presence of these contaminants in downgradient samples (CC-TW-02 and CC-TW-06) suggests that they may have begun to migrate offsite.

On August 22, 1989, FIT 4 requested Emergency Removal Action be considered at this facility based upon the high concentrations of contaminants discovered during this investigation. Factors supporting this decision included contaminated soils located outside of the fenced portion of the facility, common flooding of this contaminated soil, and use of the facility for public storage space (Ref. 3).

5.0 SUMMARY

In summary, the potentially affected targets would be the population at risk for onsite exposure (3582 people) and those residents connected to the Orlando Utilities water service (342,326 people). The significant findings of the field investigation indicate that the surface soil, subsurface soil, and groundwater are contaminated with pesticides and petroleum products. In consideration of the groundwater flow direction and sample locations, the analytical data suggests that contaminants may be migrating offsite. Based on these findings, FIT 4 recommends that Phase I of a Listing Site Inspection be initiated.

REFERENCES

1. Dames & Moore, Survey and Assessment of Former Agricultural Chemical Plant Site, Orlando, Florida For Chevron Chemical Company, D & M Job No. 3818-068-09 (January 10, 1983).

2. Jammal & Associates, Inc., Preliminary Contamination Assessment, Central Florida Mack Truck Company, Orange County, Orlando, Florida, Project No. 87-03001 (January 15, 1987).

3. Phillip Henderson, NUS Corporation, letter to A.R. Hanke, Environmental Protection Agency, August 22, 1989. Subject: Emergency Removal Action at Chevron.

4. NUS Corporation Field Logbook No. F4-1472 for Chevron Chemical/Ortho, TDD No. F4-8808-22. Documentation of Screening Site Inspection, June 12, 1989.

5. U.S. Environmental Protection Agency, Graphical Exposure Modeling System (GEMS) Data Base, compiled from U.S. Bureau of the Census data (1980).

6. U.S. Geological Survey, 7.5 minute series Topographic Quadrangle Maps of Florida: Forest City 1959 (PR 1980), Casselberry 1962 (PR 1980), Orlando East 1956 (PR 1980), Orlando West 1956 (PR 1980).

7. U.S. Fish and Wildlife Service, Endangered and Threatened Species of the Southeastern United States (Orlando, Florida, 1988), p. 10.

8. U. S. Department of Commerce, Climatic Atlas of the United States (Washington, D.C.: GPO, June 1968) Reprint: 1983, National Oceanic and Atmospheric Administration.

9. W.F. Lichtler, et al., Water Resources of Orange County, Florida, Report of Investigations No. 50 (Tallahassee, FL: U.S. Geological Survey, 1968).

10. Ed Lane, Karst in Florida, Special Publication No. 29 (Tallahassee, Florida: Florida Geological Survey, 1986.

11. R. Allan Freeze and John A. Cherry, Groundwater (Englewood Cliffs, New Jersey: Prentice-Hall, Inc.).

12. David M. Hershfield, Rainfall Frequency Atlas of the United States, U.S. Department of Commerce, Technical Paper No. 40 (Washington, D.C.: GPO, 1961).

13. Barry Beck, Florida Sinkholes For Orange County, University of Central Florida Sinkhole Research Institute, Orlando, Florida, January 16, 1990.

14. John Banks, Orlando Utilities Commission Water Department, telephone conversation with Terry Tanner, NUS Corporation, February 14, 1990. Subject: Water supply to Orange County.

15. Jim Enselmo, Winter Park Utilities, telephone conversation with Terry Tanner, NUS Corporation, February 14, 1990. Subject: Water supply to Orange County.

16. David Stewart, Central Florida Well Drillers, telephone conversation with Terry Tanner, NUS Corporation, February 15, 1990. Subject: Water supply to Orange County.

17. NUS Corporation Field Logbook No. F4-1427 for Chevron Chemical/Ortho. Field Analytical Support Project, TDD No. F4-8808-22. Documentation of FASP activities, June 12, 1989.

Site Inspection Report

CHEURON CHEMICAL CO., INC-ORTHO

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
FL	D004064242

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO. OR SPECIFIC LOCATION IDENTIFIER
CHEVRON CHEMICAL CO.-ORTHO	3100 ORANGE BLOSSOM TRAIL

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG. DIST.
ORLANDO	FL		ORANGE COUNTY		

09 COORDINATES LATITUDE	LONGITUDE	10 TYPE OF OWNERSHIP (Check one)
28° 34' 00.0	081° 25' 00.0	☐ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION (Month Day Year)	02 SITE STATUS	03 YEARS OF OPERATION
6 12 89	☐ ACTIVE ☒ INACTIVE	1950 (Beginning Year) 1976 (Ending Year) ☐ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)

☐ A. EPA ☒ B. EPA CONTRACTOR NUS CORP (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR _____ (Name of firm)

☐ E. STATE ☐ F. STATE CONTRACTOR _____ (Name of firm) ☐ G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
PHILLIP HENDERSON	PROJECT MANAGER	NUS CORP	(404) 938-7710

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
			( )
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO.
			( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☐ PERMISSION ☐ WARRANT		

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
N/A —		( )

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
TERRY TANNER	NUS CORP	→	(404) 938-7710	4-10-90

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- A SOLID
- B POWDER, FINES
- ✓ C SLUDGE
- D OTHER _____ (Specify)
- E SLURRY
- ✓ F LIQUID
- G GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

- TONS UNKNOWN
- CUBIC YARDS " "
- NO. OF DRUMS " "

03 WASTE CHARACTERISTICS (Check all that apply)

- ✓ A TOXIC
- B CORROSIVE
- C RADIOACTIVE
- D PERSISTENT
- E SOLUBLE
- F INFECTIOUS
- G FLAMMABLE
- H IGNITABLE
- I HIGHLY VOLATILE
- J EXPLOSIVE
- K REACTIVE
- L INCOMPATIBLE
- M NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE	UNK		
SOL	SOLVENTS	UNK		
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS	UNK		
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
	GAMMA - BHC		UNKNOWN		
	DDE		" "		
	DDD		" "		
	ENDRIN		" "		
	GAMMA-CHLORDANE		" "		
	ALPHA-CHLORDANE		" "		
	PETROLEUM SOLVENTS		" "		

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Draft Screening Inspection Site Inspection Report for Chevron Chem - Ortho, NUS Corp.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [✓] A GROUNDWATER CONTAMINATION — 02 [✓] OBSERVED (DATE 6/12/89) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 89,000 — 04 NARRATIVE DESCRIPTION
Groundwater contaminated with variety of petroleum products and pesticides

01 [✓] B SURFACE WATER CONTAMINATION — 02 [ ] OBSERVED (DATE _____) — [✓] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: UNKNOWN — 04 NARRATIVE DESCRIPTION
Surface soils contaminated with pesticides and petroleum solvents

01 [✓] C CONTAMINATION OF AIR — 02 [ ] OBSERVED (DATE _____) — [✓] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 3582 — 04 NARRATIVE DESCRIPTION
Surface soils contaminated with pesticides and petroleum solvents

01 [✓] D FIRE EXPLOSIVE CONDITIONS — 02 [ ] OBSERVED (DATE _____) — [✓] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: UNKNOWN — 04 NARRATIVE DESCRIPTION
Petroleum solvent/sludge present at ~~sur~~ ground surface

01 [✓] E DIRECT CONTACT — 02 [ ] OBSERVED (DATE _____) — [✓] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 3582 — 04 NARRATIVE DESCRIPTION
Surface soils contaminated with pesticides and petroleum solvents, access possible by public

01 [✓] F CONTAMINATION OF SOIL — 02 [ ] OBSERVED (DATE 6/12/89) — [ ] POTENTIAL — [ ] ALLEGED
03 AREA POTENTIALLY AFFECTED: ~~35~~ UNKNOWN — 04 NARRATIVE DESCRIPTION
Soils contaminated with pesticides and petroleum solvents

01 [ ] G DRINKING WATER CONTAMINATION — 02 [ ] OBSERVED (DATE _____) — [✓] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 89,000 — 04 NARRATIVE DESCRIPTION
Migration of contaminated groundwater off site is possible

01 [ ] H WORKER EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE _____) — [✓] POTENTIAL — [ ] ALLEGED
03 WORKERS POTENTIALLY AFFECTED: 0 — 04 NARRATIVE DESCRIPTION
None onsite

01 [ ] I POPULATION EXPOSURE INJURY — 02 [ ] OBSERVED (DATE _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: UNKNOWN — 04 NARRATIVE DESCRIPTION
Public access is available. Site is operated as "Affordable Storage" ~~at~~ warehouse rental space

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ J DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ K DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ L CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ M UNSTABLE CONTAINMENT OF WASTES (Spills, Runoff, Standing liquids, Leaking drums) — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: UNKNOWN — 04 NARRATIVE DESCRIPTION

Waste soils present at surface.

01 ☐ N DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ O CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ P ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Apparent waste disposed of on site

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

N/A

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

NONE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Screening Site Inspection for Chevron Chem - Ortho. NUS Corp

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
A NPDES	N/A			
B UIC	N/A			
C AIR	N/A			
D RCRA	N/A			
E RCRA INTERIM STATUS	NONE			
F SPCC PLAN	N/A			
G STATE (Specify)	N/A			
H LOCAL (Specify)	N/A			
I OTHER (Specify)	N/A			
J NONE	N/A			

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
A. SURFACE IMPOUNDMENT		
B PILES		
C DRUMS, ABOVE GROUND		
D. TANK, ABOVE GROUND		
E. TANK, BELOW GROUND		
F LANDFILL		
G LANDFARM		
H OPEN DUMP	UNKNOWN	—
I. OTHER (Specify)		

04 TREATMENT (Check all that apply)
A. INCENERATION
B UNDERGROUND INJECTION
C. CHEMICAL, PHYSICAL
D BIOLOGICAL
E. WASTE OIL PROCESSING
F SOLVENT RECOVERY
G. OTHER RECYCLING/RECOVERY
H OTHER (Specify)

05 OTHER
✓ A BUILDINGS ON SITE

06 AREA OF SITE
2-3 acres

07 COMMENTS

NONE

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

A ADEQUATE, SECURE B. MODERATE C INADEQUATE, POOR ✓ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC

NONE PRESENT

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE ✓ YES NO

02 COMMENTS

Contaminated surface soil present

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Screening Site Inspection Report for Chevron Chemical-Ortho April 10, 1990. NUS Corp.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as appropriate)

	SURFACE	WELL
COMMUNITY	A ☐	B ☑
NON-COMMUNITY	C ☐	D ☐

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A ☑	B ☐	C ☐
D ☐	E ☐	F ☐

03 DISTANCE TO SITE

A 2.2 (mi)

B _____ (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☑ A ONLY SOURCE FOR DRINKING ☐ B DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) ☐ C COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER 89,000

03 DISTANCE TO NEAREST DRINKING WATER WELL PRIVATE WELL 0.5 (mi)

04 DEPTH TO GROUNDWATER 2 (ft)

05 DIRECTION OF GROUNDWATER FLOW Unknown

06 DEPTH TO AQUIFER OF CONCERN 2 (ft)

07 POTENTIAL YIELD OF AQUIFER Unk (gpd)

08 SOLE SOURCE AQUIFER ☑ YES ☐ NO

09 DESCRIPTION OF WELLS (Including usage, depth, and location relative to population and buildings)

Many wells present in area. Sinkholes in area.

10 RECHARGE AREA ☐ YES ☑ NO COMMENTS

11 DISCHARGE AREA ☐ YES ☑ NO COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☑ A RESERVOIR, RECREATION DRINKING WATER SOURCE ☐ B IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C COMMERCIAL, INDUSTRIAL ☐ D NOT CURRENTLY USED

02 AFFECTED POTENTIALLY AFFECTED BODIES OF WATER

NAME	AFFECTED	DISTANCE TO SITE
None threatened	☐	(mi)
	☐	(mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE A 3582 NO OF PERSONS

TWO (2) MILES OF SITE B 19,213 NO OF PERSONS

THREE (3) MILES OF SITE C 46060 NO OF PERSONS

02 DISTANCE TO NEAREST POPULATION 500 FEET (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE UNKNOWN

04 DISTANCE TO NEAREST OFF-SITE BUILDING 500 FEET (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site (e.g., total number of persons, proximity of residential areas, schools, hospitals, industrial/commercial establishments, agricultural lands, parks, etc.)

Population within 1-mile is predominately urban with some commercial property along Orange Blossom Trail

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A $10^{-6} - 10^{-8}$ cm/sec ☐ B $10^{-4} - 10^{-6}$ cm/sec ☑ C $10^{-4} - 10^{-3}$ cm/sec ☐ D GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A IMPERMEABLE (Greater than 10^{-6} cm/sec) ☐ B RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☑ C RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH	
UNK (ft)	0 (ft)	UNK	

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
7 (in)	(in)	0 %	0	1.0 %

09 FLOOD POTENTIAL	10
SITE IS IN N/A YEAR FLOODPLAIN	☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)	12 DISTANCE TO CRITICAL HABITAT (of endangered species)
ESTUARINE: A 1 (does not appear on map) (mi) OTHER: B (mi)	(mi) ENDANGERED SPECIES: N/A

13 LAND USE IN VICINITY

DISTANCE TO COMMERCIAL INDUSTRIAL	RESIDENTIAL AREAS, NATIONAL, STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A 0.09 (mi)	B 0.2 (mi)	C N/A (mi)	D N/A (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Site located in area void of topographic relief.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

U.S.G.S. Topographic Quadrangle: Orlando East, FLA. 1956

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	6	GULF SOUTH ENVIRONMENTA LAB	
SURFACE WATER	N/A	NEW ORLEANS ORGANIC ANALYSIS	
WASTE	N/A		
AIR	N/A	LAUCKS TESTING LABS, INC.	
RUNOFF	N/A	SEATTLE, WASHINGTON	
SPILL	N/A	INORGANIC ANALYSIS	
SOIL	9		
VEGETATION	N/A		
OTHER	N/A		

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
N/A	
N/A	
N/A	
N/A	
N/A	

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF NUS CORP.
(name of organization or individual)

03 MAPS ☐ YES ☒ NO

04 LOCATION OF MAPS N/A

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

N/A

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Screening Site Inspection for Chevron Chem Co - Ortho
NUS Corp.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER
UNKNOWN	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME	02 D+B NUMBER
UNKNOWN	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

IV. REALTY OWNER(S) (If applicable, list most recent first)

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

N/A

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. CURRENT OPERATOR		OPERATOR'S PARENT COMPANY	
01 NAME: AFFORDABLE STORAGE	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS	04 SIC CODE	12 STREET ADDRESS	13 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	14 CITY	15 STATE / 16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER		

III. PREVIOUS OPERATOR(S)		PREVIOUS OPERATORS' PARENT COMPANIES	
01 NAME: CENTRAL FLORIDA MACK TRUCK CO.	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS	04 SIC CODE	12 STREET ADDRESS	13 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	14 CITY	15 STATE / 16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD		
01 NAME: CHEVRON CHEMICAL	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS	04 SIC CODE	12 STREET ADDRESS	13 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	14 CITY	15 STATE / 16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD		
01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS	04 SIC CODE	12 STREET ADDRESS	13 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	14 CITY	15 STATE / 16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD		

IV. SOURCES OF INFORMATION

Screening Site Inspection Report for Chevron Chem. Co.
NUS Corp.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
N/A	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
N/A			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
N/A			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

N/A

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ S CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ T BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ U GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ V BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ W GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ X FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ Y LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ Z AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ 1 ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ 2 POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ 3 OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

N/A

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY ENFORCEMENT ACTION YES NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY ENFORCEMENT ACTION

Site never listed, ceased operations before 1980.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA & State File Material

EPA FORM 2070-13 (7-81)

APPENDIX

I. FEEDSTOCKS

CAS Number	Chemical Name
1. 7664-41-7	Ammonia
2. 7440-36-0	Antimony
3. 1309-64-4	Antimony Trioxide
4. 7440-38-2	Arsenic
5. 1327-53-3	Arsenic Trioxide
6. 21109-95-5	Barium Sulfide
7. 7726-95-6	Bromine
8. 106-99-0	Butadiene
9. 7440-43-9	Cadmium
10. 7782-50-5	Chlorine
11. 12737-27-8	Chromite
12. 7440-47-3	Chromium
13. 7440-48-4	Cobalt
14. 1317-38-0	Cupric Oxide
15. 7758-98-7	Cupric Sulfate
16. 1317-39-1	Cuprous Oxide
17. 74-85-1	Ethylene
18. 7647-01-0	Hydrochloric Acid
19. 7664-39-3	Hydrogen Fluoride
20. 1335-25-7	Lead Oxide
21. 7439-97-6	Mercury
22. 74-82-8	Methane
23. 91-20-3	Napthalene
24. 7440-02-0	Nickel
25. 7697-37-2	Nitric Acid
26. 7723-14-0	Phosphorus
27. 7778-50-9	Potassium Dichromate
28. 1310-58-3	Potassium Hydroxide
29. 115-07-1	Propylene
30. 10588-01-9	Sodium Dichromate
31. 1310-73-2	Sodium Hydroxide
32. 7646-78-8	Stannic Chloride
33. 7772-99-8	Stannous Chloride
34. 7664-93-9	Sulfuric Acid
35. 108-88-3	Toluene
36. 1330-20-7	Xylene
37. 7646-85-7	Zinc Chloride
38. 7733-02-0	Zinc Sulfate

II. HAZARDOUS SUBSTANCES

CAS Number	Chemical Name
1. 75-07-0	Acetaldehyde
2. 64-19-7	Acetic Acid
3. 108-24-7	Acetic Anhydride
4. 75-86-5	Acetone Cyanohydrin
5. 506-96-7	Acetyl Bromide
6. 75-36-5	Acetyl Chloride
7. 107-02-8	Acrolein
8. 107-13-1	Acrylonitrile
9. 124-04-9	Adipic Acid
10. 309-00-2	Aldrin
11. 10043-01-3	Aluminum Sulfate
12. 107-18-6	Allyl Alcohol
13. 107-05-1	Allyl Chloride
14. 7664-41-7	Ammonia
15. 631-61-8	Ammonium Acetate
16. 1863-63-4	Ammonium Benzoate
17. 1066-33-7	Ammonium Bicarbonate
18. 7789-09-5	Ammonium Bichromate
19. 1341-49-7	Ammonium Bifluoride
20. 10192-30-0	Ammonium Bisulfite
21. 1111-78-0	Ammonium Carbamate
22. 12125-02-9	Ammonium Chloride
23. 7788-98-9	Ammonium Chromate
24. 3012-65-5	Ammonium Citrate, Dibasic
25. 13826-83-0	Ammonium Fluoborate
26. 12125-01-8	Ammonium Fluoride
27. 1336-21-6	Ammonium Hydroxide
28. 6009-70-7	Ammonium Oxalate
29. 16919-19-0	Ammonium Silicofluoride
30. 7773-06-0	Ammonium Sulfamate
31. 12135-76-1	Ammonium Sulfide
32. 10196-04-0	Ammonium Sulfite
33. 14307-43-8	Ammonium Tartrate
34. 1762-95-4	Ammonium Thiocyanate
35. 7783-18-8	Ammonium Thiosulfate
36. 628-63-7	Amyl Acetate
37. 62-53-3	Aniline
38. 7647-18-9	Antimony Pentachloride
39. 7789-61-9	Antimony Tribromide
40. 10025-91-9	Antimony Trichloride
41. 7783-56-4	Antimony Trifluoride
42. 1309-64-4	Antimony Trioxide
43. 1303-32-8	Arsenic Disulfide
44. 1303-28-2	Arsenic Pentoxide
45. 7784-34-1	Arsenic Trichloride
47. 1303-33-9	Arsenic Trisulfide
48. 542-62-1	Barium Cyanide
49. 71-43-2	Benzene
50. 65-85-0	Benzoic Acid
51. 100-47-0	Benzonitrile
52. 98-88-4	Benzoyl Chloride
53. 100-44-7	Benzyl Chloride
54. 7440-41-7	Beryllium
55. 7787-47-5	Beryllium Chloride
56. 7787-49-7	Beryllium Fluoride
57. 13597-99-4	Beryllium Nitrate
58. 123-86-4	Butyl Acetate
59. 84-74-2	n-Butyl Phthalate
60. 109-73-9	Butylamine
61. 107-92-6	Butyric Acid
62. 543-90-8	Cadimium Acetate
63. 7789-42-6	Cadmium Bromide
64. 10108-64-2	Cadmium Chloride
65. 7778-44-1	Calcium Arsenate
66. 52740-16-6	Calcium Arsenite
67. 75-20-7	Calcium Carbide
68. 13765-19-0	Calcium Chromate
69. 592-01-8	Calcium Cyanide
70. 26264-06-2	Calcium Dodecylbenzene Sulfonate
71. 7778-54-3	Calcium Hypochlorite
72. 133-06-2	Captan
73. 63-25-2	Carbaryl
74. 1563-66-2	Carbofuran
75. 75-15-0	Carbon Disulfide
76. 56-23-5	Carbon Tetrachloride
77. 57-74-9	Chlordane
78. 7782-50-5	Chlorine
79. 108-90-7	Chlorobenzene
80. 67-66-3	Chloroform
81. 7790-94-5	Chlorosulfonic Acid
82. 2921-88-2	Chlorpyrifos
83. 1066-30-4	Chromic Acetate
84. 7738-94-5	Chromic Acid
85. 10101-53-8	Chromic Sulfate
86. 10049-05-5	Chromous Chloride
87. 544-18-3	Cobaltous Formate
88. 14017-41-5	Cobaltous Sulfamate
89. 56-72-4	Coumaphos
92. 142-71-2	Cupric Acetate
93. 12002-03-8	Cupric Acetoarsenite
94. 7447-39-4	Cupric Chloride
95. 3251-23-8	Cupric Nitrate
96. 5893-66-3	Cupric Oxalate
97. 7758-98-7	Cupric Sulfate
98. 10380-29-7	Cupric Sulfate Ammoniated
99. 815-82-7	Cupric Tartrate
100. 506-77-4	Cyanogen Chloride
101. 110-82-7	Cyclohexane
102. 94-75-7	2,4-D Acid
103. 94-11-1	2,4-D Esters
104. 50-29-3	DDT
105. 333-41-5	Diazinon
106. 1918-00-9	Dicamba
107. 1194-65-6	Dichlobenil
108. 117-80-6	Dichlone
109. 25321-22-6	Dichlorobenzene (all isomers)
110. 266-38-19-7	Dichloropropene (all isomers)
111. 26952-23-8	Dichloropropene (all isomers)
112. 8003-19-8	Dichloropropene-Dichloropropane Mixture
113. 75-99-0	2-2-Dichloropropionic Acid
114. 62-73-7	Dichlorvos
115. 60-57-1	Dieldrin
116. 109-89-7	Diethylamine
117. 124-40-3	Dimethylamine
118. 25154-54-6	Dinitrobenzene (all isomers)
119. 51-28-5	Dinitrophenol
120. 25321-14-6	Dinitrotoluene (all isomers)
121. 85-00-7	Diquat
122. 298-04-4	Disulfoton
123. 330-54-1	Diuron
124. 27176-87-0	Dodecylbenzenesulfonic Acid
125. 115-29-7	Endosulfan (all isomers)
126. 72-20-8	Endrin and Metabolites
127. 106-89-8	Epichlorohydrin
128. 563-12-2	Ethion
129. 100-41-4	Ethyl Benzene
130. 107-15-3	Ethylenediamine
131. 106-93-4	Ethylene Dibromide
132. 107-06-2	Ethylene Dichloride
133. 60-00-4	EDTA
134. 1185-57-5	Ferric Ammonium Citrate

II. HAZARDOUS SUBSTANCES

CAS Number	Chemical Name
137. 7783-50-8	Ferric Fluoride
138. 10421-48-4	Ferric Nitrate
139. 10028-22-5	Ferric Sulfate
140. 10045-89-3	Ferrous Ammonium Sulfate
141. 7758-94-3	Ferrous Chloride
142. 7720-78-7	Ferrous Sulfate
143. 206-44-0	Fluoranthene
144. 50-00-0	Formaldehyde
145. 64-18-6	Formic Acid
146. 110-17-8	Fumaric Acid
147. 98-01-1	Furfural
148. 86-50-0	Guthion
149. 76-44-8	Heptachlor
150. 118-74-1	Hexachlorobenzene
151. 87-68-3	Hexachlorobutadiene
152. 67-72-1	Hexachloroethane
153. 70-30-4	Hexachlorophene
154. 77-47-4	Hexachlorocyclopentadiene
155. 7647-01-0	Hydrochloric Acid (Hydrogen Chloride)
156. 7664-39-3	Hydrofluoric Acid (Hydrogen Fluoride)
157. 74-90-8	Hydrogen Cyanide
158. 7783-06-4	Hydrogen Sulfide
159. 78-79-5	Isoprene
160. 42504-46-1	Isopropanolamine Dodecylbenzenesulfonate
161. 115-32-2	Kelthane
162. 143-50-0	Kepone
163. 301-04-2	Lead Acetate
164. 3687-31-8	Lead Arsenate
165. 7758-95-4	Lead Chloride
166. 13814-96-5	Lead Fluoborate
167. 7783-46-2	Lead Fluoride
168. 10101-63-0	Lead Iodide
169. 18256-98-9	Lead Nitrate
170. 7428-48-0	Lead Stearate
171. 15739-80-7	Lead Sulfate
172. 1314-87-0	Lead Sulfide
173. 592-87-0	Lead Thiocyanate
174. 58-89-9	Lindane
175. 14307-35-8	Lithium Chromate
176. 121-75-5	Malthion
177. 110-16-7	Maleic Acid
178. 108-31-6	Maleic Anhydride
179. 2032-65-7	Mercaptodimethur
180. 592-04-1	Mercuric Cyanide
181. 10045-94-0	Mercuric Nitrate
182. 7783-35-9	Mercuric Sulfate
183. 592-85-8	Mercuric Thiocyanate
184. 10415-75-5	Mercurous Nitrate
185. 72-43-5	Methoxychlor
186. 74-93-1	Methyl Mercaptan
187. 80-62-6	Methyl Methacrylate
188. 298-00-0	Methyl Parathion
189. 7786-34-7	Mevinphos
190. 315-18-4	Mexacarbate
191. 75-04-7	Monoethylamine
192. 74-89-5	Monomethylamine
193. 300-76-5	Naled
194. 91-20-3	Naphthalene
195. 1338-24-5	Naphthenic Acid
196. 7440-02-0	Nickel
197. 15699-18-0	Nickel Ammonium Sulfate
198. 37211-05-5	Nickel Chloride
199. 12054-48-7	Nickel Hydroxide
200. 14216-75-2	Nickel Nitrate
201. 7786-81-4	Nickel Sulfate
202. 7697-37-2	Nitric Acid
203. 98-95-3	Nitrobenzene
204. 10102-44-0	Nitrogen Dioxide
205. 25154-55-6	Nitrophenol (all isomers)
206. 1321-12-6	Nitrotoluene
207. 30525-89-4	Paraformaldehyde
208. 56-38-2	Parathion
209. 608-93-5	Pentachlorobenzene
210. 87-86-5	Pentachlorophenol
211. 85-01-8	Phenanthrene
212. 108-95-2	Phenol
213. 75-44-5	Phosgene
214. 7664-38-2	Phosphoric Acid
215. 7723-14-0	Phosphorus
216. 10025-87-3	Phosphorus Oxychloride
217. 1314-80-3	Phosphorus Pentasulfide
218. 7719-12-2	Phosphorus Trichloride
219. 7784-41-0	Potassium Arsenate
220. 10124-50-2	Potassium Arsenite
221. 7778-50-9	Potassium Bichromate
222. 7789-00-6	Potassium Chromate
223. 7722-64-7	Potassium Permanganate
224. 2312-35-8	Propargite
225. 79-09-4	Propionic Acid
226. 123-62-6	Propionic Anhydride
227. 1336-36-3	Polychlorinated Biphenyls
228. 151-50-8	Potassium Cyanide
229. 1310-58-3	Potassium Hydroxide
230. 75-56-9	Propylene Oxide
231. 121-29-9	Pyrethrins
232. 91-22-5	Quinoline
233. 108-46-3	Resorcinol
234. 7446-08-4	Selenium Oxide
235. 7761-88-8	Silver Nitrate
236. 7631-89-2	Sodium Arsenate
237. 7784-46-5	Sodium Arsenite
238. 10588-01-9	Sodium Bichromate
239. 1333-83-1	Sodium Bifluoride
240. 7631-90-5	Sodium Bisulfite
241. 7775-11-3	Sodium Chromate
242. 143-33-9	Sodium Cyanide
243. 25155-30-0	Sodium Dodecylbenzene Sulfonate
244. 7681-49-4	Sodium Fluoride
245. 16721-80-5	Sodium Hydrosulfide
246. 1310-73-2	Sodium Hydroxide
247. 7681-52-9	Sodium Hypochlorite
248. 124-41-4	Sodium Methylate
249. 7632-00-0	Sodium Nitrate
250. 7558-79-4	Sodium Phosphate, Dibasic
251. 7601-54-9	Sodium Phosphate, Tribasic
252. 10102-18-8	Sodium Selenite
253. 7789-06-2	Strontium Chromate
254. 57-24-9	Strychnine and Salts
255. 100-420-5	Styrene
256. 12771-08-3	Sulfur Monochloride
257. 7664-93-9	Sulfuric Acid
258. 93-76-5	2,4,5-T Acid
259. 2008-46-0	2,4,5-T Amines
260. 93-79-8	2,4,5-T Esters
261. 13560-99-1	2,4,5-T Salts
262. 93-72-1	2,4,5-TP Acid
263. 32534-95-5	2,4,5-TP Acid Esters
264. 72-54-8	TDE
265. 95-94-3	Tetrachlorobenzene
266. 127-18-4	Tetrachloroethane
267. 78-00-2	Tetraethyl Lead
268. 107-49-3	Tetraethyl Pyrophosphate
269. 7446-18-6	Thallium (I) Sulfate
270. 108-88-3	Toluene
271. 8001-35-2	Toxaphene
272. 12002-48-1	Trichlorobenzene (all isomers)
273. 52-68-6	Trichlorfon
274. 25323-89-1	Trichloroethane (all isomers)
275. 79-01-6	Trichloroethylene
276. 25167-82-2	Trichlorophenol (all isomers)
277. 27323-41-7	Triethanolamine Dodecylbenzenesulfonate
278. 121-44-8	Triethylamine
279. 75-50-3	Trimethylamine
280. 541-09-3	Uranyl Acetate
281. 10102-06-4	Uranyl Nitrate
282. 1314-62-1	Vanadium Pentoxide
283. 27774-13-6	Vanadyl Sulfate
284. 108-05-4	Vinyl Acetate
285. 75-35-4	Vinylidene Chloride
286. 1300-71-6	Xylenol
287. 557-34-6	Zinc Acetate
288. 52628-25-8	Zinc Ammonium Chloride
289. 1332-07-6	Zinc Borate
290. 7699-45-8	Zinc Bromide
291. 3486-35-9	Zinc Carbonate
292. 7646-85-7	Zinc Chloride
293. 557-21-1	Zinc Cyanide
294. 7783-49-3	Zinc Fluoride
295. 557-41-6	Zinc Formate
296. 7779-86-4	Zinc Hydrosulfite
297. 7779-88-6	Zinc Nitrate
298. 127-82-2	Zinc Phenolsulfonate
299. 1314-84-7	Zinc Phosphide
300. 16871-71-9	Zinc Silicofluoride
301. 7733-02-0	Zinc Sulfate
302. 13746-89-9	Zirconium Nitrate
303. 16923-95-8	Zirconium Potassium Fluoride
304. 14644-61-2	Zirconium Sulfate
305. 10026-11-6	Zirconium Tetrachloride

ORGANIC SCREENING PROTOCOLS

February 1988

NUS FIT IV

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2

DRAFT

FASP Method 101, Screening for Volatile Organics in Water

General Discussion 1
Equipment 2
Photovac 10S50 2
Field kit 3
Set-Up and Calibration 3
Instrument Set-Up 3
Instrument Calibration 4
Preparation of Stock Standards 4
Preparation of Working Standards 6
Sample Collection and Preparation 6
Sample Collection 6
Sample Preparation 7
Screening Procedure 7
Additional considerations 8
Calculations 9
QA/QC 9

4

DRAFT

FASP Method 101, Screening for Volatile Organics in Water

1. General Discussion

This method uses gas chromatography (GC) and the head-space technique to estimate the concentrations of volatile organic compounds in water. It is written specifically for the Photovac 10S50 portable gas chromatograph, but can be used with a variety of GCs. This discussion does not cover all considerations involved in gas chromatographic screening/analysis. It is assumed that the operator is trained in the proper use and theory of gas chromatography.

This method does not list specific instrument conditions for specific compounds. Rather it discusses procedures that must be followed for all volatile screening methods. As field experience increases, methods containing instrument conditions for specific compounds will be incorporated into the FASP methods manual after peer review by the FASP working group.

The head-space technique is intended only for screening samples due to several assumptions made in implementing the technique. For example, it is assummed that the quantity and number of compounds found in the head-space over the liquid sample directly relate to the actual concentrations of compounds in the water sample. This is often a good assumption, especially in relatively clean or non-complex matrices. However, this assumption begins to break down for complex matices which are often found during the course of environmental investigations. Examples of complex matrices are oily wastes, multi-phase samples and many samples containing high levels of one or several compounds that might prevent the usual partitioning between the liquid and gas/vapor phases in the sample bottle. Synergistic (enhancing) or antagonistic (masking) effects may either artificially increase or decrease the resulting concentrations of specific compounds in the sample. Therefore, all screening data should be stamped with the rubber stamp in the field kit that qualifies the data. This stamp will help prevent use of the data for purposes that it is not intended .

This method should only be used to generate screening data which can be used to direct on-going field work or identify

5

samples that need additional analysis. Such analysis should be performed using more accurate methods such as the purge and trap method for volatiles analysis.

The Photovac 10S50 uses a Photoionization Detector (PID) to detect volatile compounds in samples. The principle of the PID is ionization of compounds by a high energy ultraviolet (UV) light source as they enter the ionization chamber of the detector. A high-voltage potential is applied across the detector to collect the ions produced. The collision of the ions onto the charged detector creates a current that can be quantitated. In general, the PID will only detect compounds that have an ionization potential near or below the energy of the UV light source (see Table 1). This makes the PID very selective. A properly trained analyst can use this selectiveness to his advantage in screening for specific classes of compounds. The Photovac 10S50 uses a 10.6 eV UV lamp in the PID. This energy level is well suited for detecting aromatic compounds but does not detect most aliphatic compounds. Most of the TCL volatile compounds typically checked for at hazardous waste sites are either aromatic or halogenated making the use of the PID well suited for this task.

2. Equipment

1. Photovac 10S50

The Photovac 10S50 gas chromatograph is a completely self-contained portable instrument well suited for field operations. It has a self-contained carrier gas cylinder with a capacity sufficient for up to 8 hours of operation.

The internal battery pack can supply power for eight hours or it can be operated using the external battery for up to 16 hours. A third means of power is the optional cigarette-lighter power adapter that can be plugged into a conventional automobile cigarette lighter. This is included in a separate field kit that contains equipment to support the Photovac GC in the field. The 10S50 also comes with a power cord for 115V AC power

The Photovac 10S50 GC is an ambient instrument (no

heated column) and therefore can only analyze samples that exist as a gas or vapor at ambient conditions. Liquid samples must never be injected into the Photovac because of its inability to vaporize them.

The 10S50 is suppied with a 4 foot SE-30 packed column and pre-column. This column is well suited for some of the volatile compounds commonly found at hazardous waste sites. A variety of other packed columns are also available. Refer to Photovac application note number 4 for a listing of specific compounds and columns best suited for their analysis.

The Photovac 10S50 is a very versatile instrument. For more detailed information, consult the owner's manual.

2. Field kit

The FASP field kit contains all accessories needed to calibrate the 10S50 and analyze field samples. Standards are not included because of the variety of specific site requirements. The FASP analyst must prepare applicable standards for each specific site. General standard mixes can also be prepared or purchased commercially which contain a groups of compounds.

3. **Set-Up and Calibration**

1. Instrument Set-Up

The Photovac 10S50 is an extremely sensitive ambient gas chromatograph able to produce reliable data in field situations in spite of variables such as temperature variation.

During a site investigation or other field activity where the Photovac GC is used, it should be placed in an area out of direct sunlight and extreme temperature variations to minimize shifts in retention times. If possible, it should be placed in an area that provides work space, a power supply and the most stable temperature environment. As mentioned above, the 10S50 is totally self-contained, however as a general rule, it is always best to set-up where the most support can be utilized. By minimizing temperature

variations, calibration procedures can be simplified. The Photovac GC (or any other field procedure) should never be used in a motel room or other off-site location.

2. Instrument Calibration

A standard containing each compound of interest must be injected into the 10S50 during calibration to establish a retention time and response factor for quantitation. The 10S50 will only do single-point calibration but the PID detector is linear over a wide concentration range so this should not present a problem. For screening, a single-point calibration is sufficient. Instrument linearity can be documented, however by bracketing the expected sample concentration range with standards of known concentrations. The analyst should prepare a mid-concentration standard as the calibration standard. After calibration, the low-concentration and high-concentration standards can be run in the same way as samples. If the instrument is linear, the low and high standards will be quantitated correctly. A correct quantitation is within 10% of the true value. Inaccurate quantitation can be the result of a non-linear working range or inaccurate standards.

1. Preparation of Stock Standards

Stock standards containing the compounds of interest should be prepared before going to the field. High concentration stock standards should be prepared in analytical-grade methanol. Small amounts of the stock standard should then be used to make up working standards in water that are used to calibrate the GC in the field. Use of methanol will insure that hyrophobic organic compounds remain miscible in the water standards. This will prevent the formation of separate organic phases in the water standards that will adversely affect the desired partioning in the head-space.

Concentrations required for screening will vary from site to site. Therefore, exact procedures for standards preparation cannot dictated. Whenever

possible, prepared standard should be purchased from commercial sources. When this is not possible, standards must be prepared from "neat" (pure) primary standards. This will require formulation of applicable standards consistent with the data quality objectives of the field activity. An example of this method is outlined below.

Preparation of 100 mg/l stock standards:

1) Partially fill a 100ml volumetric flask with analytical grade methanol.

2) For each compound of interest the amount of "neat" standard added is calculated by dividing the desired volume by the density of the liquid (see Table 1):

Example: 100mg/l Benzene stock standard (density= .8765 mg/ul)

$$\frac{\text{(Conc. of Std)} \quad \text{(Vol. of Std)}}{\text{Density of Std. Compound}} = \text{Amt. needed}$$

$$\frac{100\text{mg/l} \times 0.10\ \text{l}}{0.8765\ \text{mg/ul}} = 11.4\ \text{ul}$$

3) Use the 10ml syringe to add the required amount of standard. IMPORTANT: This is the most critical and important step in the stock standard preparation procedure.

4) After adding all compounds of interest, fill the flask to the mark with methanol and invert the flask at least ten times to mix.

2. Preparation of Working Standards

To prepare a 20ppb working standard in the field from the stock standard, the following procedure is used:

1) Completely fill a 40ml VOA vial (fitted with a septum cap) with distilled/deionized water. (Be sure to avoid all air bubbles in the vial.)

2) Withdraw exactly 10ml of the water using a 10ml syringe. Insert a second needle through the septum to allow air to fill the head space in the vial.

3) Determine the amount of stock standard to add to the vial:

General Formula :

(Conc. of Stock) (Vol of Stock)=(Conc. of Std)(Vol of Std)

(100mg/l)(Vol of Stock)=(.020mg/l)(.03 l)

$$\text{Vol of Stock} = \frac{(.020\text{mg/l})(.03\ \text{l})}{100\text{mg/l}} = .000006\ \text{l} = 6\ \text{ul}$$

4) Using the 10 ul syringe, inject 6 ul of working standard into the VOA vial.

5) Shake the vial vigorously for one minute.

6) Let the standard equilibrate for 15 minutes at ambient temperature (same as the samples)

7) The other standards are made in the same manner.

4. **Sample Collection and Preparation**

1. Sample Collection

Samples collected for on-site volatiles screening should be collected by the FIT sampling team in the usual manner, except that an additional VOA vial fitted with a septum cap is also filled. This vial is labeled and delivered to the FASP analyst. Additional vials should also be collected for QA/QC as determined in the site work plan.

to the FASP analyst. Additional vials should also be collected for QA/QC as determined in the site work plan.

2. Sample Preparation

VOA samples for field screening should be prepared as follows:

1) Using the clean 10ml syringe and vent needle, withdraw exactly 10ml of sample from the vial.

2) (optional) An internal standard can be injected into each sample to help compensate for shifts in retention times and reduce the number of calibration runs throughout the screening runs.

An internal standard can be injected into each sample prior to screening to correct for retention time changes and resulting peak recognition errors. The internal standard should be a compound that, 1) is not expected to be found in the samples, 2) has a retention time towards the end of the run (where the greatest shifts occur), and 3) is in the middle of the expected concentration range. By including this in all the samples, the Photovac can be easily recalibrated to adjust the retention times of all the identified peaks in the sample. This procedure avoids the need to run a separate calibration run each time the ambient temperature changes. If this method is used, the working standard must also contain the internal standard as a calibration peak.

3) After removing the syringe and vent needle, the vial is shaken vigorously for one minute.

4) Let the vial equillibrate for 15 minutes at ambient temperature. This must be identical to the temperature used to equillibrate the standards.

5) The samples are ready for screening.

5. Screening Procedure

When screening an unknown sample, the analyst should be careful not to inject high concentrations into the 10S50. This may result in instrument contamination or detector saturation. There are two ways to avoid or minimize this possibility. First, the HNu PI-101 or Photovac TIP-II can be used to check the

sample. This should be done in another partially filled larger sample bottle to compensate for the flow rates of those instruments. A second method is to inject progressively larger amounts of head space from the sample. This can begin by injecting only the amount of head space that osmotically fills the syringe needle without moving the syringe plunger. The amount injected can progress to a maximum injection volume of 2 ml of head space to obtain maximum sensitivity.

The order of standard and sample injections should be as follows:

1) Inject a blank head space sample to verify a clean baseline.

2) Inject the medium concentration calibration standard and calibrate the instrument.

3) Inject the low and high concentration standards to verify instrument linearity and bracket the expected sample concentration range.

4) Inject a second blank to check for carry-over. If the baseline is clean, proceed to the samples; if not, run additional blanks untill the baseline is clean.

1. Additional considerations

Samples should be injected in groups of 5-10 samples checking that each peak is correctly identified. If retention times shift, the internal standard can be used to reset the peak retention times. If no internal standard is used, a calibration run must be performed after each sample that shows a retention time shift. The sample must then be run again using the corrected retention times. Inbetween groups of samples, the calibration standard should be injected to recalculate all standard peak concentrations and retention times. The sample group size will be determined by regional requirements and site work plans. After each calibration standard, a blank must be injected to verify the clean baseline. A blank should also be injected after high-concentration samples to insure that there is no carry-over between sanples.

At the end of the day's run, the three working standards must be injected again to verify that the instrument has remained linear in the bracketed working range. All sample concentrations that fall outside this range must be reanalyzed using smaller injections to keep them in the working range. If most samples are outside the working range, the analyst may want to change instrument conditions.

The printout from the 10S50 is the primary record of the screening done by the analyst in the field. In addition to the information printed on the tape output, the analyst must record each sample ID number or description and the injection volume. At the end of the run, the analyst must sign each printout tape and record any other pertinent information such as the site name.

6. Calculations

All calculations are made automatically by the 10S50 except compensating for variable injection volumes. These variations must be well documented on the printout. Consult the owner's manual for details concerning instrument calibration.

7. QA/QC

For a detailed discussion regarding QA/QC protocols and considerations, refer to the FASP QA/QC manual.

As a minimum, the analyst should perform duplicate analysis and spikes on 5% of the samples. The spikes can be made exactly like the working standards in the field.

Precision and accuracy data are partly a functiuon of the sample matrix and are not available at this time.

Table 1

Compound	Density @ 20°C (mg/ml)		Boiling Point		IP (ev)
Chloromethane	.9459		-24.2		--
Bromomethane	1.6755		3.6		10.53
Vinyl Chloride	.9106		-13.4		10.00
Chloroethane	.8978		12.3		10.97
Methylene Chloride	1.3266		40		11.35
Acetone	.7899		56.2		9.69
Carbon Disulfide	1.2632		46.2		10.13
1,1-Dichloroethene	1.218		37		--
1,1 Dichloroethane	1.1757		57.3		11.06
Trans-1,2-Dichloroethene	1.2565		47.5		
Chloroform	1.4832		61.7		11.37
1,2-Dichloroethane	1.2351		83.5		11.04
2-Butanone	.8054		79.6		9.53
1,1,1-Trichloroethane	1.3390		74.1		11.23
Carbon Tetrachloride	1.5940		76.5		11.28
Vinyl Acetate	.9317		72.2		9.19
Bromodichloromethane	1.980		90		--
1,2-Dichloropropane	1.1560		96.4		10.87
Trans-1,3-Dichloropropene	--		--		--
Trichloroethene	1.4642		87		9.45
Dibromochloromethane	2.451		119		10.59
1,1,2-Trichloroethane	1.4397		113.8		--
Benzene	.8765		80.1		9.25
Cis-1,3-Dichloropropene	--		--		--
2-Chloroethylvinylether	--		--		--
Bromoform	2.8899		149.5		10.48
4-Methyl-2-Pentanone	.7978		116.8		--
2-Hexanone	.8115		128		--
Tetrachloroethene	1.6227		121		9.32
1,1,2,2-Tetrachloroethane	1.5953		146.2		--
Toluene	.8669		110.6		8.82
Chlorobenzene	1.1058		132		9.07
Ethylbenzene	.8670		136.2		8.76
Styrene	.9060		145.2		8.47
O-Xylene	.8802 (1)		144.4		--
M-Xylene	.8642		139.1		--
P-Xylene	.8611		138.3		--

(1) Measured at 10°C

14

DRAFT

FASP Method 201, Screening for Volatile Organics in Soil/Sediment

General Discussion 1
Equipment 2
Photovac 10S50 2
Field kit 3
Set-Up and Calibration 3
Instrument Set-Up 3
Instrument Calibration 4
Preparation of Stock Standards 4
Preparation of Working Standards 6
Sample Collection and Preparation 6
Sample Collection 7
Sample Preparation 7
Screening Procedure 9
Additional considerations 9
Calculations 10
QA/QC 10

17

DRAFT

FASP Method 201, Screening for Volatile Organics in Soil/Sediment

1. General Discussion

This method uses gas chromatography (GC) and the head-space technique to estimate the concentrations of volatile organic compounds in soils and sediments. It is written specifically for the Photovac 10S50 portable gas chromatograph, but can be used with a variety of GCs. This discussion can not cover all considerations involved in gas chromatographic screening/analysis. It is assumed that the operator is trained in the proper use and theory of gas chromatography.

This method does not specify fixed instrument conditions for specific compounds. Rather it discusses procedures that must be followed for all volatile screening methods. As field experience increases, methods containing instrument conditions for specific compounds will be incorporated into the FASP methods manual after peer review by the FASP working group.

The head-space technique is intended only for screening samples due to several assumptions made in implementing the technique. For example, it is assummed that the quantity and number of compounds found in the head-space over the soil/sediment sample directly relate to the actual concentrations of compounds in the soil/sediment sample. This is often a good assumption, especially in relatively clean or non-complex matrices. However, this assumption begins to break down for complex matices which are often found during the course of environmental investigations. Examples of complex matrices are oily wastes, multi-phase samples and many samples containing high levels of one or several compounds that might prevent the usual partitioning between the soil/sediment and gas/vapor phases in the sample bottle. Synergistic (enhancing) or antagonistic (masking) effects may either artificially increase or decrease the resulting concentrations of specific compounds in the sample. Therefore, all screening data should be stamped with the rubber stamp in the field kit that qualifies the data. This stamp will help prevent use of the data for purposes that it is not intended .

This method should only be used to generate screening data

18

which can be used to direct on-going field work or identify samples that need additional analysis. Such analysis should be performed using more accurate methods such as the purge and trap for volatiles analysis.

The Photovac 10S50 uses a Photoionization Detector (PID) to detect volatile compounds in samples. The principle of the PID is ionization of compounds by a high energy ultraviolet (UV) light source as they enter the ionization chamber of the detector. A high-voltage potential is applied across the detector to collect the ions produced. The collision of the ions onto the charged detector creates a current that can be quantitated. In general, the PID will only detect compounds that have an ionization potential less than or near the energy of the UV light source (see Table 1). This makes the PID very selective. A properly trained analyst can use this selectiveness to his advantage in screening for specific classes of compounds. The Photovac 10S50 uses a 10.6 eV UV lamp in the PID. This energy level is well suited for detecting aromatic and chlorinated compounds. Most of the TCL volatile compounds typically checked for at hazardous waste sites are either aromatic or halogenated making the use of the PID well suited for this task.

2. Equipment

1. Photovac 10S50

The Photovac 10S50 gas chromatograph is a completely self-contained portable instrument well suited for field operations. It has a self-contained carrier gas cylinder with a capacity sufficient for up to 8 hours of operation.

The internal battery pack can supply power for eight hours or it can be operated using 115VAC power. A third means of power is the optional cigarette-lighter power adapter that can be plugged into a conventional automobile cigarette lighter. This is included in a separate field kit that contains equipment to support the Photovac GC in the field.

The Photovac 10S50 GC is an ambient instrument (no heated column) and therefore can only analyze samples that exist as a gas or vapor at ambient conditions. Liquid samples

must never be injected into the Photovac because of its inability to vaporize them.

The 10S50 is supplied with a 4 foot SE-30 packed column and pre-column. This column is well suited for some of the volatile compounds commonly found at hazardous waste sites. A variety of other packed columns are also available. Refer to Photovac application note number 4 for a listing of specific compounds and columns best suited for their analysis.

The Photovac 10S50 is a very versatile instrument. For more detailed information, consult the owner's manual.

2. Field kit

The FASP field kit contains all accessories needed to calibrate the 10S50 and analyze field samples. Standards are not included because of the variety of specific site requirements. The FASP analyst must prepare applicable standards for each specific site. General standard mixes can also be prepared or purchased commercially which contain a group of commonly encountered compounds.

3. **Set-Up and Calibration**

1. Instrument Set-Up

The Photovac 10S50 is an extremely sensitive ambient gas chromatograph able to produce reliable data in field situations in spite of variables such as temperature variation.

During a site investigation or other field activity where the Photovac GC is used, it should be placed in an area out of direct sunlight and extreme temperature variations to minimize shifts in retention times. If possible, it should be placed in an area that provides work space, a power supply and the most stable temperature environment. As mentioned above, the 10S50 is totally self-contained, however as a general rule, it is always best to set-up where the most support can be utilized. By minimizing temperature variations, calibration procedures can be simplified. The Photovac GC (or any other field procedure) should never be

used in a motel room or other off-site location.

2. Instrument Calibration

A standard containing each compound of interest must be injected into the 10S50 during calibration to establish a retention time and response factor for quantitation. The 10S50 will only do single-point calibration but the PID detector is linear over a wide concentration range so this should not present a problem. For screening, a single-point calibration is sufficient. Instrument linearity can be documented, however by bracketing the expected sample concentration range with standards of known concentrations. Therefore, the analyst should prepare a mid-concentration standard as the calibration standard. After calibration, the low-concentration and high-concentration standards can be run in the same way as samples. If the instrument is linear, the low and high standards will be quantitated correctly. A correct quantitation is within 10% of the true value. Inaccurate quantitation can be the result of a non-linear working range or inaccurate standards.

For head-space screening of soil/sediment samples, standards are prepared as follows:

1. Preparation of Stock Standards

Stock standards containing the compounds of interest should be prepared before going to the field. High concentration stock standards should be prepared in analytical-grade methanol. Small amounts of the stock standard should then be used to make up working standards in water that are used to calibrate the GC in the field. Use of methanol will insure that hyrophobic organic compounds remain miscible in the water standards. This will prevent the formation of separate organic phases in the water standards that will adversely affect the desired partioning in the head-space.

Concentrations required for screening will vary from site to site. Therefore, exact procedures for standards preparation cannot dictated. Whenever

possible, prepared standards should be purchased from commercial sources. When this is not possible, standards must be prepared from "neat" (pure) primary standards. This will require formulation of applicable standards consistent with the data quality objectives of the field activity. An example of this method is outlined below.

Preparation of 1000 mg/l stock standards:

1) Partially fill a 100ml volumetric flask with analytical grade methanol.

2) For each compound of interest the amount of "neat" standard added is calculated by dividing the desired volume by the density of the liquid (see Table 1):

Example: 1000mg/l Benzene stock standard (density= .8765 mg/ul)

$$\frac{\text{(Conc. of Std)} \quad \text{(Vol. of Std)}}{\text{Density of Std. Compound}} = \text{Amt. needed}$$

$$\frac{1000\text{mg/l} \times 0.10\ \text{l}}{0.8765\ \text{mg/ul}} = 114\ \text{ul}$$

4) Use the 100ul syringe to add the required amount of standard. IMPORTANT: This is the most critical and important step in the stock standard preparation procedure.

4) After adding all compounds of interest, fill the flask to the mark with methanol and invert the flask at least ten times to mix.

DRAFT

2. Preparation of Working Standards

To prepare a 20ppm working standard in the field, the following procedure is used:

1) Completely fill a 40ml VOA vial (fitted with a septum cap) with distilled/deionized water. (Be sure to avoid all air bubbles in the vial.)

2) Withdraw exactly 10ml of the water using a 10ml syringe. Insert a second needle through the septum to allow air to fill the head space in the vial.

3) Determine the amount of stock standard to add to the vial:

General Formula :

(Conc. of Stock) (Vol of Stock)=(Conc. of Std)(Vol of Std)

$$(1000mg/l)(Vol\ of\ Stock)=(20mg/l)(.03\ l)$$

$$Vol\ of\ Stock = \frac{(20mg/l)(.03\ l)}{1000mg/l} = .0006\ l = 600\ ul\ ^{*}$$

* Adding this amount of stock standard will reult in a 6% error in the head-space volume. To avoid this, withdraw an additional 600 ul of water before adding the stock standard.

4) Using a syringe, inject 600 ul of stock standard into the VOA vial.

5) Shake the vial vigorously for one minute.

6) Let the standard equilibrate for 15 minutes at ambient temperature (same as the samples)

7) The other standards are made in the same manner.

4. **Sample Collection and Preparation**

23

DRAFT

FASP Method 201, Screening for Volatile Organics in Soil/Sediment

1. Sample Collection

Samples collected for on-site volatiles screening should be collected by the FIT sampling team in the usual manner, except that an additional 4 oz. bottle is also filled. This bottle is labeled and delivered to the FASP analyst. Additional 4 oz. bottles should also be collected for QA/QC as determined in the site work plan.

2. Sample Preparation

VOA samples for field screening can be prepared in several ways:

Soil can be simply placed in a VOA vial to equillibrate for a specific period of time followed by injection of the head space.

Another method is to add water to the soil in the VOA vial to create a slurry as follows:

1) Add 30 ml of water to a 40 ml VOA vial and mark the level of the water. Mark additional vials in the same way.

2) Add soil or sediment to one of these empty, marked vials to fill it approximately half full.

3) Add distilled/deionized water to the 30 ml mark and cap the vial with a septum cap.

4) (optional) An internal standard can be injected into each sample to help compensate for shifts in retention times and reduce the number of calibration runs throughout the screening runs.

An internal standard can be injected into each sample prior to screening to correct for retention time changes and resulting peak recognition errors. The internal standard should be a compound that, 1) is not expected to be found in the samples, 2) has a retention time towards the end of the run (where the greatest shifts occur), and 3) is in the middle of the expected concentration range. By including this in all the samples, the Photovac can be easily recalibrated to adjust the retention times of all the identified peaks in the sample. This procedure avoids the need to run a separate

24

calibration run each time the ambient temperature changes. If this method is used, the working standard must also contain the internal standard as a calibration peak.

5) Shake the vial vigorously for one minute.

6) Let the vial equillibrate for 15 minutes at ambient temperature. This must be identical to the temperature used to equillibrate the standards.

7) Repeat steps 5 & 6 three times.

8) The samples are ready for screening.

A third method is as follows:

1) Add 5 grams of soil or sediment to a 40ml VOA vial (weighing the vial is optional).

2) Add 5ml of reagent-grade methanol and shake vigorously for one minute.

3) Add 10ml of distilled/deionized water to the vial and cap it with a septum cap.

4) (optional) An internal standard can be injected into each sample to help compensate for shifts in retention times and reduce the number of calibration runs throughout the screening runs.

An internal standard can be injected into each sample prior to screening to correct for retention time changes and resulting peak recognition errors. The internal standard should be a compound that, 1) is not expected to be found in the samples, 2) has a retention time towards the end of the run (where the greatest shifts occur), and 3) is in the middle of the expected concentration range. By including this in all the samples, the Photovac can be easily recalibrated to adjust the retention times of all the identified peaks in the sample. This procedure avoids the need to run a separate calibration run each time the ambient temperature changes. If this method is used, the working standard must also contain the internal standard as a calibration peak.

5) Shake the vial vigorously for one minute.

6) Let the vial equillibrate for 15 minutes at ambient

DRAFT

temperature. This must be identical to the temperature used to equillibrate the standards.

7) Repeat steps 5 & 6 three times.

8) The samples are ready for screening.

5. Screening Procedure

When screening an unknown sample, the analyst should be careful not to inject high concentrations into the 10S50. This may result in instrument contamination or detector saturation. There are two ways to avoid or minimize this possibility. First, the HNu PI-101 or Photovac TIP-II can be used to check the sample. This should be done in another partially filled larger sample bottle to compensate for the flow rates of those instruments. A second method is to inject progressively larger amounts of head space from the sample. This can begin by injecting only the amount of head space that osmotically fills the syringe needle without moving the syringe plunger. The amount injected can progress to a maximum injection volume of 2 ml of head space to obtain maximum sensitivity.

The order of standard and sample injections should be as follows:

1) Inject a blank head space sample to verify a clean baseline.

2) Inject the medium concentration calibration standard and calibrate the instrument.

3) (optional) Inject the low and high concentration standards to verify instrument linearity and bracket the expected sample concentration range.

4) Inject a second blank to check for carry-over. If the baseline is clean, proceed to the samples; if not, run additional blanks untill the baseline is clean. (See the FASP QA/QC manual for more details.)

1. Additional considerations

Samples should be injected in groups of 5-10 samples checking that each peak is correctly identified. If retention times shift, the internal standard can be used to reset the peak retention times. If no internal standard is used, a

26

calibration run must be performed after each sample that shows a retention time shift. The sample must then be run again using the corrected retention times. In between groups of samples, the calibration standard should be injected to recalculate all standard peak concentrations and retention times. The sample group size will be determined by regional requirements and site work plans. After each calibration standard, a blank must be injected to verify the clean baseline. A blank should also be injected after high-concentration samples to insure that there is no carry-over between sanples.

At the end of the day's run, the working standard must be injected again to verify that the instrument has remained calibrated.

The printout from the 10S50 is the primary record of the screening done by the analyst in the field. In addition to the information printed on the tape output, the analyst must record each sample ID number or description and the injection volume. At the end of the run, the analyst must sign each printout tape and record any other pertinent information such as the site name.

6. Calculations

All calculations are made automatically by the 10S50 except compensating for variable injection volumes. These variations must be well documented on the printout. Consult the owner's manual for details concerning instrument calibration.

7. QA/QC

For a detailed discussion regarding QA/QC protocols and considerations, refer to the FASP QA/QC manual.

As a minimum, the analyst should perform duplicate analysis and spikes on 5% of the samples. The spikes can be made exactly like the working standards in the field.

Precision and accuracy data are partly a functiuon of the sample matrix and are not available at this time.

Table 1

Compound	Density @ 20°C (kg/ml)		Boiling Point		IP (ev)
Chloroethane	.9159		-24.2		--
Bromoethane	1.6759		3.6		10.53
Vinyl Chloride	.9106		-13.4		10.00
Chloroethene	.8978		12.3		10.97
Methylene Chloride	1.3266		40		11.33
Acetone	.7899		56.2		9.69
Carbon Disulfide	1.2632		46.2		10.13
1,1-Dichloroethene	1.218		37		--
1,1 Dichloroethene	1.1757		57.3		11.06
Trans-1,2-Dichloroethene	1.2565		47.5		
Chloroform	1.4832		61.7		11.37
1,2-Dichloroethane	1.2351		83.5		11.04
2-Butanone	.8054		79.6		9.53
1,1,1-Trichloroethane	1.3390		74.1		11.25
Carbon Tetrachloride	1.5940		76.5		11.28
Vinyl Acetate	.9317		72.2		9.19
Bromodichloromethane	1.980		98		--
1,2-Dichloropropane	1.1560		96.4		10.87
Trans-1,3-Dichloropropene	--		--		--
Trichloroethene	1.4642		87		9.45
Dibromochloromethane	2.451		119		10.59
1,1,2-Trichloroethane	1.4397		113.8		--
Benzene	.8765		80.1		9.25
Cis-1,3-Dichloropropene	--		--		--
2-Chloroethylvinylether	--		--		--
Bromoform	2.8899		149.5		10.48
4-Methyl-2-Pentanone	.7978		116.8		--
2-Hexanone	.8113		128		--
Tetrachloroethene	1.6227		121		9.32
1,1,2,2-Tetrachloroethane	1.5953		146.2		--
Toluene	.8669		110.6		8.82
Chlorobenzene	1.1058		132		9.07
Ethylbenzene	.8670		136.2		8.76
Styrene	.9060		145.2		8.47
O-Xylene	.8802 (1)		144.4		--
M-Xylene	.8642		139.1		--
P-xylene	.8611		138.5		--

(1) Measured at 18°C

28

FASP

AIR METHODS

29

DRAFT

FASP Method 301, Volatile Organics in Air

General Discussion 1
Equipment 2
Photovac 10S50 2
Field kit 3
Set-Up and Calibration 3
Instrument Set-Up 3
Instrument Calibration 4
Standards Preparation 4
Sample Collection and Preparation 7
Sample Collection 7
Sample Preparation 9
Analysis Procedure 9
Additional considerations 10
Calculations 11
QA/QC 11

30

DRAFT

FASP Method 301, Volatile Organics in Air

1. General Discussion

This method uses gas chromatography (GC) to determine the concentrations of volatile organic compounds in air. It is written specifically for the Photovac 10S50 portable gas chromatograph, but can be used with a variety of GCs. This discussion can not cover all considerations involved in gas chromatographic screening/analysis. It is assumed that the operator is trained in the proper use and theory of gas chromatography.

This method does not specify fixed instrument conditions for specific compounds. Rather it discusses general procedures that must be followed for all volatile organic analysis methods. As field experience increases, methods containing instrument conditions for specific compounds will be incorporated into the FASP methods manual after peer review by the FASP working group.

This method contains procedures for standards preparation which provide for very accurate quantitation of the final sample concentration. The most representative air sample results for volatile organics are obtained immediately after sampling due to their labile nature and short holding times. For these reasons, this method should be used for sample analysis as well as screening. (See the FASP QA/QC manual for explainations of these terms.)

The Photovac 10S50 uses a Photoionization Detector (PID) to detect volatile compounds in samples. The principle of the PID is ionization of compounds by a high energy ultraviolet (UV) light source as they enter the ionization chamber of the detector. A high-voltage potential is applied across the detector to collect the ions produced. The collision of the ions onto the charged detector creates a current that can be quantified. In general, the PID will only detect compounds that have an ionization potential less (sometimes slightly greater) than the energy of the UV light source (see Table 1). This makes the PID very selective. A properly trained analyst can use this selectiveness to his advantage in screening for specific classes

31

of compounds. The Photovac 10S50 uses a 10.6 eV UV lamp in the PID. This energy level is well suited for detecting aromatic and chlorinated compounds. Most of the TCL volatile compounds typically checked for at hazardous waste sites are either aromatic or halogenated making the use of the PID well suited for this task.

Air samples can be either grab or composite samples. Grab samples for organic volatile screening/analysis are typically taken by filling a Tedlar™ bag, evacuated vessel or GC syringe in the area to be tested. This type of sample is very unstable and must be analyzed immediately after filling. Therefore all grab samples for volatiles must be analyzed on site using the 10S50 GC.

Composite samples are usually taken by controlling the intake of air into an evacuated vessel over time or by pulling a metered amount of air through an adsorbant tube over time. Adsorbant media include Tenax™, Florisil™, XAD™ resin, carbon, Polyurethane foam (PUF) and others.

2. **Equipment**

1. Photovac 10S50

The Photovac 10S50 gas chromatograph is a completely self-contained portable instrument well suited for field operations. It has a self-contained carrier gas cylinder with a capacity sufficient for up to 8 hours of operation.

The internal battery pack can supply power for eight hours or it can be operated using the external battery for up to 16 hours. A third means of power is the optional cigarette-lighter power adapter that can be plugged into a conventional automobile cigarette lighter. This is included in a separate field kit that contains equipment to support the Photovac GC in the field. The 10S50 also comes with a power cord for 115V AC power.

The Photovac 10S50 GC is an ambient instrument (no heated column) and therefore can only analyze samples that exist as a gas or vapor at ambient conditions. Liquid samples must never be injected into the Photovac because of its

inability to vaporize them.

The 10S50 is supplied with a 6 foot SE-30 packed column and pre-column. This column is well suited for some of the volatile compounds commonly found at hazardous waste sites. A variety of other packed columns are also available. Refer to Photovac application note number 4 for a listing of specific compounds and columns best suited for their analysis.

The Photovac 10S50 is a very versatile instrument. For more detailed information, consult the owner's manual.

2. Field kit

The FASP field kit contains all accessories needed to calibrate the 10S50 and analyze field samples. Standards are not included because of the variety of specific site requirements. The FASP analyst must prepare applicable standards for each specific site. General standard mixes can also be prepared or purchased commercially which contain groups of compounds.

3. **Set-Up and Calibration**

1. Instrument Set-Up

The Photovac 10S50 is an extremely sensitive ambient gas chromatograph able to produce reliable data in field situations in spite of variables such as temperature flucuation.

During a site investigation or other field activity where the Photovac GC is used, it should be placed in an area out of direct sunlight and extreme temperature variations to minimize shifts in retention times. If possible, it should be placed in an area that provides work space, a power supply and the most stable temperature environment. As mentioned above, the 10S50 is totally self-contained, however as a general rule, it is always best to set-up where the most support can be utilized. By minimizing temperature variations, calibration procedures can be simplified. The Photovac GC (or any other field procedure) should never be used in a motel room or other improper off-site location.

DRAFT

2. *Instrument Calibration*

A standard containing each compound of interest must be injected into the 10S50 during the initial calibration to establish a retention time and response factor for quantitation. The 10S50 will only do single-point calibration, but the PID detector is linear over a wide concentration range so this should not present a problem. Instrument linearity must be documented during analysis by bracketing the expected sample concentration range with standards of known concentrations. The analyst should prepare a mid-concentration standard as the calibration standard. After calibration, the low-concentration and high-concentration standards are run in the same way as samples. If the instrument is linear, the low and high standards will be quantitated correctly. A correct quantitation is within 10% of the true value. Inaccurate quantitation can be the result of a non-linear working range or inaccurate standards. If this occurs, the standards must be remade or the working range adjusted.

1. Standards Preparation

Gaseous stock standards containing the compounds of interest can be purchased from commercial sources before going to the field.

Concentrations required for analysis will vary from site to site. Therefore, exact procedures for standards preparation cannot dictated. Whenever possible, prepared standards should be purchased from commercial sources. When this is not possible, standards must be prepared from "neat" (pure) primary standards. This will require formulation of applicable standards consistent with the data quality objectives of the field activity. Example of several methods are outlined below.

1. Commercially purchased standards

Customized standards can be purchased from several sources. A suitable mixture of 5 or 6 compounds (or more) at relatively high concentrations

34

(1-20 ppm) can be included in each of several canisters. The compounds chosen can be based on field experience and site histories to combine compounds commonly found together.

The standards can be used either diluted or undiluted to match site conditions as follows:

A. Undiluted Commercial Standards

1) Fill a Tedlar™ bag by connecting it to the canister.

2) Inject a 1ml aliquot into the 10S50 and calibrate it.

3) The linear behavior of the instrument can be checked by injecting varying amounts of sub-sample, i.e., a 0.5ml injection should produce a result half as much as a 1ml injection.

B. Diluted Commercial Standards

1) Using ultra-zero air, purge a 1000ml gas collection vessel.

2) Turn off the air and close both ends of the vessel.

3) Using the septum port on the vessel, withdraw 1ml of air and inject it into the GC to check for contamination.

4) Fill a Tedlar™ bag by connecting it to the standard canister.

5) Withdraw exactly 1ml from the bag and inject it into the 1000ml gas collection vessel.(This represents a dilution of 1000 so that a 5ppb standard can quickly and accurately be made from a 5ppm standard.

2. Standards made from head space vapors

Standards can also be made using the head-space vapor above pure standards. The amount of head space needed is dependent on the specific vapor pressure of each compound. In addition, the vapor pressure changes as a function of temperature and pressure. Therefore, these variables must be accounted for when preparing standards. An example of this method for preparation of a 5ppm trichloroethylene standard is as follows:

1) In the morning, before going to the site, call the local airport or weather station and ask for the barometric pressure. (For example, "30 inches and steady")

2) Using the thermometer in the field kit, check the temperature on site at the time the standards are prepared. (For example, 25°C)

3) Based on the temperature and pressure information, calculate the vapor pressure for site conditions from vapor pressure tables at standard temperature and pressure (STP). (Vapor pressure references are somewhat obscure. Information for some compounds is in the CRC Handbook for Chemistry and Physics, but this is almost useless for FASP purposes. Tables containing vapor pressures for all TCL compounds are being complied by FASP and Photovac personnel and will be available soon. An example is in Table 2.) Table 2 lists vapor pressures for trichloroehylene at specific temperatures (at one atmosphere). From Table 2, the vapor pressure of 74.268 mm of mercury is obtained for 25°C. Correct for the barometric pressure at the site: 30 inches of mercury (obtained from the weather service for that day) as follows:

One atmosphere=760 mm of mercury, or 29.92 inches of water

Corrected vapor pressure of trichloroethylene =

$$74.268 \times \frac{29.92}{30.0} = 74.070 \text{ mm of mercury}$$

4) To make a 5ppm standard of trichloroethylene in a 1000ml gas collection vessel, the amount of head space vapor to add is calculated as follows:

Amt.of vapor =

$$(\text{Conc. of Std.})\ (\text{Vol.of vessel}) \times \frac{760}{74.070} =$$

$$(5\text{ul/l} \times 1\ \text{l}) \times \frac{760}{74.070} = 51.3\ \text{ul}$$

5) Inject 51.3ul of head space into the 1000ml gas collection vessel to make a 5ppm trichloroethylene standard.

4. Sample Collection and Preparation

1. Sample Collection

Grab samples collected for on-site volatiles analysis should be collected by the FIT sampling team using Tedlar™

bags. All equipment needed for this task is in the field kit:

Tedlar™ bags
Sampling pump
Ridged plastic container
Teflon™ tubing

To collect a grab sample, the following procedure is followed:

1) A piece of Teflon™ tubing is attached to the open port on the Tedlar bag.

2) The bag is placed inside the ridged plastic container and the tubing is fed through the top of the container and tightened to prevent air leaks.

3) The sampling pump is connected to a second tube on the container used to evacuate it.

4) The pump is turned on creating a vacuum in the container that fills the Tedlar™bag with the sample.

5) When the bag is filled, the port on the Tedlar bag is closed and the bag is removed.

6) The bag is ready for analysis.

Composite samples collected using adsorbant tubes that are thermally desorbed for analysis can be analyzed on site if a Foxboro Programmed Thermal Desorber (PTD) is used in conjunction with a GC. Adsorbant media suited for this purpose are Tenax™ and several varieties of carbon. Samples can be collected as follows:

1) Tenax™ or activated carbon should be purchased and placed into tubes that will be used with the PTD.

2) Each tube should be placed into the PTD and thermally desorbed immediately prior to analysis.

3) A sample of the desorption should be injected to verify that the adsorbant tube is free of contamination.

4) The uncontaminated adsorbant tubes should be set up

and sampled according to established SOPs.

5) The tubes are collected after sampling and are ready for analysis. (Handling of the tubes during the entire sampling process is critical and extreme care should be taken to avoid contamination due to handling.)

2. Sample Preparation

There is no preparation needed for a grab air sample. However, an adsorbant tube must be thermally desorbed prior to analysis. The manufacturer's instructions should be consulted regarding the operation of the desorber. It is important that the adsorbant tubes are analyzed as soon after sampling as possible. This is especially true for Tenax™ tubes because of Tenax's™ tendency to pick up contamination as time passes.

An internal standard can be injected into each sample prior to analysis to correct for retention time changes and resulting peak recognition errors. The internal standard should be a compound that, 1) is not expected to be found in the samples, 2) has a retention time towards the end of the run (where the greatest shifts occur), and 3) is in the middle of the expected concentration range. By including this in all the samples, the Photovac can be easily recalibrated to adjust the retention times of all the identified peaks in the sample. This procedure avoids the need to run a separate calibration run each time the ambient temperature changes. If this method is used, the working standard must also contain the internal standard as a calibration peak. If this is used for samples in Tedlar™ bags, the volume of air in each bag must be the same in order to avoid quantitation errors.

5. **Analysis Procedure**

When analyzing an unknown sample, the analyst should be careful not to inject high concentrations into the 10S50. This may result in instrument contamination or detector saturation. There are two ways to avoid or minimize this possibility. First, the HNu PI-101 or Photovac TIP-II can be used to check the

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sample. A second method is to inject progressively larger amounts of head space from the sample. This can begin by injecting only the amount of head space that osmotically fills the syringe needle without moving the syringe plunger. The amount injected can progress to a maximum injection volume of 2 ml of head space to obtain maximum sensitivity.

The order of standard and sample injections is outlined in the FASP QA/QC manual.

1. Additional considerations

Samples should be injected in groups of 5-10 samples checking that each peak is correctly identified. If retention times shift, the internal standard can be used to reset the peak retention times. If no internal standard is used, a calibration run must be performed after each sample that shows a retention time shift. The sample must then be run again using the corrected retention times. In between groups of samples, the calibration standard should be injected to recalculate all standard peak concentrations and retention times. The sample group size will be determined by regional requirements and site work plans. After each calibration standard, a blank must be injected to verify the clean baseline. A blank should also be injected after high-concentration samples to insure that there is no carry-over between samples.

At the end of the day's run, the three working standards must be injected again to verify that the instrument has remained linear in the bracketed working range. All sample concentrations that fall outside this range must be reanalyzed using smaller injections to keep them in the working range. If most samples are outside the working range, the analyst may want to change instrument conditions.

The printout from the 10S50 is the primary record of the analysis done by the analyst in the field. In addition to the information printed on the tape output, the analyst must record each sample ID number or description and the injection volume. At the end of the run, the analyst must sign each

40

DRAFT

printout tape and record any other pertinent information such as the site name. Refer to the FASP QA/QC manual for more details.

6. **Calculations**

All calculations are made automatically by the 10S50 except compensating for variable injection volumes. These variations must be well documented on the printout. Consult the owner's manual for details concerning instrument calibration.

7. **QA/QC**

For a detailed discussion regarding QA/QC protocols and considerations, refer to the FASP QA/QC manual.

As a minimum, the analyst should perform duplicate analysis and spikes on 10% of the samples. The spikes can be made exactly like the working standards in the field.

Precision and accuracy data are partly a functiuon of the sample matrix and are not available at this time.

41

Table 1

Compound	Density @ 20°C (mg/ml)		Boiling Point		IP (ev)
Chloromethane	.9150		-24.2		--
Bromomethane	1.6755		3.6		10.53
Vinyl Chloride	.9106		-13.4		10.00
Chloroethane	.8978		12.3		10.97
Methylene Chloride	1.3266		40		11.35
Acetone	.7899		56.2		9.69
Carbon Disulfide	1.2632		46.2		10.13
1,1-Dichloroethene	1.218		37		--
1,1 Dichloroethane	1.1757		57.3		11.06
Trans-1,2-Dichloroethene	1.2565		47.5		
Chloroform	1.4832		61.7		11.37
1,2-Dichloroethane	1.2351		83.5		11.04
2-Butanone	.8054		79.6		9.53
1,1,1-Trichloroethane	1.3390		74.1		11.25
Carbon Tetrachloride	1.5940		76.5		11.28
Vinyl Acetate	.9317		72.2		9.19
Bromodichloromethane	1.980		90		--
1,2-Dichloropropane	1.1560		96.4		10.87
Trans-1,3-Dichloropropene	--		--		--
Trichloroethene	1.4642		87		9.45
Dibromochloromethane	2.451		119		10.59
1,1,2-Trichloroethane	1.4397		113.8		--
Benzene	.8765		80.1		9.25
Cis-1,3-Dichloropropene	--		--		--
2-Chloroethylvinylether	--		--		--
Bromoform	2.8899		149.5		10.48
4-Methyl-2-Pentanone	.7976		116.8		--
2-Hexanone	.8113		128		--
Tetrachloroethene	1.6227		121		9.32
1,1,2,2-Tetrachloroethane	1.5953		146.3		--
Toluene	.8669		110.6		8.82
Chlorobenzene	1.1058		132		9.07
Ethylbenzene	.8670		136.2		8.76
Styrene	.9060		145.2		8.47
O-Xylene	.8802 (1)		144.4		--
M-Xylene	.8642		139.1		--
P-Xylene	.8611		138.3		--

(1) Measured at 18°C

Table 2

Vapor pressure of Trichloroethylene

Temp °C	Vapor Press. (mm of Hg)
5	27.03251
10	35.35683
15	45.74057
16	48.0974
17	50.55512
18	53.11705
19	55.78667
20	58.5675
21	61.4631
22	64.47718
23	67.61339
24	70.87573
25	74.268
30	93.32106
35	116.256
40	143.6534
45	176.1468

DRAFT

FASP Quality Assurance/Quality Control Manual

Introduction 1
On-site conditions and set-up 1
Organization 2
Standard Operating Procedures (SOPs) 2
Training 3
Consumables 3
Method protocols 4
Screening 4
Calibration 5
Controls 6
Matrix Spikes 6
Duplicates 7
Detection limits 7
Screening sequence 8
Analysis 8
Calibration 9
Controls 10
Matrix Spikes 11
Duplicates 12
Dilutions 12
Standard Additions 12
Detection limits 13
Analysis sequence 13
Documentation 13
Standard Operating Procedures (SOPs) 14
Screening/Analysis Documentation 14
Record keeping 14

45

DRAFT

FASP Quality Assurance/Quality Control Manual

1. Introduction

This manual is written to present the minimum requirements for data generated as part of the Field Analytical Screening Project (FASP). Regional data users may require more rigorous QA/QC requirements; however, data generated without the protocols described herein will not be acceptable to meet the pre-remedial Data Quality Objectives (DQOs) associated with screening and/or analysis.

This document's importance cannot be over-stated, nor the need to comply with it. Data generated on or off site must have defined predictable and consistent quality that matches its intended uses whether that involves identifying samples for CLP analysis or generating data used for HRS ranking.

This manual includes not only the QA/QC protocols for the FASP methods used, but also considerations for training, organization and documentation. It is intended to cover all major QA/QC topics that influence the daily operation of FASP and the final data produced. The final data generated depends on a comprehensive QA/QC approach that includes each step taken to produce that data.

2. On-site conditions and set-up

To help minimize problems in the field and ensure the smoothest operation possible, it is important to research the site's history and refer to previous sample results to determine the site contaminants and whether field screening/analysis is appropriate.

Not all sites or site activities are applicable to FASP capabilities. The goals of the field activity as defined in the work plan or DQOs must be matched to FASP capabilities. Sites at which only 1 or 2 samples are taken (Preliminary Assessments (PAs) or very small Site Investigations (SIs)) will probably not be good candidates for field screening due to the associated planning and level of effort (LOE) required for mobilization. In addition, if the contaminants at the site are unknown or questionable, field screening may not be appropriate. Unknown contaminants may not be detected by certain field

46

DRAFT

instruments. For example, if screening for volatile organics, PCBs will not be detected. Therefore, when the start-up effort is not justifiable or the contaminants at a site are inappropriate, a CLP lab should be used.

If FASP samples are deemed appropriate, planning should include (but not be limited to) the following:

- Make arrangements to provide 24-hour security if leaving equipment on site.
- Arrange for utilities if needed.
- Assemble supplies and equipment needed to meet the site goals/DQOs.
- Prepare stock standards prior to going to the field if appropriate.
- Prepare all items possible prior to going to the field, i.e. minimize tasks to be done in the field.
- Prepare adequate support equipment to meet FASP safety requirements

3. Organization

The FASP working group, composed of the Zone I and II Screening Managers (ZSMs)and Regional Screening Coordinators (RSCs) serves a most important QA/QC function. Its organization provides regional input and centralized decision-making capability. This is essential in assuring a consistent and predictable quality product and policies that are followed by all persons involved.

Anyone wishing to incorporate a specific method or protocol into the FASP Standard Operating Procedures (SOPs), must submit a draft to the working group for review. All methods and policies will be reviewed by the working group and other interested persons, i.e. interested regional EPA QA/QC personnel. After this peer-review process, the adopted protocols will be incorporated into the FASP SOPs.

4. Standard Operating Procedures (SOPs)

A FASP SOP will be issued for all areas requiring standardization to insure a consistent product. Initially, this

47

will include FASP QA/QC protocols and FASP screening and analysis methods. All changes and additions will be submitted to the FASP working group for peer review as mentioned in Section 3.0.

5. **Training**

It will be the Zone Screening Manager's and Regional Screening Coordinators' responsibility to provide training to all personnel involved in FASP activities. Training will include proper use and care of all instrumentation, QA/QC protocols, safety procedures and screening/analysis procedures. Training is the most important yet often neglected part of QA/QC. It is imperative that each person is aware of the "hows and whys" of FASP procedures and protocols to insure that they are properly implemented.

Training is planned as part of each phase of FASP deployment as well as periodically afterwards. Several mechanisms, such as regional audits will be used to determine the need for additional training.

6. **Consumables**

Consumables are those items used up during sample screening/analysis. These include gases, solvents, chemicals, standards, glassware, etc. This is where some labs try to cut costs by buying seemingly identical but less expensive items than their current supply. However, this often results in sample contamination, standard deteriorization or unexplained QA/QC problems. Or worse, undetected enhancements or supressions of the sample values.

The manufacturer's recommendations should always be followed when ordering and using consumables for their instruments. Usually the cost savings on less expensive gases, solvents and glassware are insignificant unless many, many samples are analyzed. If contamination does occur, any savings are quickly lost during the down-time required to fix the problem.

If less expensive consumables seem to be of good quality, they should be tested before the stock of regular supplies is

DRAFT

depleted. If a problem does occur from the new supplies, their use can be discontinued and the regular supplies used as before. This procedure will avoid the necessity of relying on defective consumables because that is all that is in stock.

As a rule, all solvents, chemicals, gases and standards should be dated and initialed by the person receiving them when they arrive from the vendor. This is especially important for items with short shelf lives. This will only take a short time but may prevent the use of out-dated supplies before their use can cause problems. It can also help track down sources of problems if they occur. Additionally, when large stock piles of consumables are stored, checking the date can insure that the oldest supplies are used first.

7. Method protocols

7.1. Screening

There are many opinions as to what screening is and how screening data should be used. For the purposes of FASP, screening data will be defined as preliminary data that is used to select meaningful and appropriate samples for further analysis (CLP) or to provide feedback in the field that can direct on-going work.

On-going work can include, but is not limited to, the following:

-Site characterization and determining the extent of contaminant migration

-Soil-gas sampling to track sub-surface leachate plumes and to help place monitoring wells

-Determining the aquifer of concern and the proper depth to place monitoring well screens

-Monitoring PRP removal operations

49

DRAFT

7.1.1. Calibration

All instruments used to screen samples must be used by properly trained personnel and be set-up following the manufacturer's instructions unless instructed to the contrary in a specific application. Once operating, the instrument must be allowed to equillibrate for a time to insure steady-state operation.

Calibration procedures for instruments used in screening samples are less rigorous than typically found in analytical laboratories. Instead of the multi-point calibration curve approach, a single calibration standard can be used to estimate the sample concentrations. The standard should contain all compounds to be screened. The analyst should not rely on secondary standards to obtain results. This is less critical for screening, but should be avoided if possible. A fairly good approximation of the sample concentration can be obtained if the sample concentration is within 20% of the standard concentration or is within the linear range of the instrument.

Before injecting a calibration standard, a blank must be injected to verify a clean baseline. Once this is done calibration can begin. If a clean baseline cannot be obtained after repeated blank injections, follow each step below until a clean baseline is obtained:

1) Remake a new blank solution in clean glassware.

2) Reinject the blank. If the baseline is still dirty:

3) Remake the blank with new reagents.

4) Reinject the new blank. If the baseline is still dirty:

5) Check the instrument for proper settings and operation.

DRAFT

6) Reinject the blank. If the baseline is still dirty:

7) Shut down the instrument and begin trouble-shooting procedures based on the manufacturer's manual.

8) Repeat the injection procedure. If the baseline is still dirty:

9) Shut down the instrument and find assistance.

Once the baseline is clean, continue to calibrate the instrument according to the FASP QA/QC protocols.

7.1.2. Controls

A control as described in this case is a commercially prepared standard containing a known concentration of the analyte of interest. After calibration of the instrument, the control is run as a sample. The resulting quantitation is used as a check of the accuracy of the standards. A result out of the acceptable range can indicate deteriorating standards or improperly prepared standards. The acceptable range of the control result is usually determined by inter-laboratory comparisons and is included on the information sheet supplied by the manufacturer. While less critical for screening, a control is a good way to quickly determine the accuracy of the calibration.

7.1.3. Matrix Spikes

Matrix spikes are made by adding a known amount of the compound of interest to a separate aliquot or sub-sample of one of the samples in the sample set. The sample chosen should be representative of the matrix-type in the other samples of the group. While less important for screening purposes, a matrix spike can help

51

determine the accuracy of the method for each matrix type. High spike recoveries (> 125%) indicating positive error are not a major problem for screening since additional analysis will be performed. However, a low spike recovery may indicate false negatives in the other samplesas a result of an inappropriate application of the method or matrix interference. Therefore a matrix spike should be performed at least once in each group of twenty samples, or once for each matrix type tested which ever is more.

The amount of spike added should be approximately the same concentration of the samples being screened. If all the samples are blank, the spike should be close to the concentration of the calibration standard.

The spike recovery is calculated as follows:

$$\% \text{ recovery} = \frac{[\text{sample} + \text{spike}] - [\text{sample}]}{[\text{spike added}]} \times 100$$

7.1.4. Duplicates

Duplicates are used as an indication of the precision of the method. They should be performed on identical sub-samples to avoid the variables associated with the sampling technique. (Field duplicates are used for these purposes.) For screening, duplicates are less important than for analysis. However, as a minimum, one sample in each group of twenty should be screened in duplicate to estimate the precision of the method for each matrix.

7.1.5. Detection limits

The final detection limits achieved for a given sample are the combination of the instrument detection limits, method detection linits and the influence of the sample matrix. These factors produce an instrument signal-to-noise ratio used to determine the final detection limits. As a general rule, the quoted minimum

detection limit used for FASP data should be two times the signal-to-noise ratio. This value will vary for each analysis and should be determined independently during the analysis.

7.1.6. Screening sequence

The sequence of screening should be the following:

1) Instrument blank
2) Method blank
3) Calibration standard
4) Control
5) Method blank
6) Sample group (10-20 samples)
7) Matrix spike
8) Duplicate
9) Calibration standard
10) Method blank
11) Repeat steps 6-10 until all samples are run
12) Calibration standard

The size of the sample group will be determined by the site work plan or DQOs.

In addition to this sequence, a blank should be run after all samples with large concentrations to verify that there is no sample carry-over.

7.2. Analysis

The definition of field analysis data generated through FASP is data that is confirmed screening data with a degree of confidence to meet stated pre-remedial DQOs and which complements CLP data. The level of confidence associated with this analysis data is higher than that for screening data because of more rigorous calibration and QA/QC protocols and additional procedures such as second column GC confirmation. This confirmation reduces the probability that interferences will be misidentified as the compound of interest. The combination of CLP data and FASP analysis data provides a mix well suited to meet certain site goals. These

goals (DQOs) can include the following:

-Site characterization and determining the extent of contaminant migration that complement CLP data at Expanded Site Investigation (ESI) sites.

-Air monitoring, both grab and composite (adsorbant tubes), to support HRS ranking.

-Monitoring PRP removal operations

7.2.1. Calibration

All instruments used to analyze samples must be used by properly trained personnel and be set-up following the manufacturer's instructions unless instructed to the contrary in a specific application. Once operating, the instrument must be allowed to equillibrate for a time sufficient to insure steady-state operation.

The calibration procedure for instruments used to analyze samples must be the multi-standard (at least three) calibration curve approach. The multi-standard calibration technique is used to verify that the samples are within the linear working range of the instrument. The standards should contain all compounds to be analyzed and their concentrations should bracket the sample concentration range. Any sample result falling outside the established linear calibration range should be diluted and reanalyzed. The analyst should never rely on secondary standards to obtain results.

Before injecting a calibration standard, a blank must be injected to verify a clean baseline. Once this is done, calibration can begin. If a clean baseline cannot be obtained after repeated blank injections, follow each step below until a clean baseline is obtained:

1) Remake a new blank solution in clean glassware;

2) Reinject the blank. If the baseline is still dirty:

3) Remake the blank with new reagents;

4) Reinject the new blank. If the baseline is still dirty:

5) Check the instrument for proper settings and operation;

6) Reinject the blank. If the baseline is still dirty:

7) Shut down the instrument and begin trouble-shooting procedures based on the manufacturer's manual.

8) Repeat the injection procedure. If the baseline is still dirty:

9) Shut down the instrument and find assistance.

Once the baseline is clean, calibrate the instrument according to the FASP QA/QC protocols.

7.2.2. Controls

A control as described in this case is a commercially prepared standard containing a known concentration of the analyte of interest. After calibration of the instrument, the control is run as a sample. The resulting quantitation is used as a check of the accuracy of the standards. A result out of the acceptable range can indicate deteriorating or improperly prepared standards. The acceptable range of the control result is usually determined by inter-laboratory comparisons and is included on the information sheet supplied by the manufacturer. A control is a good way to

quickly determine the accuracy of the calibration. The control should always be included in each analysis.

The results obtained for controls can be used to generate control charts. Each result is used to establish an exceptable variation. Over time these results are statistically analyzed to obtain a standard deviation. The results are plotted graphically with limits of plus or minus two standard deviations. Control results outside these limits signify that corrective action is needed.

7.2.3. Matrix Spikes

Matrix spikes are made by adding a known amount of the compound of interest to a separate aliquot or sub-sample for one of the samples in the sample set. The sample chosen should be representative of the matrix-type in the other samples of the group. A matrix spike can help determine the accuracy of the method for each matrix type. High spike recoveries (> 125%) indicate a positive error. To determine if the error is a result of a matrix effect or analytical error, another spike is run. If the same result is obtained, it is attributed to the sample matrix and documented as such. A low spike recovery may indicate false negatives as a result of an inappropriate application of the method or as a result of a matrix effect. Once again, the spike is rerun to determine if the error is a matrix effect.

A matrix spike should be performed at least once in each group of ten samples, or once for each matrix type tested which ever is more. The amount of spike added should be approximately the same concentration of the samples being analyzed. If all the samples are blank, the spike should be close to the concentration of the mid-concentration calibration standard. The spiked sample results should be within the documented linear range of the method.

The spike recovery is calculated as follows:

$$\% \text{ recovery} = \frac{[\text{sample} + \text{spike}] - [\text{sample}]}{[\text{spike added}]} \times 100$$

7.2.4. Duplicates

Analytical duplicates are used as an indication of the precision of the method. They should be performed on identical sub-samples to avoid the variables associated with the sampling technique. (Field duplicates are used for these purposes.) . As a minimum, one sample in each group of ten should be analyzed in duplicate to estimate the precision of the method for each matrix.

7.2.5. Dilutions

Sample dilution is sometimes used to determine if matrix effects are biasing the results. Analyzing half as much sample, should produce a concentration half as much as the original result. If there is a matrix influence effecting the result, it will be either more or less than half. This can be used as a second check on the accuracy of the result.

7.2.6. Standard Additions

The method of standard additions is sometimes used to obtain accurate results in the pressence of matrix effects (i.e. metals analysis is sea water). A sub-sample is first run in the usual way. Then different concentrations of standard are added to separate, identical sub-samples and analyzed identically as the sample. The matrix effect will exhibit a consistent bias for all the sub-samples, either enhancing or supressing the result. The results can be plotted to obtain the "true" result. Detailed instructions for the method of standard addition should be obtained before trying the procedure. One disadvantage is that at least three separate sample runs must be performed to obtain a single result.

7.2.7. Detection limits

The final detection limits achieved for a given sample are the combination of the instrument detection limits, method detection linits and the influence of the sample matrix. These factors produce an instrument signal-to-noise ratio used to determine the final detection limits. As a general rule, the quoted minimum detection limit used for FASP data should be two times the signal-to-noise ratio. This value will vary for each analysis and should be determined independently during the analysis.

7.2.8. Analysis sequence

The sequence of analysis should be the following:

1) Instrument blank
2) Method blank
3) Calibration standards (at least three)
4) Method blank
5) Control
6) Method blank
7) Sample group (5-10 samples)
8) Matrix spike
9) Duplicate
10) Mid-concentration calibration standard
11) Method blank
12) Repeat steps 7-11 until all samples are run
13) Calibration standards (at least three)

The size of the sample group will be determined by the site work plan or DQOs.

In addition to this sequence, a blank should be run after all samples with large concentrations to verify that there is no sample carry-over.

8. Documentation

An important part of the final data-product is documentation. Every variable needs to be documented so that another trained analyst can determine exactly what was done by

examining the raw data generated during screening/analysis. Some of the major areas of documentation are discussed below.

8.1. Standard Operating Procedures (SOPs)

One of the most important pieces of a complete documentation regime is a detailed set of Standard Operating Procedures (SOPs). These serve as a reference describing procedures and protocols that must be followed to maintain the standard of quality required by the project's goals. As mentioned earlier, the set of FASP SOPs includes QA/QC protocols, screening/analysis methods and safety procedures. All SOPs are reviewed and approved for use by the FASP working group. This is essential in producing a consistent level of quality. The peer-review process described in Section 3 is used to incorporate all new procedures and protocols used in the FASP project. This will insure a dynamic process allowing for continual improvements and up-dates that will be applied consistently throughout the project.

8.2. Screening/Analysis Documentation

During screening or analysis procedures, all raw data must be well documented for future reference and to support the DQOs associated with it. Among the variables that must be documented are the following:

1) The method used
2) The sample identifications
3) The instrument conditions
4) Variables associated with sample preparation (i.e. sample weight or volume)
5) All variables used in the calculations of results.

8.3. Record keeping

All data and reports generated from that data must be kept for future reference. A filing system should be established to keep copies of all raw data generated.

ADAPTED FROM:

ENVIRONMENTAL PROTECTION AGENCY

REGION IV, ATHENS, GA 30613

SCREENING METHOD FOR EXTRACTABLE ORGANIC COMPOUNDS

1.0 SCOPE AND APPLICATION

1.1 This method describes the rapid screening of water and soil/sediment samples to determine if extractable organic compounds are present. It is designed to identify tentatively a small group of extractable organic compounds (see Tables 1, 2, and 3) that are commonly found at hazardous waste sites.

1.2 All other compounds detected are reported with a retention time and an estimated concentration range.

1.3 This method utilizes gas chromatography.

1.4 Estimated detection limits fro the extractable organics are 5-1000 ug/l (ppb) for water and 0.5-100 ug/g (ppm) for soil/sediment. See Tables 1 and 2 for more details.

1.5 Data generated by this method allows only rapid evaluation of a site. It is used to determine if sampling for complete analyses by standard EPA analytical methods is warranted and where the samples should be taken. The data should not be used for ranking a site or for enforcement purposes since only limited quality control procedures are required and the reported data is qualified as estimated.

2.0 SUMMARY OF METHOD

Samples are solvent extracted; hexane is used for organochlorine pesticides and polychlorinated biphenyls (PCBs) and methylene chloride is used for base/neutral/acids (BNAs). Soil/sediment samples are extracted by liquid-solid extraction and water samples by liquid-liquid extraction. The extracts are analyzed by gas chromatographs equipped with fused silica capillary columns and flameionization and electron capture detectors.

60

TABLE 1

EXTRACTABLE COMPOUNDS FOR SCREENING ANALYSIS

Compounds	Retention Time min.	Water Quantitation Limit ug/L
Phenol	5:24	100
Naphthalene	9:31	100
Acenaphthene	14:50	100
Pentachlorophenol	18:54	1000
Phenanthrene	19:17	100
Di-n-butylphthalate	21:28	200
Fluoranthene	22:59	100
Pyrene	23:39	200
p-Terphenyl*	24:20	
Chrysene	27:34	500
Bis (2-ethylhexyl) phthalate	28:06	500

EC DETECTABLE COMPOUNDS

Aldrin*		
Arodor 1260	multipeak	25

* Surrogate compound

61

TABLE 2

ESTIMATED DETECTION LIMITS FOR EXTRACTABLES

Detector/Compound Type	Water ug/L (ppb)	Sediment/Soil ug/g (ppm)
Flameionization detector		
Polyaromatic hydrocarbons	100-5000	10-500
Phenols	100-10000	10-1000
Other non-halogenated compounds	100-5000	10-500
Electron capture detector		
Aroclor 1260	25	2.5
Most halogenated compounds	5	0.5
Organosulfur, phosphorus, nitrogen or oxygen compounds	50	5

67

3.0 INTERFERENCES

3.1 Solvents, reagents, glassware and other processing hardware may yield discrete artifacts and/or interferences to sample analyses. Method blanks must be run to demonstrate that the materials are interference-free under the conditions of the analysis.

4.0 APPARATUS AND MATERIALS

4.1 Gas chromatograph: An analytical system complete with a temperature programmable gas chromatograph and all required accessories including analytical columns, gases, detector and printer/plotter capable of retention time labeling of peaks and providing peak height or peak area measurements.

4.1.1 Column: 30m x 0.53 mm ID DB-5,1 micron film thickness, fused-silica capillary column (FSCC) (J&W Scientific or equivalent).

4.1.2 Detector 1: Flameionization detector
Optional detector - Photoionization.

4.1.3 Detector 2: Electron capture detector.

4.2 Balance: Top loading, capable of accurately weighing 0.1 g.

4.3 Glass scintillation vials: At least 20 mL, with screw cap and Teflon or aluminum foil liner. Glass culture tubes with screw caps and Teflon liners may be substituted for water extraction.

4.4 Spatula: Stainless steel or Teflon.

4.5 Serological glass pipets: 5 and 25 ml, disposable.

4.6 Pasteur glass pipets: 1 ml, disposable.

4.7 Bench top centrifuge: (optional) and holders for 20 ml culture tubes. May be used for breaking emulsions.

5.0 REAGENTS

5.1 Sodium sulfate: anhydrous, reagent grade, heated at 400°C for 4 hr., collected in a desiccator and stored in a glass bottle. Baker anhydrous powder, catalog #73898 or equivalent.

5.2 Methylene chloride, hexane: pesticide residue quality or equivalent.

5.3 Sulfuric acid: 1:1 mix equal volume of concentrated sulfuric acid (ACS) with distilled or distilled, deionized water.

5.4 Stock solutions: Commercially prepared stock standards can be used at any concentration if they are certified by the manufacturer or by an independent source.

5.4.1 Prepare stock standard solutions at a concentration of 1.00 ug/ul by dissolving 0.0100 g of assayed reference material in methanol and diluting to volume in a 10 ml volumetric flask. (It may be necessary to use 5-10 percent toluene to dissolve all compounds.) Larger volumes can be used at the convenience of the analyst. When compound purity is assayed to be 96% or greater, the weight can be used without correction to calculate the concentration of the stock standard.

5.4.2 Transfer the stock standard solutions into Teflon-sealed screw-cap bottles. Store at 4°C and protect from light. Stock standards should be checked frequently for signs of degradation or evaporation, especially just prior to preparing calibration standards.

5.4.3 Stock standard solutions must be replaced after six months, or sooner if comparison with check standards indicates a problem.

5.5 Calibration standard: A calibration standard mixture is prepared by dilution of the stock standards. Secondary dilutions may be necessary. The mixture contains all BNA compounds in Table 1 at a concentration of 10 ug/ml (per compound). The PCB calibration standard is in hexane at a concentration of 0.010 ng/ul for aldrin and 0.25 ng/uL for Aroclor 1260.

64

5.6 Surrogate standard: The surrogate is p-terphenyl for BNA's and aldrin for PCBs. A stock surrogate solution in methanol should be prepared as described in Paragraph 5.1. The BNA surrogate standard spiking solution is prepared from the stock at a concentration of 500 ug/1 mL in methanol. The PCB surrogate standard spiking solution contains 0.2 ug/1 mL of aldrin in methanol.

5.7 Matrix spike standard: A matrix spike standard is prepared from the appropriate stock solutions as outlined in Paragraph 5.1. The extractable organic mixture contains all BNA compounds in Table 1 at a concentration of 10 ug/ml ~~mL~~ (per compound) in methanol. The pesticide mixture contains 100 ng/ml of each of the sixteen listed pesticides (Table 3).

5.8 Reagent Water: Reagent water is defined as water in which an interferent is not observed at the method detection limit (MDL) of the parameters of interest.

6.0 SAMPLE STORAGE

6.1 The sample must be iced or refrigerated (4°C) from time of collection until extraction.

6.2 All samples must be extracted within 7 days and completely analyzed within 30 days of collection based on sample stability. However, the contract may require a shorter turnaround of data, based on site resampling requirements.

7.0 PROCEDURE

7.1 All samples and standard solutions must be allowed to warm to ambient temperature before analysis. The following procedures show preparation of two extracts for each sample. These two preparations are identical, except for the extraction solvents. Methylene Chloride is used for BNAs, to be detected by FID or PID. Hexane is used for pesticides/PCBs, to be detected by ECD. To prepare extracts for both detectors, perform only a single hexane extraction for each sample. (Do not run methylene chloride on ECD!)

7.2 Extractation of Water

15

7.2.1 Pipet two, 15 ml portions of a water sample into two 20 mL disposable tubes. Label one BNA and the other PCB. Add 150 uL of the appropriate surrogate standard to each sample.

7.2.1.1 For the BNA extraction, acidify the sample to pH<2 using sulfuric acid. Add 1.5 mL of methylene chloride, cap and shake the vial for 2 minutes. Allow the layers to separate. If an emulsion forms, centrifuge for a few minutes to break it. Use a Pasteur disposable pipet to withdraw about 1 mL of the lower layer (methylene chloride). Transfer it to a 2 mL GC vial.

7.2.1.2 For the PCB extraction, add 1.5 mL of hexane, cap and shake the vial for 2 minutes. Allow the layers to separate. If an emulsion forms, centrifuge for a few minutes to break it. Use a Pasteur disposable pipet to withdraw about 1 mL of the upper (Hexane) layer. Transfer it to a 2 mL GC vial.

7.2.2 Pipet two 15 mL portions of reagent water into separate 20 mL disposable tubes for the BNA and PCB blanks. Also select a sample to be used as a matrix spike and pipet two portions as for blanks. Add 150 uL or the appropriate surrogate standard to each blank and spike and 150 uL of the appropriate matrix spike to the spike samples. Then proceed with extraction as outlined in 7.2.1.1 and 7.2.1.2.

7.3 <u>Extraction of soil/sediment</u>

7.3.1 Transfer two 2 g portions (record weight to the nearest 0.1g) of sample to separate 20 mL scintillation vials. Wipe the mouth of the vial with a tissue to remove any sample material and record the exact weight of sample taken. Cap the vial before proceeding with the next sample to avoid any cross contamination.

7.3.2 Add 2 g of anhydrous sodium sulfate to the sample in each 20 mL vial and mix well. Additional sodium sulfate (up to 2 g) may be added, to achieve a "free-flowing powder."

66

7.3.3 Transfer two 2 g portions of anhydrous sodium sulfate into separate 20 mL scintillation vials for BNA and PCB blanks. Also select a sample expected to be relatively low or free of organic contaminants to be used as the matrix spike sample. Set up two, 2 g portions as for the blank and mix with 2 g of sodium sulfate. Add 1 mL of the appropriate surrogate standard to each blank and spike and 1 mL of the appropriate matrix spike to the spike samples.

7.3.4 Immediately add 10.0 mL of solvent to the sample, spike or blanks. Mix throughly (vortex) for 2 minutes.
BNAs: methylene chloride
PCBs: hexane

7.4 Analysis by Gas Chromatography

7.4.1 Recommended GC conditions:

	FTD	ECD
Initial column temperature	60°c	60°C
Initial column holding time	2 min.	2 min.
Column temperature program	8°C/min.	8°C/min.
Final column temperature	280°C	280°C
Final column holding time	16 min.	4 min.
Onjection port temperature	250°C	230°C
Detector temperature	250°C	350°C
Carrier gas flow rate	0.7-1 cm/sec	0.7-1 cm/sec
Carrier gas	helium	helium
Make up gas		95% argon/5% methane

7.4.2 See Figures 1, 2, 3 and 4 for chromatograms. The chromatograms for Aroclors 1242 and 1254 are included to assist in the identification of PCBs.

7.4.3 Inject 4 ul of sample extract. Extracts should be injected in the following sequence:

#1 Reagent blank

67

#2 Calibration standard

#3 Matrix spike

#4-13 Sample extracts

#14 Solvent blank

#15-24 Sample extracts

#25 Solvent blank*

#26 Calibration standard*

* If less then 20 samples are analyzed in a day, this QC required after the last sample extract.

GC/ECD extracts must be diluted or re-plotted so that the majority of peaks are on scale. This is required so that the PCB pattern is recognizable. No dilutions are required for extracts analyzed by GC/FID unless >50% of the chromatogram is off scale.

7.4.4 Calculate and report results on the data reporting sheet. If extract dilutions are made, record the size of the dilution.

7.5 Calculations

7.5.1 External standard calibration is used for the calculation of the compounds of interest. The concentration of each Table 1 analyte may be determined by the following formulas:

7.5.1.1 Aqueous sample

Concentration (ug/L) = $[(A)(V_t)(D)] / [(V_1)(V_s)]$ where:

A = Detected amount of material injected, ng.

V_1 = Volume of extract injected, ul.

D = Dilution factor if dilution was made on the sample prior to analysis. If no dilution made, D = 1, and is dimensionless.

V_t = Volume of total extract, uL.

V_s = Volume of sample extracted, mL.

7.5.2 Nonaqueous samples

concentration (ug/g) = $[(A)(V_t)(D)] / [(V_1)(W)]$ where:

68

W = Wet weight of sample extracted, in mg.

A, Vt, D and Vi have the same difinition as for aqueous samples.

7.5.3 Report results without correction for recovery data. Soil/sediment will be reported on a wet weight basis.

7.5.4 Unknown compound concentrations are estimated by using p-terphenyl response for BNAs or aldrin response for ECD compounds.

7.5.5 Report up to maximum of fifteen BNA extractable unknowns and fifteen ECD unknowns. Choose the fifteen that are the highest apparent concentration

8.0 QUALITY CONTROL

8.1 A reagent blank and matrix spike must be extracted with each set of samples, with a maximum of 20 samples per set.

8.2 All samples, blanks, standards and spikes must be spiked with a surrogate standard containing p-terphenyl for the BNA extracts and aldrin for the PCB extracts. Calculate recovery after analysis. If recovery is not within the range of 50-150%, another portion of smple must be analyzed. Report all surrogate data on the appropriate form. If the surrogate recovery still exceeds the ± 50% limits on the second analysis, report the data and footnote that surrogate data was high or low.

8.3 A reagent blank and calibration standard must be analyzed each day at the beginning of the GC analysis sequence. Include a solvent blank after every 10 sample extracts and again at the end of the sequence along with a calibration standard. The maximum number of sample extracts per sequence is 20.

8.3.1 The reagent and solvent blanks must be free of all analytes in Table 1.

8.3.2 The response of the most sensitive analyte inthe calibration standard (50 ng/analyte) must be greater than 30% of full scale.

TABLE 3

ORGANOCHLORINE PESTICIDES

(EPA METHOD 608)

Solutions All .1 mg/ml (100 ug/ml)	5 ml Solutions CAT. NO.
Aldrin	F89S
Dieldrin	F90S
p,p'-DDT	F92S
p,p'-DDE	F93S
p,p'-DDD	F94S
Endosulfan I	F202S
Endosulfan II	F203S
Endosulfan sulfate	F97S
Endrin	F98S
Endrin aldehyde	F99S
Heptachlor	F100S
Heptachlor epoxide	F101S
a-BHC	F102S
b-BHC	F103S
g-BHC	F104S
d-BHC	F105S

70

APPENDIX B

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36787 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-02

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1110 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N299

UG/KG	ANALYTICAL RESULTS
31000U	CHLOROMETHANE
31000U	BROMOMETHANE
31000U	VINYL CHLORIDE
31000U	CHLOROETHANE
20000U	METHYLENE CHLORIDE
31000U	ACETONE
16000U	CARBON DISULFIDE
16000U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
16000U	1,1-DICHLOROETHANE
16000U	1,2-DICHLOROETHENE (TOTAL)
16000U	CHLOROFORM
16000U	1,2-DICHLOROETHANE
31000UR	*METHYL ETHYL KETONE*
16000U	1,1,1-TRICHLOROETHANE
16000U	CARBON TETRACHLORIDE
31000UJ	VINYL ACETATE
16000U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
16000U	1,2-DICHLOROPROPANE
16000U	CIS-1,3-DICHLOROPROPENE
16000U	TRICHLOROETHENE(TRICHLOROETHYLENE)
16000U	DIBROMOCHLOROMETHANE
16000U	1,1,2-TRICHLOROETHANE
16000U	BENZENE
16000U	TRANS-1,3-DICHLOROPROPENE
16000U	BROMOFORM
31000U	METHYL ISOBUTYL KETONE
31000UJ	METHYL BUTYL KETONE
16000U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
16000U	1,1,2,2-TETRACHLOROETHANE
12000J	*TOLUENE*
16000U	CHLOROBENZENE
16000U	ETHYL BENZENE
16000U	STYRENE
300000	TOTAL XYLENES
20	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36787 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-02
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1110 STOP: 00/00/00
D. NUMBER: N299

UG/KG	ANALYTICAL RESULTS
25000	ALPHA-BHC
15000U	BETA-BHC
15000U	DELTA-BHC
15000U	GAMMA-BHC (LINDANE)
15000U	HEPTACHLOR
15000U	ALDRIN
15000U	HEPTACHLOR EPOXIDE
15000U	ENDOSULFAN I (ALPHA)
30000U	DIELDRIN
320000C	4,4'-DDE (P,P'-DDE)
130000	ENDRIN
30000U	ENDOSULFAN II (BETA)
820000C	4,4'-DDD (P,P'-DDD)
30000U	ENDOSULFAN SULFATE
230000J	4,4'-DDT (P,P'-DDT)

UG/KG	ANALYTICAL RESULTS
150000U	METHOXYCHLOR
30000U	ENDRIN KETONE
—	CHLORDANE (TECH. MIXTURE) /1
240000C	GAMMA-CHLORDANE /2
480000C	ALPHA-CHLORDANE /2
300000U	TOXAPHENE
150000U	PCB-1016 (AROCLOR 1016)
150000U	PCB-1221 (AROCLOR 1221)
150000U	PCB-1232 (AROCLOR 1232)
150000U	PCB-1242 (AROCLOR 1242)
150000U	PCB-1248 (AROCLOR 1248)
300000U	PCB-1254 (AROCLOR 1254)
300000U	PCB-1260 (AROCLOR 1260)
20	PERCENT MOISTURE

FOOTNOTES
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*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.
*C-CONFIRMED BY GCMS 1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36789 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-03
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1140 STOP: 00/00/00
D. NUMBER: N300

UG/KG	ANALYTICAL RESULTS
100U	ALPHA-BHC
31	BETA-BHC
100U	DELTA-BHC
100U	GAMMA-BHC (LINDANE)
100U	HEPTACHLOR
100U	ALDRIN
310	HEPTACHLOR EPOXIDE
100U	ENDOSULFAN I (ALPHA)
300JN	DIELDRIN
500J	4,4'-DDE (P,P'-DDE)
210U	ENDRIN
87	ENDOSULFAN II (BETA)
270JN	4,4'-DDD (P,P'-DDD)
210U	ENDOSULFAN SULFATE
67J	4,4'-DDT (P,P'-DDT)

UG/KG	ANALYTICAL RESULTS
1000U	METHOXYCHLOR
210U	ENDRIN KETONE
--	CHLORDANE (TECH. MIXTURE) /1
3900C	GAMMA-CHLORDANE /2
2500C	ALPHA-CHLORDANE /2
2100U	TOXAPHENE
1000U	PCB-1016 (AROCLOR 1016)
1000U	PCB-1221 (AROCLOR 1221)
1000U	PCB-1232 (AROCLOR 1232)
1000U	PCB-1242 (AROCLOR 1242)
1000U	PCB-1248 (AROCLOR 1248)
2100U	PCB-1254 (AROCLOR 1254)
2100U	PCB-1260 (AROCLOR 1260)
23	PERCENT MOISTURE

FOOTNOTES
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*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.
*C-CONFIRMED BY GCMS 1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36787 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-02
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1110 STOP: 00/00/00
MD NUMBER: N299

MG/KG	ANALYTICAL RESULTS	MG/KG	ANALYTICAL RESULTS
2700J	ALUMINUM	36J	MANGANESE
2U	ANTIMONY	0.10U	MERCURY
2.5	ARSENIC	5U	NICKEL
34	BARIUM	470U	POTASSIUM
0.22U	BERYLLIUM	0.33U	SELENIUM
1UJ	CADMIUM	1UJ	SILVER
2200J	CALCIUM	370	SODIUM
13J	CHROMIUM	0.22U	THALLIUM
2.5UJ	COBALT	NA	TIN
85	COPPER	5.7	VANADIUM
2100J	IRON	260	ZINC
110	LEAD	13	PERCENT MOISTURE
400U	MAGNESIUM		

REMARKS

REMARKS

FOOTNOTES
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*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36785 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-01 COLLECTION START: 06/13/89 0835 STOP: 00/00/00
CASE NUMBER: 12126 SAS NUMBER: MD NUMBER: N295

ANALYTICAL RESULTS

UG/L		UG/L	
56000	ALUMINUM	5	MANGANESE
10U	ANTIMONY	0.60J	MERCURY
4U	ARSENIC	20U	NICKEL
130	BARIUM	2600U	POTASSIUM
2U	BERYLLIUM	2U	SELENIUM
3UJ	CADMIUM	5UJ	SILVER
25000	CALCIUM	4600	SODIUM
39	CHROMIUM	2U	THALLIUM
20U	COBALT	NA	TIN
10	COPPER	15	VANADIUM
2200	IRON	20U	ZINC
6J	LEAD		
1600U	MAGNESIUM		

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

4

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36797 SAMPLE TYPE: GROUNDWA
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: TW-02

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 1235 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N397

UG/L	ANALYTICAL RESULTS
10UJ	CHLOROMETHANE
10U	BROMOMETHANE
10U	VINYL CHLORIDE
10U	CHLOROETHANE
20U	METHYLENE CHLORIDE
20UJ	ACETONE
58J	CARBON DISULFIDE
5U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
5U	1,1-DICHLOROETHANE
5U	1,2-DICHLOROETHENE (TOTAL)
5U	CHLOROFORM
5U	1,2-DICHLOROETHANE
10U	METHYL ETHYL KETONE
5U	1,1,1-TRICHLOROETHANE
5U	CARBON TETRACHLORIDE
10UJ	VINYL ACETATE
5U	BROMODICHLOROMETHANE

UG/L	ANALYTICAL RESULTS
4J	1,2-DICHLOROPROPANE
5U	CIS-1,3-DICHLOROPROPENE
5U	TRICHLOROETHENE(TRICHLOROETHYLENE)
5UJ	DIBROMOCHLOROMETHANE
5U	1,1,2-TRICHLOROETHANE
29	BENZENE
5UJ	TRANS-1,3-DICHLOROPROPENE
5UJ	BROMOFORM
10U	METHYL ISOBUTYL KETONE
10U	METHYL BUTYL KETONE
5U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
5U	1,1,2,2-TETRACHLOROETHANE
20U	TOLUENE
150	CHLOROBENZENE
220	ETHYL BENZENE
5U	STYRENE
550J	TOTAL XYLENES

REMARKS

REMARKS

FOOTNOTES
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*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
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6

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36797 SAMPLE TYPE: GROUNDWA
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: TW-02

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 1:35 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N397

UG/L	ANALYTICAL RESULTS
10U	PHENOL
10U	BIS(2-CHLOROETHYL) ETHER
10U	2-CHLOROPHENOL
10U	1,3-DICHLOROBENZENE
12	1,4-DICHLOROBENZENE
10U	BENZYL ALCOHOL
10U	1,2-DICHLOROBENZENE
10U	2-METHYLPHENOL
10U	BIS(2-CHLOROISOPROPYL) ETHER
10U	(3-AND/OR 4-)METHYLPHENOL
10U	N-NITROSODI-N-PROPYLAMINE
10U	HEXACHLOROETHANE
10U	NITROBENZENE
10U	ISOPHORONE
10U	2-NITROPHENOL
10U	2,4-DIMETHYLPHENOL
50UJ	BENZOIC ACID
10U	BIS(2-CHLOROETHOXY) METHANE
10U	2,4-DICHLOROPHENOL
10U	1,2,4-TRICHLOROBENZENE
13	NAPHTHALENE
10U	4-CHLOROANILINE
10U	HEXACHLOROBUTADIENE
10U	4-CHLORO-3-METHYLPHENOL
10	2-METHYLNAPHTHALENE
10U	HEXACHLOROCYCLOPENTADIENE (HCCP)
10U	2,4,6-TRICHLOROPHENOL
50U	2,4,5-TRICHLOROPHENOL
10U	2-CHLORONAPHTHALENE
50U	2-NITROANILINE
10U	DIMETHYL PHTHALATE
10U	ACENAPHTHYLENE
10U	2,6-DINITROTOLUENE

UG/L	ANALYTICAL RESULTS
50UJ	3-NITROANILINE
10U	ACENAPHTHENE
50UJ	2,4-DINITROPHENOL
50U	4-NITROPHENOL
10U	DIBENZOFURAN
10UJ	2,4-DINITROTOLUENE
10U	DIETHYL PHTHALATE
10U	4-CHLOROPHENYL PHENYL ETHER
10U	FLUORENE
50UJ	4-NITROANILINE
50U	2-METHYL-4,6-DINITROPHENOL
10U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
10U	4-BROMOPHENYL PHENYL ETHER
10U	HEXACHLOROBENZENE (HCB)
50UR	PENTACHLOROPHENOL
10U	PHENANTHRENE
10U	ANTHRACENE
10U	DI-N-BUTYLPHTHALATE
10U	FLUORANTHENE
10U	PYRENE
10U	BENZYL BUTYL PHTHALATE
20UJ	3,3'-DICHLOROBENZIDINE
10U	BENZO(A)ANTHRACENE
10U	CHRYSENE
10U	BIS(2-ETHYLHEXYL) PHTHALATE
10U	DI-N-OCTYLPHTHALATE
10UJ	BENZO(B AND/OR K)FLUORANTHENE
10U	BENZO-A-PYRENE
10UJ	INDENO (1,2,3-CD) PYRENE
10U	DIBENZO(A,H)ANTHRACENE
10U	BENZO(GHI)PERYLENE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36797 SAMPLE TYPE: GROUNDWA
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: TW-02
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 1235 STOP: 00/00/00
D. NUMBER: N397

UG/L	ANALYTICAL RESULTS
17	ALPHA-BHC
5.5	BETA-BHC
20	DELTA-BHC
1.2	GAMMA-BHC (LINDANE)
1.1	HEPTACHLOR
3.1	ALDRIN
0.10U	HEPTACHLOR EPOXIDE
0.10U	ENDOSULFAN I (ALPHA)
1.3	DIELDRIN
0.20U	4,4'-DDE (P,P'-DDE)
0.51	ENDRIN
0.20U	ENDOSULFAN II (BETA)
0.20U	4,4'-DDD (P,P'-DDD)
0.20U	ENDOSULFAN SULFATE
0.20U	4,4'-DDT (P,P'-DDT)

UG/L	ANALYTICAL RESULTS
0.10U	METHOXYCHLOR
0.20U	ENDRIN KETONE
--	CHLORDANE (TECH. MIXTURE) /1
3.1	GAMMA-CHLORDANE /2
0.10U	ALPHA-CHLORDANE /2
2.0U	TOXAPHENE
1.0U	PCB-1016 (AROCLOR 1016)
1.0U	PCB-1221 (AROCLOR 1221)
1.0U	PCB-1232 (AROCLOR 1232)
1.0U	PCB-1242 (AROCLOR 1242)
1.0U	PCB-1248 (AROCLOR 1248)
2.0U	PCB-1254 (AROCLOR 1254)
2.0U	PCB-1260 (AROCLOR 1260)

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.
*C-CONFIRMED BY GCMS 1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36797 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-02 COLLECTION START. 06/14/89 1235 STOP: 00/00/00
CASE NUMBER: 12126 SAS NUMBER: MD NUMBER: N397

UG/L	ANALYTICAL RESULTS	UG/L	ANALYTICAL RESULTS
190000	ALUMINUM	64	MANGANESE
8U	ANTIMONY	0.71J	MERCURY
12J	ARSENIC	90U	NICKEL
880	BARIUM	21000	POTASSIUM
2U	BERYLLIUM	2U	SELENIUM
3UJ	CADMIUM	5UJ	SILVER
54000	CALCIUM	46000	SODIUM
130	CHROMIUM	2U	THALLIUM
15	COBALT	NA	TIN
110	COPPER	140	VANADIUM
9600	IRON	350U	ZINC
9J	LEAD		
7800	MAGNESIUM		

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36795 SAMPLE TYPE: GROUNDWA
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: TW-03

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 1025 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N305

UG/L	ANALYTICAL RESULTS
250U	CHLOROMETHANE
250U	BROMOMETHANE
250U	VINYL CHLORIDE
250U	CHLOROETHANE
130U	METHYLENE CHLORIDE
300U	ACETONE
130U	CARBON DISULFIDE
130U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
130U	1,1-DICHLOROETHANE
130U	1,2-DICHLOROETHENE (TOTAL)
130U	CHLOROFORM
130U	1,2-DICHLOROETHANE
250U	METHYL ETHYL KETONE
130U	1,1,1-TRICHLOROETHANE
130U	CARBON TETRACHLORIDE
250U	VINYL ACETATE
130U	BROMODICHLOROMETHANE

UG/L	ANALYTICAL RESULTS
130U	1,2-DICHLOROPROPANE
130U	CIS-1,3-DICHLOROPROPENE
130U	TRICHLOROETHENE(TRICHLOROETHYLENE)
130U	DIBROMOCHLOROMETHANE
130U	1,1,2-TRICHLOROETHANE
130U	BENZENE
130U	TRANS-1,3-DICHLOROPROPENE
130U	BROMOFORM
250U	METHYL ISOBUTYL KETONE
250U	METHYL BUTYL KETONE
130U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
130U	1,1,2,2-TETRACHLOROETHANE
730N	TOLUENE
140	CHLOROBENZENE
720	ETHYL BENZENE
130U	STYRENE
4400	TOTAL XYLENES

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36795 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-03 COLLECTION START: 06/14/89 1025 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N305

UG/L	ANALYTICAL RESULTS
10U	PHENOL
10U	BIS(2-CHLOROETHYL) ETHER
10U	2-CHLOROPHENOL
10U	1,3-DICHLOROBENZENE
10U	1,4-DICHLOROBENZENE
10U	BENZYL ALCOHOL
10U	1,2-DICHLOROBENZENE
23	2-METHYLPHENOL
10U	BIS(2-CHLOROISOPROPYL) ETHER
32	(3-AND/OR 4-)METHYLPHENOL
10U	N-NITROSODI-N-PROPYLAMINE
10U	HEXACHLOROETHANE
10U	NITROBENZENE
20	ISOPHORONE
10U	2-NITROPHENOL
10U	2,4-DIMETHYLPHENOL
50UJ	BENZOIC ACID
10U	BIS(2-CHLOROETHOXY) METHANE
10U	2,4-DICHLOROPHENOL
10U	1,2,4-TRICHLOROBENZENE
100	NAPHTHALENE
10U	4-CHLOROANILINE
10U	HEXACHLOROBUTADIENE
10U	4-CHLORO-3-METHYLPHENOL
56	2-METHYLNAPHTHALENE
10U	HEXACHLOROCYCLOPENTADIENE (HCCP)
10U	2,4,6-TRICHLOROPHENOL
23J	2,4,5-TRICHLOROPHENOL
10U	2-CHLORONAPHTHALENE
50U	2-NITROANILINE
10U	DIMETHYL PHTHALATE
10U	ACENAPHTHYLENE
10U	2,6-DINITROTOLUENE

UG/L	ANALYTICAL RESULTS
50UJ	3-NITROANILINE
10U	ACENAPHTHENE
50UJ	2,4-DINITROPHENOL
50U	4-NITROPHENOL
10U	DIBENZOFURAN
10UJ	2,4-DINITROTOLUENE
40U	DIETHYL PHTHALATE
10U	4-CHLOROPHENYL PHENYL ETHER
10U	FLUORENE
50UJ	4-NITROANILINE
50U	2-METHYL-4,6-DINITROPHENOL
10U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
10U	4-BROMOPHENYL PHENYL ETHER
10U	HEXACHLOROBENZENE (HCB)
50UR	PENTACHLOROPHENOL
10U	PHENANTHRENE
10U	ANTHRACENE
10U	DI-N-BUTYLPHTHALATE
10U	FLUORANTHENE
10U	PYRENE
10U	BENZYL BUTYL PHTHALATE
20UJ	3,3'-DICHLOROBENZIDINE
10U	BENZO(A)ANTHRACENE
10U	CHRYSENE
10U	BIS(2-ETHYLHEXYL) PHTHALATE
10U	DI-N-OCTYLPHTHALATE
10UJ	BENZO(B AND/OR K)FLUORANTHENE
10U	BENZO-A-PYRENE
10UJ	INDENO (1,2,3-CD) PYRENE
10U	DIBENZO(A,H)ANTHRACENE
10U	BENZO(GHI)PERYLENE

REMARKS ***REMARKS***

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36795 SAMPLE TYPE: GROUNDWA
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: TW-03
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 1025 STOP: 00/00/00
D. NUMBER: N305

UG/L	ANALYTICAL RESULTS
3.6	ALPHA-BHC
0.50U	BETA-BHC
5.7	DELTA-BHC
0.50U	GAMMA-BHC (LINDANE)
0.50U	HEPTACHLOR
0.50U	ALDRIN
5.7	HEPTACHLOR EPOXIDE
0.50U	ENDOSULFAN I (ALPHA)
1.0U	DIELDRIN
1.0U	4,4'-DDE (P,P'-DDE)
1.0U	ENDRIN
1.0U	ENDOSULFAN II (BETA)
5.4	4,4'-DDD (P,P'-DDD)
1.0U	ENDOSULFAN SULFATE
1.0U	4,4'-DDT (P,P'-DDT)

UG/L	ANALYTICAL RESULTS
0.50U	METHOXYCHLOR
1.0U	ENDRIN KETONE
--	CHLORDANE (TECH. MIXTURE) /1
0.50U	GAMMA-CHLORDANE /2
0.50U	ALPHA-CHLORDANE /2
10U	TOXAPHENE
5.0U	PCB-1016 (AROCLOR 1016)
5.0U	PCB-1221 (AROCLOR 1221)
5.0U	PCB-1232 (AROCLOR 1232)
5.0U	PCB-1242 (AROCLOR 1242)
5.0U	PCB-1248 (AROCLOR 1248)
10U	PCB-1254 (AROCLOR 1254)
10U	PCB-1260 (AROCLOR 1260)

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36795 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-03 COLLECTION START: 06/14/89 1025 STOP: 00/00/00
CASE NUMBER: 12126 SAS NUMBER: MD NUMBER: N305

UG/L	ANALYTICAL RESULTS	UG/L	ANALYTICAL RESULTS
90000	ALUMINUM	85	MANGANESE
6U	ANTIMONY	0.60J	MERCURY
110J	ARSENIC	50U	NICKEL
25U	BARIUM	120000	POTASSIUM
2U	BERYLLIUM	2U	SELENIUM
3UJ	CADMIUM	7UJ	SILVER
4200	CALCIUM	80000	SODIUM
110	CHROMIUM	2U	THALLIUM
16	COBALT	NA	TIN
32	COPPER	18U	VANADIUM
4700	IRON	490	ZINC
37J	LEAD		
1300U	MAGNESIUM		

REMARKS ***REMARKS***

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36791 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-04 COLLECTION START: 06/13/89 1415 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N302

UG/L	ANALYTICAL RESULTS	UG/L	ANALYTICAL RESULTS
500UJ	CHLOROMETHANE	250U	1,2-DICHLOROPROPANE
500U	BROMOMETHANE	250U	CIS-1,3-DICHLOROPROPENE
500U	VINYL CHLORIDE	250U	TRICHLOROETHENE(TRICHLOROETHYLENE)
500U	CHLOROETHANE	250U	DIBROMOCHLOROMETHANE
3000U	METHYLENE CHLORIDE	430	1,1,2-TRICHLOROETHANE
500U	ACETONE	250U	BENZENE
250UJ	CARBON DISULFIDE	250U	TRANS-1,3-DICHLOROPROPENE
250U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)	250U	BROMOFORM
250U	1,1-DICHLOROETHANE	520U	METHYL ISOBUTYL KETONE
250U	1,2-DICHLOROETHENE (TOTAL)	500U	METHYL BUTYL KETONE
250U	CHLOROFORM	250U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
250U	1,2-DICHLOROETHANE	250U	1,1,2,2-TETRACHLOROETHANE
500UJ	METHYL ETHYL KETONE	400U	TOLUENE
250U	1,1,1-TRICHLOROETHANE	250U	CHLOROBENZENE
250U	CARBON TETRACHLORIDE	3600	ETHYL BENZENE
500UJ	VINYL ACETATE	250U	STYRENE
250U	BROMODICHLOROMETHANE	18000	TOTAL XYLENES

REMARKS ***REMARKS***

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36791 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-04 COLLECTION START: 06/13/89 1415 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N302

UG/L	ANALYTICAL RESULTS
50U	PHENOL
50U	BIS(2-CHLOROETHYL) ETHER
50U	2-CHLOROPHENOL
50U	1,3-DICHLOROBENZENE
55	1,4-DICHLOROBENZENE
50U	BENZYL ALCOHOL
50U	1,2-DICHLOROBENZENE
50U	2-METHYLPHENOL
50U	BIS(2-CHLOROISOPROPYL) ETHER
260	(3-AND/OR 4-)METHYLPHENOL
50U	N-NITROSODI-N-PROPYLAMINE
50U	HEXACHLOROETHANE
50U	NITROBENZENE
750	ISOPHORONE
50U	2-NITROPHENOL
50U	2,4-DIMETHYLPHENOL
250UJ	BENZOIC ACID
50U	BIS(2-CHLOROETHOXY) METHANE
50U	2,4-DICHLOROPHENOL
50U	1,2,4-TRICHLOROBENZENE
190	NAPHTHALENE
50UJ	4-CHLOROANILINE
50U	HEXACHLOROBUTADIENE
50U	4-CHLORO-3-METHYLPHENOL
200	2-METHYLNAPHTHALENE
50U	HEXACHLOROCYCLOPENTADIENE (HCCP)
50U	2,4,6-TRICHLOROPHENOL
250U	2,4,5-TRICHLOROPHENOL
50U	2-CHLORONAPHTHALENE
250U	2-NITROANILINE
50U	DIMETHYL PHTHALATE
50U	ACENAPHTHYLENE
50U	2,6-DINITROTOLUENE

UG/L	ANALYTICAL RESULTS
250UJ	3-NITROANILINE
50U	ACENAPHTHENE
250UJ	2,4-DINITROPHENOL
250U	4-NITROPHENOL
50U	DIBENZOFURAN
50UJ	2,4-DINITROTOLUENE
50U	DIETHYL PHTHALATE
50U	4-CHLOROPHENYL PHENYL ETHER
50U	FLUORENE
250U	4-NITROANILINE
250U	2-METHYL-4,6-DINITROPHENOL
50U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
50U	4-BROMOPHENYL PHENYL ETHER
50U	HEXACHLOROBENZENE (HCB)
250UR	PENTACHLOROPHENOL
50U	PHENANTHRENE
50U	ANTHRACENE
50U	DI-N-BUTYLPHTHALATE
50U	FLUORANTHENE
50U	PYRENE
50U	BENZYL BUTYL PHTHALATE
100U	3,3'-DICHLOROBENZIDINE
50U	BENZO(A)ANTHRACENE
50U	CHRYSENE
50U	BIS(2-ETHYLHEXYL) PHTHALATE
50U	DI-N-OCTYLPHTHALATE
50U	BENZO(B AND/OR K)FLUORANTHENE
50U	BENZO-A-PYRENE
50U	INDENO (1,2,3-CD) PYRENE
50UJ	DIBENZO(A,H)ANTHRACENE
50U	BENZO(GHI)PERYLENE

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36791 SAMPLE TYPE: GROUNDWA
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: TW-04
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1415 STOP: 00/00/00
D. NUMBER: N302

UG/L	ANALYTICAL RESULTS
35	ALPHA-BHC
10U	BETA-BHC
10U	DELTA-BHC
10U	GAMMA-BHC (LINDANE)
98	HEPTACHLOR
22	ALDRIN
30	HEPTACHLOR EPOXIDE
10U	ENDOSULFAN I (ALPHA)
72	DIELDRIN
52	4,4'-DDE (P,P'-DDE)
140	ENDRIN
20U	ENDOSULFAN II (BETA)
20U	4,4'-DDD (P,P'-DDD)
20U	ENDOSULFAN SULFATE
140	4,4'-DDT (P,P'-DDT)

UG/L	ANALYTICAL RESULTS
10U	METHOXYCHLOR
20U	ENDRIN KETONE
—	CHLORDANE (TECH. MIXTURE) /1
530	GAMMA-CHLORDANE /2
390	ALPHA-CHLORDANE /2
200U	TOXAPHENE
100U	PCB-1016 (AROCLOR 1016)
100U	PCB-1221 (AROCLOR 1221)
100U	PCB-1232 (AROCLOR 1232)
100U	PCB-1242 (AROCLOR 1242)
100U	PCB-1248 (AROCLOR 1248)
200U	PCB-1254 (AROCLOR 1254)
200U	PCB-1260 (AROCLOR 1260)

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36791 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-04 COLLECTION START: 06/13/89 1415 STOP: 00/00/00
CASE NUMBER: 12126 SAS NUMBER: MD NUMBER: N302

UG/L	ANALYTICAL RESULTS	UG/L	ANALYTICAL RESULTS
15000	ALUMINUM	250	MANGANESE
5U	ANTIMONY	0.20UJ	MERCURY
320J	ARSENIC	110U	NICKEL
25U	BARIUM	350000	POTASSIUM
2U	BERYLLIUM	2U	SELENIUM
3UJ	CADMIUM	5UJ	SILVER
45000	CALCIUM	150000	SODIUM
82	CHROMIUM	2U	THALLIUM
20	COBALT	NA	TIN
8U	COPPER	110	VANADIUM
7500	IRON	39	ZINC
60J	LEAD		
11000	MAGNESIUM		

REMARKS ***REMARKS***

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36793 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-05 COLLECTION START: 06/13/89 1600 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N296

UG/L	ANALYTICAL RESULTS
10U	CHLOROMETHANE
10U	BROMOMETHANE
10U	VINYL CHLORIDE
10U	CHLOROETHANE
5U	METHYLENE CHLORIDE
10UJ	ACETONE
5U	CARBON DISULFIDE
5U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
5U	1,1-DICHLOROETHANE
5U	1,2-DICHLOROETHENE (TOTAL)
5U	CHLOROFORM
5U	1,2-DICHLOROETHANE
10U	METHYL ETHYL KETONE
5U	1,1,1-TRICHLOROETHANE
5U	CARBON TETRACHLORIDE
10U	VINYL ACETATE
5U	BROMODICHLOROMETHANE

UG/L	ANALYTICAL RESULTS
5U	1,2-DICHLOROPROPANE
5U	CIS-1,3-DICHLOROPROPENE
5U	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	DIBROMOCHLOROMETHANE
5U	1,1,2-TRICHLOROETHANE
5U	BENZENE
5U	TRANS-1,3-DICHLOROPROPENE
5U	BROMOFORM
10U	METHYL ISOBUTYL KETONE
10U	METHYL BUTYL KETONE
5U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
5U	1,1,2,2-TETRACHLOROETHANE
5U	TOLUENE
5U	CHLOROBENZENE
4J	ETHYL BENZENE
5U	STYRENE
17O	TOTAL XYLENES

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36793 SAMPLE TYPE: GROUNDWA
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: TW-05

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1600 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N296

UG/L	ANALYTICAL RESULTS
10U	PHENOL
10U	BIS(2-CHLOROETHYL) ETHER
10U	2-CHLOROPHENOL
10U	1,3-DICHLOROBENZENE
10U	1,4-DICHLOROBENZENE
10U	BENZYL ALCOHOL
10U	1,2-DICHLOROBENZENE
10U	2-METHYLPHENOL
10U	BIS(2-CHLOROISOPROPYL) ETHER
10U	(3-AND/OR 4-)METHYLPHENOL
10U	N-NITROSODI-N-PROPYLAMINE
10U	HEXACHLOROETHANE
10U	NITROBENZENE
10U	ISOPHORONE
10U	2-NITROPHENOL
10U	2,4-DIMETHYLPHENOL
50UJ	BENZOIC ACID
10U	BIS(2-CHLOROETHOXY) METHANE
10U	2,4-DICHLOROPHENOL
10U	1,2,4-TRICHLOROBENZENE
9J	NAPHTHALENE
10U	4-CHLOROANILINE
10U	HEXACHLOROBUTADIENE
10U	4-CHLORO-3-METHYLPHENOL
11	2-METHYLNAPHTHALENE
10U	HEXACHLOROCYCLOPENTADIENE (HCCP)
10U	2,4,6-TRICHLOROPHENOL
50U	2,4,5-TRICHLOROPHENOL
10U	2-CHLORONAPHTHALENE
50U	2-NITROANILINE
10U	DIMETHYL PHTHALATE
10U	ACENAPHTHYLENE
10U	2,6-DINITROTOLUENE

UG/L	ANALYTICAL RESULTS
50UJ	3-NITROANILINE
10U	ACENAPHTHENE
50UJ	2,4-DINITROPHENOL
50U	4-NITROPHENOL
10U	DIBENZOFURAN
10UJ	2,4-DINITROTOLUENE
10U	DIETHYL PHTHALATE
10U	4-CHLOROPHENYL PHENYL ETHER
10U	FLUORENE
50UJ	4-NITROANILINE
50U	2-METHYL-4,6-DINITROPHENOL
10U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
10U	4-BROMOPHENYL PHENYL ETHER
10U	HEXACHLOROBENZENE (HCB)
50UR	PENTACHLOROPHENOL
10U	PHENANTHRENE
10U	ANTHRACENE
10U	DI-N-BUTYLPHTHALATE
10U	FLUORANTHENE
10U	PYRENE
10U	BENZYL BUTYL PHTHALATE
20UJ	3,3'-DICHLOROBENZIDINE
10U	BENZO(A)ANTHRACENE
10U	CHRYSENE
10U	BIS(2-ETHYLHEXYL) PHTHALATE
10U	DI-N-OCTYLPHTHALATE
10UJ	BENZO(B AND/OR K)FLUORANTHENE
10U	BENZO-A-PYRENE
10UJ	INDENO (1,2,3-CD) PYRENE
10U	DIBENZO(A,H)ANTHRACENE
10U	BENZO(GHI)PERYLENE

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36793 SAMPLE TYPE: GROUNDWA
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: TW-05
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1600 STOP: 00/00/00
D. NUMBER: N296

UG/L	ANALYTICAL RESULTS
0.25U	ALPHA-BHC
0.25U	BETA-BHC
0.92	DELTA-BHC
0.79	GAMMA-BHC (LINDANE)
0.59	HEPTACHLOR
0.25U	ALDRIN
0.58	HEPTACHLOR EPOXIDE
0.25U	ENDOSULFAN I (ALPHA)
0.93	DIELDRIN
0.50U	4,4'-DDE (P,P'-DDE)
0.87	ENDRIN
0.50U	ENDOSULFAN II (BETA)
1.3	4,4'-DDD (P,P'-DDD)
0.50U	ENDOSULFAN SULFATE
0.50U	4,4'-DDT (P,P'-DDT)

UG/L	ANALYTICAL RESULTS
0.25U	METHOXYCHLOR
0.50U	ENDRIN KETONE
—	CHLORDANE (TECH. MIXTURE) /1
2.8	GAMMA-CHLORDANE /2
2.2	ALPHA-CHLORDANE /2
5.0U	TOXAPHENE
2.5U	PCB-1016 (AROCLOR 1016)
2.5U	PCB-1221 (AROCLOR 1221)
2.5U	PCB-1232 (AROCLOR 1232)
2.5U	PCB-1242 (AROCLOR 1242)
2.5U	PCB-1248 (AROCLOR 1248)
5.0U	PCB-1254 (AROCLOR 1254)
5.0U	PCB-1260 (AROCLOR 1260)

FOOTNOTES
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*C-CONFIRMED BY GCMS 1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36793 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-05 COLLECTION START: 06/13/89 1600 STOP: 00/00/00
CASE NUMBER: 12126 SAS NUMBER: MD NUMBER: N296

UG/L	ANALYTICAL RESULTS	UG/L	ANALYTICAL RESULTS
39000	ALUMINUM	15	MANGANESE
5U	ANTIMONY	1UJ	MERCURY
4UJ	ARSENIC	30U	NICKEL
32	BARIUM	8600	POTASSIUM
2U	BERYLLIUM	2U	SELENIUM
3UJ	CADMIUM	5UJ	SILVER
5400	CALCIUM	3700	SODIUM
28	CHROMIUM	2U	THALLIUM
20U	COBALT	NA	TIN
63	COPPER	20U	VANADIUM
670	IRON	25	ZINC
41J	LEAD		
730U	MAGNESIUM		

REMARKS ***REMARKS***

FOOTNOTES
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N

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36788 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-06 COLLECTION START: 06/13/89 1120 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N298

UG/L	ANALYTICAL RESULTS	UG/L	ANALYTICAL RESULTS
100U	CHLOROMETHANE	23J	1,2-DICHLOROPROPANE
100U	BROMOMETHANE	50U	CIS-1,3-DICHLOROPROPENE
100U	VINYL CHLORIDE	50U	TRICHLOROETHENE(TRICHLOROETHYLENE)
100U	CHLOROETHANE	50U	DIBROMOCHLOROMETHANE
200U	METHYLENE CHLORIDE	62	1,1,2-TRICHLOROETHANE
300U	ACETONE	70U	BENZENE
50U	CARBON DISULFIDE	50U	TRANS-1,3-DICHLOROPROPENE
44J	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)	50U	BROMOFORM
50U	1,1-DICHLOROETHANE	100U	METHYL ISOBUTYL KETONE
50U	1,2-DICHLOROETHENE (TOTAL)	100U	METHYL BUTYL KETONE
50U	CHLOROFORM	50U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
35J	1,2-DICHLOROETHANE	50U	1,1,2,2-TETRACHLOROETHANE
100U	METHYL ETHYL KETONE	200U	TOLUENE
50U	1,1,1-TRICHLOROETHANE	180	CHLOROBENZENE
50U	CARBON TETRACHLORIDE	600	ETHYL BENZENE
100U	VINYL ACETATE	50U	STYRENE
50U	BROMODICHLOROMETHANE	2900	TOTAL XYLENES

REMARKS ***REMARKS***

FOOTNOTES
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22

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36788 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-06 COLLECTION START: 06/13/89 1120 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N298

UG/L	ANALYTICAL RESULTS
10U	PHENOL
10U	BIS(2-CHLOROETHYL) ETHER
10U	2-CHLOROPHENOL
10U	1,3-DICHLOROBENZENE
56	1,4-DICHLOROBENZENE
10U	BENZYL ALCOHOL
18	1,2-DICHLOROBENZENE
10U	2-METHYLPHENOL
10U	BIS(2-CHLOROISOPROPYL) ETHER
56	(3-AND/OR 4-)METHYLPHENOL
10U	N-NITROSODI-N-PROPYLAMINE
10U	HEXACHLOROETHANE
10U	NITROBENZENE
10U	ISOPHORONE
10U	2-NITROPHENOL
10U	2,4-DIMETHYLPHENOL
50UJ	BENZOIC ACID
10U	BIS(2-CHLOROETHOXY) METHANE
10U	2,4-DICHLOROPHENOL
21	1,2,4-TRICHLOROBENZENE
63	NAPHTHALENE
10UJ	4-CHLOROANILINE
10U	HEXACHLOROBUTADIENE
10U	4-CHLORO-3-METHYLPHENOL
75	2-METHYLNAPHTHALENE
10U	HEXACHLOROCYCLOPENTADIENE (HCCP)
10U	2,4,6-TRICHLOROPHENOL
50U	2,4,5-TRICHLOROPHENOL
10U	2-CHLORONAPHTHALENE
50U	2-NITROANILINE
10U	DIMETHYL PHTHALATE
10U	ACENAPHTHYLENE
10U	2,6-DINITROTOLUENE

UG/L	ANALYTICAL RESULTS
50UJ	3-NITROANILINE
10U	ACENAPHTHENE
50UJ	2,4-DINITROPHENOL
50U	4-NITROPHENOL
10U	DIBENZOFURAN
10UJ	2,4-DINITROTOLUENE
10U	DIETHYL PHTHALATE
10U	4-CHLOROPHENYL PHENYL ETHER
10U	FLUORENE
50U	4-NITROANILINE
50U	2-METHYL-4,6-DINITROPHENOL
10U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
10U	4-BROMOPHENYL PHENYL ETHER
10U	HEXACHLOROBENZENE (HCB)
50UR	PENTACHLOROPHENOL
10U	PHENANTHRENE
10U	ANTHRACENE
10U	DI-N-BUTYLPHTHALATE
10U	FLUORANTHENE
10U	PYRENE
10U	BENZYL BUTYL PHTHALATE
20U	3,3'-DICHLOROBENZIDINE
10U	BENZO(A)ANTHRACENE
10U	CHRYSENE
10U	BIS(2-ETHYLHEXYL) PHTHALATE
10U	DI-N-OCTYLPHTHALATE
10U	BENZO(B AND/OR K)FLUORANTHENE
10U	BENZO-A-PYRENE
10U	INDENO (1,2,3-CD) PYRENE
10UJ	DIBENZO(A,H)ANTHRACENE
10U	BENZO(GHI)PERYLENE

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36788 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-06 COLLECTION START: 06/13/89 1120 STOP: 00/00/00
CASE NUMBER: 12126 SAS NUMBER: MD NUMBER: N298

UG/L	ANALYTICAL RESULTS	UG/L	ANALYTICAL RESULTS
150000	ALUMINUM	39	MANGANESE
9U	ANTIMONY	1UJ	MERCURY
81J	ARSENIC	80U	NICKEL
710	BARIUM	84000	POTASSIUM
3U	BERYLLIUM	10U	SELENIUM
3UJ	CADMIUM	5UJ	SILVER
8700	CALCIUM	170000	SODIUM
120	CHROMIUM	2U	THALLIUM
20U	COBALT	NA	TIN
55	COPPER	180	VANADIUM
9300	IRON	320	ZINC
10J	LEAD		
2900	MAGNESIUM		

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36788 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-08 COLLECTION START: 06/13/89 1120 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N298 MD NO: N298

ANALYTICAL RESULTS UG/L

100JN	ETHYLMETHYLBENZENE (2 ISOMERS)
100JN	TRIMETHYLBENZENE (2 ISOMERS)
30JN	TETRAMETHYLBENZENE
20JN	1-METHYLNAPHTHALENE
60JN	DIMETHYLNAPHTHALENE
50JN	TETRAHYDROISOINDOLEDIONE
100JN	ETHION
50JN	CARBOPHENOTHION
[illegible]J	9 UNIDENTIFIED COMPOUNDS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36788 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-06 COLLECTION START: 06/13/89 1120 STOP: 00/00/00
CASE NUMBER: 12126 SAS NUMBER: D. NUMBER: N298

UG/L	ANALYTICAL RESULTS
0.50U	ALPHA-BHC
5.9	BETA-BHC
2.1	DELTA-BHC
1.0	GAMMA-BHC (LINDANE)
0.50U	HEPTACHLOR
0.50U	ALDRIN
0.50U	HEPTACHLOR EPOXIDE
0.50U	ENDOSULFAN I (ALPHA)
1.0U	DIELDRIN
1.0U	4,4'-DDE (P,P'-DDE)
1.0U	ENDRIN
1.0U	ENDOSULFAN II (BETA)
1.0U	4,4'-DDD (P,P'-DDD)
1.0U	ENDOSULFAN SULFATE
1.0U	4,4'-DDT (P,P'-DDT)

UG/L	ANALYTICAL RESULTS
0.50U	METHOXYCHLOR
1.0U	ENDRIN KETONE
--	CHLORDANE (TECH. MIXTURE) /1
12	GAMMA-CHLORDANE /2
2.6	ALPHA-CHLORDANE /2
10U	TOXAPHENE
5.0U	PCB-1016 (AROCLOR 1016)
5.0U	PCB-1221 (AROCLOR 1221)
5.0U	PCB-1232 (AROCLOR 1232)
5.0U	PCB-1242 (AROCLOR 1242)
5.0U	PCB-1248 (AROCLOR 1248)
10U	PCB-1254 (AROCLOR 1254)
10U	PCB-1260 (AROCLOR 1260)

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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*C-CONFIRMED BY GCMS 1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36793 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-05 COLLECTION START: 06/13/89 1600 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N296 MD NO: N296

ANALYTICAL RESULTS UG/L

290UN	ETHYLMETHYLBENZENE (2 ISOMERS)
460JN	TRIMETHYLBENZENE (3 ISOMERS)
20JN	DIHYDROINDENE
30JN	METHYLPROPYLBENZENE
45JN	ETHYLDIMETHYLBENZENE

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36785 SAMPLE TYPE: GROUNDWA
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: TW-01
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0835 STOP: 00/00/00
D. NUMBER: N295

UG/L	ANALYTICAL RESULTS
0.050U	ALPHA-BHC
0.050U	BETA-BHC
0.050U	DELTA-BHC
0.050U	GAMMA-BHC (LINDANE)
0.050U	HEPTACHLOR
0.050U	ALDRIN
0.050U	HEPTACHLOR EPOXIDE
0.050U	ENDOSULFAN I (ALPHA)
0.10U	DIELDRIN
0.10U	4,4'-DDE (P,P'-DDE)
0.10U	ENDRIN
0.10U	ENDOSULFAN II (BETA)
0.10U	4,4'-DDD (P,P'-DDD)
0.10U	ENDOSULFAN SULFATE
0.10U	4,4'-DDT (P,P'-DDT)

UG/L	ANALYTICAL RESULTS
0.050U	METHOXYCHLOR
0.10U	ENDRIN KETONE
--	CHLORDANE (TECH. MIXTURE) /1
0.050U	GAMMA-CHLORDANE /2
0.050U	ALPHA-CHLORDANE /2
1.0U	TOXAPHENE
0.50U	PCB-1016 (AROCLOR 1016)
0.50U	PCB-1221 (AROCLOR 1221)
0.50U	PCB-1232 (AROCLOR 1232)
0.50U	PCB-1242 (AROCLOR 1242)
0.50U	PCB-1248 (AROCLOR 1248)
1.0U	PCB-1254 (AROCLOR 1254)
1.0U	PCB-1260 (AROCLOR 1260)

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.
*C-CONFIRMED BY GCMS 1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36791 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-04 COLLECTION START: 06/13/89 1415 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N302 MD NO: N302

ANALYTICAL RESULTS UG/L

10000J	12 UNIDENTIFIED COMPOUNDS
[illegible]00JN	DIETHYLDISULFIDE
1[illegible]00JN	ETHYLMETHYLBENZENE
2[illegible]00JN	TRIMETHYLBENZENE (3 ISOMERS)
10000JN	TETRAHYDROISOINDOLEDIONE
2[illegible]00JN	ETHION
[illegible]00JN	[illegible]

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36795 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-03 COLLECTION START: 06/14/89 1025 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N305 MD NO: N305

ANALYTICAL RESULTS UG/L

900JN	ETHYLMETHYLBENZENE (2 ISOMERS)
2000JN	TRIMETHYLBENZENE (3 ISOMERS)
200JN	DIHYDROINDENE
30JN	METHYLPROPYLBENZENE
50JN	ETHYLDIMETHYLBENZENE
50JN	PHENYLETHANONE
40JN	DIMETHYLPHENOL
30JN	ETHYLMETHYLPHENOL
200JN	DIHYDROINDENONE
50JN	1-METHYLNAPHTHALENE
500J	7 UNIDENTIFIED COMPOUNDS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36797 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-02 COLLECTION START: 06/14/89 1235 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N397 MD NO: N397

ANALYTICAL RESULTS UG/L

60J	3 UNIDENTIFIED COMPOUNDS
200JN	ETHYLMETHYLBENZENE (3 ISOMERS)
40JN	PROPYLBENZENE
1000JN	TRIMETHYLBENZENE (3 ISOMERS)
70JN	DIHYDROINDENE
300JN	METHYLETHOXYPHENOL METHYLCARBAMATE
20JN	DIMETHYLBENZALDEHYDE
30JN	DIHYDROINDENONE
20JN	DIMETHYLETHYLPHENOL
10JN	DIMETHYLBENZOIC ACID
200JN	[(DIMETHYLETHYL)PHENOXY]PROPANOL
10JN	TETRAMETHYLBUTYLPHENOL

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36788 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-06 COLLECTION START: 06/13/89 1120 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N298 MD NO: N298

RESULTS	UNITS	PARAMETER
0.01UJ	MG/L	CYANIDE

REMARKS
HOLDING TIME EXCEEDED-CN

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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W

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36793 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-05 COLLECTION START: 06/13/89 1600 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N296 MD NO: N296

RESULTS	UNITS	PARAMETER
0.02UJ	MG/L	CYANIDE

REMARKS
HOLDING TIME EXCEEDED-CN

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36791 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-04 COLLECTION START: 06/13/89 1415 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N302 MD NO: N302

RESULTS	UNITS	PARAMETER
0.01UJ	MG/L	CYANIDE

REMARKS
HOLDING TIME EXCEEDED-CN

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 38795 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-03 COLLECTION START: 06/14/89 1025 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N305 MD NO: N305

RESULTS	UNITS	PARAMETER
0.01UJ	MG/L	CYANIDE

REMARKS
HOLDING TIME EXCEEDED-CN

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36785 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-01 COLLECTION START: 06/13/89 0835 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N295 MD NO: N295

RESULTS	UNITS	PARAMETER
0.01UJ	MG/L	CYANIDE

REMARKS
HOLDING TIME EXCEEDED-CN

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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W

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36797 SAMPLE TYPE: GROUNDWA
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: TW-02
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 1235 STOP: 00/00/00
D. NO.: N397 MD NO: N397

RESULTS	UNITS	PARAMETER
0.01UJ	MG/L	CYANIDE

REMARKS
HOLDING TIME EXCEEDED-CN

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36784 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-01

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0810 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N294

UG/KG	ANALYTICAL RESULTS
430U	PHENOL
430U	BIS(2-CHLOROETHYL) ETHER
430U	2-CHLOROPHENOL
430U	1,3-DICHLOROBENZENE
430U	1,4-DICHLOROBENZENE
430UJ	BENZYL ALCOHOL
430U	1,2-DICHLOROBENZENE
430U	2-METHYLPHENOL
430U	BIS(2-CHLOROISOPROPYL) ETHER
430U	(3-AND/OR 4-)METHYLPHENOL
430U	N-NITROSODI-N-PROPYLAMINE
430U	HEXACHLOROETHANE
430U	NITROBENZENE
430U	ISOPHORONE
430U	2-NITROPHENOL
430U	2,4-DIMETHYLPHENOL
2100U	BENZOIC ACID
430U	BIS(2-CHLOROETHOXY) METHANE
430U	2,4-DICHLOROPHENOL
430U	1,2,4-TRICHLOROBENZENE
430U	NAPHTHALENE
430U	4-CHLOROANILINE
430U	HEXACHLOROBUTADIENE
430U	4-CHLORO-3-METHYLPHENOL
430UR	2-METHYLNAPHTHALENE
430U	HEXACHLOROCYCLOPENTADIENE (HCCP)
430U	2,4,6-TRICHLOROPHENOL
2100U	2,4,5-TRICHLOROPHENOL
430U	2-CHLORONAPHTHALENE
2100U	2-NITROANILINE
430U	DIMETHYL PHTHALATE
430U	ACENAPHTHYLENE
430U	2,6-DINITROTOLUENE

UG/KG	ANALYTICAL RESULTS
2100UJ	3-NITROANILINE
430U	ACENAPHTHENE
2100U	2,4-DINITROPHENOL
2100UJ	4-NITROPHENOL
430U	DIBENZOFURAN
430U	2,4-DINITROTOLUENE
430U	DIETHYL PHTHALATE
430U	4-CHLOROPHENYL PHENYL ETHER
430U	FLUORENE
2100UJ	4-NITROANILINE
2100U	2-METHYL-4,6-DINITROPHENOL
430U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
430U	4-BROMOPHENYL PHENYL ETHER
430U	HEXACHLOROBENZENE (HCB)
2100UR	PENTACHLOROPHENOL
430U	PHENANTHRENE
430U	ANTHRACENE
430U	DI-N-BUTYLPHTHALATE
430U	FLUORANTHENE
430U	PYRENE
430U	BENZYL BUTYL PHTHALATE
860UJ	3,3'-DICHLOROBENZIDINE
430U	BENZO(A)ANTHRACENE
430U	CHRYSENE
430U	BIS(2-ETHYLHEXYL) PHTHALATE
430U	DI-N-OCTYLPHTHALATE
430U	BENZO(B AND/OR K)FLUORANTHENE
430U	BENZO-A-PYRENE
430U	INDENO (1,2,3-CD) PYRENE
430U	DIBENZO(A,H)ANTHRACENE
430U	BENZO(GHI)PERYLENE
23	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NA1-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36784 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-01

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0810 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N294

UG/KG	ANALYTICAL RESULTS
13U	CHLOROMETHANE
13U	BROMOMETHANE
13U	VINYL CHLORIDE
13U	CHLOROETHANE
50UJ	METHYLENE CHLORIDE
40U	ACETONE
6U	CARBON DISULFIDE
6U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
6U	1,1-DICHLOROETHANE
6U	1,2-DICHLOROETHENE (TOTAL)
6U	CHLOROFORM
6U	1,2-DICHLOROETHANE
13UR	METHYL ETHYL KETONE
6U	1,1,1-TRICHLOROETHANE
6U	CARBON TETRACHLORIDE
13U	VINYL ACETATE
6U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
6U	1,2-DICHLOROPROPANE
6U	CIS-1,3-DICHLOROPROPENE
6U	TRICHLOROETHENE(TRICHLOROETHYLENE)
6U	DIBROMOCHLOROMETHANE
6U	1,1,2-TRICHLOROETHANE
6U	BENZENE
6U	TRANS-1,3-DICHLOROPROPENE
6U	BROMOFORM
13U	METHYL ISOBUTYL KETONE
13UJ	METHYL BUTYL KETONE
6U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
6U	1,1,2,2-TETRACHLOROETHANE
6U	TOLUENE
6U	CHLOROBENZENE
6U	ETHYL BENZENE
6U	STYRENE
6U	TOTAL XYLENES
23	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36784 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-01
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0810 STOP: 00/00/00
D. NUMBER: N294

UG/KG	ANALYTICAL RESULTS
10U	ALPHA-BHC
10U	BETA-BHC
10U	DELTA-BHC
10U	GAMMA-BHC (LINDANE)
10U	HEPTACHLOR
10U	ALDRIN
10U	HEPTACHLOR EPOXIDE
10U	ENDOSULFAN I (ALPHA)
21U	DIELDRIN
21U	4,4'-DDE (P,P'-DDE)
21U	ENDRIN
21U	ENDOSULFAN II (BETA)
21U	4,4'-DDD (P,P'-DDD)
21U	ENDOSULFAN SULFATE
21UJ	4,4'-DDT (P,P'-DDT)

UG/KG	ANALYTICAL RESULTS
100U	METHOXYCHLOR
21U	ENDRIN KETONE
--	CHLORDANE (TECH. MIXTURE) /1
100U	GAMMA-CHLORDANE /2
100U	ALPHA-CHLORDANE /2
210U	TOXAPHENE
100U	PCB-1016 (AROCLOR 1016)
100U	PCB-1221 (AROCLOR 1221)
100U	PCB-1232 (AROCLOR 1232)
100U	PCB-1242 (AROCLOR 1242)
100U	PCB-1248 (AROCLOR 1248)
210U	PCB-1254 (AROCLOR 1254)
210U	PCB-1260 (AROCLOR 1260)
23	PERCENT MOISTURE

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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*C-CONFIRMED BY GCMS 1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36798 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-02

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 1205 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N396

UG/KG	ANALYTICAL RESULTS
13U	CHLOROMETHANE
13U	BROMOMETHANE
13U	VINYL CHLORIDE
13U	CHLOROETHANE
70UJ	METHYLENE CHLORIDE
40U	ACETONE
7U	CARBON DISULFIDE
7U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
7U	1,1-DICHLOROETHANE
7U	1,2-DICHLOROETHENE (TOTAL)
7U	CHLOROFORM
7U	1,2-DICHLOROETHANE
13UR	METHYL ETHYL KETONE
7U	1,1,1-TRICHLOROETHANE
7U	CARBON TETRACHLORIDE
13U	VINYL ACETATE
7U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
7U	1,2-DICHLOROPROPANE
7U	CIS-1,3-DICHLOROPROPENE
7U	TRICHLOROETHENE(TRICHLOROETHYLENE)
7U	DIBROMOCHLOROMETHANE
7U	1,1,2-TRICHLOROETHANE
7U	BENZENE
7U	TRANS-1,3-DICHLOROPROPENE
7U	BROMOFORM
13U	METHYL ISOBUTYL KETONE
13UJ	METHYL BUTYL KETONE
7U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
7U	1,1,2,2-TETRACHLOROETHANE
210	TOLUENE
22	CHLOROBENZENE
17	ETHYL BENZENE
7U	STYRENE
28	TOTAL XYLENES
25	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36796 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-02

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 1205 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N396

UG/KG	ANALYTICAL RESULTS
440U	PHENOL
440U	BIS(2-CHLOROETHYL) ETHER
440U	2-CHLOROPHENOL
440U	1,3-DICHLOROBENZENE
440U	1,4-DICHLOROBENZENE
440UJ	BENZYL ALCOHOL
440U	1,2-DICHLOROBENZENE
440U	2-METHYLPHENOL
440U	BIS(2-CHLOROISOPROPYL) ETHER
440U	(3-AND/OR 4-)METHYLPHENOL
440U	N-NITROSODI-N-PROPYLAMINE
440U	HEXACHLOROETHANE
440U	NITROBENZENE
440U	ISOPHORONE
440U	2-NITROPHENOL
440U	2,4-DIMETHYLPHENOL
2100U	BENZOIC ACID
440U	BIS(2-CHLOROETHOXY) METHANE
440U	2,4-DICHLOROPHENOL
440U	1,2,4-TRICHLOROBENZENE
440U	NAPHTHALENE
440U	4-CHLOROANILINE
440U	HEXACHLOROBUTADIENE
440U	4-CHLORO-3-METHYLPHENOL
440UR	2-METHYLNAPHTHALENE
440U	HEXACHLOROCYCLOPENTADIENE (HCCP)
440U	2,4,6-TRICHLOROPHENOL
2100U	2,4,5-TRICHLOROPHENOL
440U	2-CHLORONAPHTHALENE
2100U	2-NITROANILINE
440U	DIMETHYL PHTHALATE
440U	ACENAPHTHYLENE
440U	2,6-DINITROTOLUENE

UG/KG	ANALYTICAL RESULTS
2100UJ	3-NITROANILINE
440U	ACENAPHTHENE
2100U	2,4-DINITROPHENOL
2100UJ	4-NITROPHENOL
440U	DIBENZOFURAN
440U	2,4-DINITROTOLUENE
440U	DIETHYL PHTHALATE
440U	4-CHLOROPHENYL PHENYL ETHER
440U	FLUORENE
2100UJ	4-NITROANILINE
2100U	2-METHYL-4,6-DINITROPHENOL
440U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
440U	4-BROMOPHENYL PHENYL ETHER
440U	HEXACHLOROBENZENE (HCB)
2100UR	PENTACHLOROPHENOL
440U	PHENANTHRENE
440U	ANTHRACENE
440U	DI-N-BUTYLPHTHALATE
440U	FLUORANTHENE
440U	PYRENE
440U	BENZYL BUTYL PHTHALATE
880UJ	3,3'-DICHLOROBENZIDINE
440U	BENZO(A)ANTHRACENE
440U	CHRYSENE
440U	BIS(2-ETHYLHEXYL) PHTHALATE
440U	DI-N-OCTYLPHTHALATE
440U	BENZO(B AND/OR K)FLUORANTHENE
440U	BENZO-A-PYRENE
440U	INDENO (1,2,3-CD) PYRENE
440U	DIBENZO(A,H)ANTHRACENE
440U	BENZO(GHI)PERYLENE
25	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

PESTICIDES/PCB'S DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36798 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: S8-02
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 1205 STOP: 00/00/00
D. NUMBER: N396

UG/KG	ANALYTICAL RESULTS
24C	ALPHA-BHC
14	BETA-BHC
51C	DELTA-BHC
11U	GAMMA-BHC (LINDANE)
11U	HEPTACHLOR
11U	ALDRIN
11U	HEPTACHLOR EPOXIDE
11U	ENDOSULFAN I (ALPHA)
21U	DIELDRIN
21U	4,4'-DDE (P,P'-DDE)
21U	ENDRIN
21U	ENDOSULFAN II (BETA)
21U	4,4'-DDD (P,P'-DDD)
21U	ENDOSULFAN SULFATE
21UJ	4,4'-DDT (P,P'-DDT)

UG/KG	ANALYTICAL RESULTS
110U	METHOXYCHLOR
21U	ENDRIN KETONE
	CHLORDANE (TECH. MIXTURE) /1
110U	GAMMA-CHLORDANE /2
110U	ALPHA-CHLORDANE /2
210U	TOXAPHENE
110U	PCB-1016 (AROCLOR 1016)
110U	PCB-1221 (AROCLOR 1221)
110U	PCB-1232 (AROCLOR 1232)
110U	PCB-1242 (AROCLOR 1242)
110U	PCB-1248 (AROCLOR 1248)
210U	PCB-1254 (AROCLOR 1254)
210U	PCB-1260 (AROCLOR 1260)
25	PERCENT MOISTURE

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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*C-CONFIRMED BY GCMS 1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36794 SAMPLE TYPE: SOIL PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: SB-03 COLLECTION START: 06/14/89 0930 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N304

UG/KG	ANALYTICAL RESULTS	UG/KG	ANALYTICAL RESULTS
30000U	CHLOROMETHANE	15000U	1,2-DICHLOROPROPANE
30000U	BROMOMETHANE	15000U	CIS-1,3-DICHLOROPROPENE
30000U	VINYL CHLORIDE	15000U	TRICHLOROETHENE(TRICHLOROETHYLENE)
30000U	CHLOROETHANE	15000U	DIBROMOCHLOROMETHANE
40000U	METHYLENE CHLORIDE	15000U	1,1,2-TRICHLOROETHANE
30000U	ACETONE	15000U	BENZENE
15000U	CARBON DISULFIDE	15000U	TRANS-1,3-DICHLOROPROPENE
15000U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)	15000U	BROMOFORM
15000U	1,1-DICHLOROETHANE	30000U	METHYL ISOBUTYL KETONE
15000U	1,2-DICHLOROETHENE (TOTAL)	30000UJ	METHYL BUTYL KETONE
15000U	CHLOROFORM	15000U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
15000U	1,2-DICHLOROETHANE	15000U	1,1,2,2-TETRACHLOROETHANE
30000UR	METHYL ETHYL KETONE	15000U	TOLUENE
15000U	1,1,1-TRICHLOROETHANE	15000U	CHLOROBENZENE
15000U	CARBON TETRACHLORIDE	28000	ETHYL BENZENE
30000UJ	VINYL ACETATE	15000U	STYRENE
15000U	BROMODICHLOROMETHANE	270000	TOTAL XYLENES
		17	PERCENT MOISTURE

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36794 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-03

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 0930 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N304

UG/KG	ANALYTICAL RESULTS
24000U	PHENOL
24000U	BIS(2-CHLOROETHYL) ETHER
24000U	2-CHLOROPHENOL
24000U	1,3-DICHLOROBENZENE
24000U	1,4-DICHLOROBENZENE
24000UJ	BENZYL ALCOHOL
24000U	1,2-DICHLOROBENZENE
24000U	2-METHYLPHENOL
24000U	BIS(2-CHLOROISOPROPYL) ETHER
24000U	(3-AND/OR 4-)METHYLPHENOL
24000U	N-NITROSODI-N-PROPYLAMINE
24000U	HEXACHLOROETHANE
24000U	NITROBENZENE
24000U	ISOPHORONE
24000U	2-NITROPHENOL
24000U	2,4-DIMETHYLPHENOL
120000UJ	BENZOIC ACID
24000U	BIS(2-CHLOROETHOXY) METHANE
24000U	2,4-DICHLOROPHENOL
24000U	1,2,4-TRICHLOROBENZENE
13000J	NAPHTHALENE
24000U	4-CHLOROANILINE
24000U	HEXACHLOROBUTADIENE
24000U	4-CHLORO-3-METHYLPHENOL
30000J	2-METHYLNAPHTHALENE
24000U	HEXACHLOROCYCLOPENTADIENE (HCCP)
24000U	2,4,6-TRICHLOROPHENOL
120000U	2,4,5-TRICHLOROPHENOL
24000U	2-CHLORONAPHTHALENE
120000U	2-NITROANILINE
24000U	DIMETHYL PHTHALATE
24000U	ACENAPHTHYLENE
24000U	2,6-DINITROTOLUENE

UG/KG	ANALYTICAL RESULTS
120000U	3-NITROANILINE
24000U	ACENAPHTHENE
1200000UJ	2,4-DINITROPHENOL
120000U	4-NITROPHENOL
24000U	DIBENZOFURAN
24000U	2,4-DINITROTOLUENE
24000U	DIETHYL PHTHALATE
24000U	4-CHLOROPHENYL PHENYL ETHER
24000U	FLUORENE
120000UJ	4-NITROANILINE
120000U	2-METHYL-4,6-DINITROPHENOL
24000U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
24000U	4-BROMOPHENYL PHENYL ETHER
24000U	HEXACHLOROBENZENE (HCB)
120000UR	PENTACHLOROPHENOL
24000U	PHENANTHRENE
24000U	ANTHRACENE
24000U	DI-N-BUTYLPHTHALATE
24000U	FLUORANTHENE
24000U	PYRENE
24000U	BENZYL BUTYL PHTHALATE
48000U	3,3'-DICHLOROBENZIDINE
24000U	BENZO(A)ANTHRACENE
24000U	CHRYSENE
24000U	BIS(2-ETHYLHEXYL) PHTHALATE
24000U	DI-N-OCTYLPHTHALATE
24000U	BENZO(B AND/OR K)FLUORANTHENE
24000U	BENZO-A-PYRENE
24000U	INDENO (1,2,3-CD) PYRENE
24000U	DIBENZO(A,H)ANTHRACENE
24000U	BENZO(GHI)PERYLENE
17	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36794 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-03
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 0930 STOP: 00/00/00
D. NO.: N304 MD NO: N304

ANALYTICAL RESULTS UG/KG

40000JN	ETHYLMETHYLBENZENE
70000JN	TRIMETHYLBENZENE
90000JN	ETHION
9000000J	16 UNIDENTIFIED COMPOUNDS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36794 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-03
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 0930 STOP: 00/00/00
D. NUMBER: N304

UG/KG	ANALYTICAL RESULTS
3300J	ALPHA-BHC
14000U	BETA-BHC
14000U	DELTA-BHC
4800J	GAMMA-BHC (LINDANE)
18000C	HEPTACHLOR
14000J	ALDRIN
14000U	HEPTACHLOR EPOXIDE
14000U	ENDOSULFAN I (ALPHA)
29000U	DIELDRIN
29000U	4,4'-DDE (P,P'-DDE)
29000U	ENDRIN
29000U	ENDOSULFAN II (BETA)
150000C	4,4'-DDD (P,P'-DDD)
29000U	ENDOSULFAN SULFATE
74000J	4,4'-DDT (P,P'-DDT)

UG/KG	ANALYTICAL RESULTS
140000U	METHOXYCHLOR
29000U	ENDRIN KETONE
—	CHLORDANE (TECH. MIXTURE) /1
45000JC	GAMMA-CHLORDANE /2
76000JC	ALPHA-CHLORDANE /2
290000U	TOXAPHENE
140000U	PCB-1016 (AROCLOR 1016)
140000U	PCB-1221 (AROCLOR 1221)
140000U	PCB-1232 (AROCLOR 1232)
140000U	PCB-1242 (AROCLOR 1242)
140000U	PCB-1248 (AROCLOR 1248)
290000U	PCB-1254 (AROCLOR 1254)
290000U	PCB-1260 (AROCLOR 1260)
17	PERCENT MOISTURE

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36790 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-04

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1330 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N301

UG/KG	ANALYTICAL RESULTS	UG/KG	ANALYTICAL RESULTS
160000U	CHLOROMETHANE	79000U	1,2-DICHLOROPROPANE
160000U	BROMOMETHANE	79000U	CIS-1,3-DICHLOROPROPENE
160000U	VINYL CHLORIDE	79000U	TRICHLOROETHENE(TRICHLOROETHYLENE)
160000U	CHLOROETHANE	79000U	DIBROMOCHLOROMETHANE
300000U	METHYLENE CHLORIDE	79000U	1,1,2-TRICHLOROETHANE
160000U	ACETONE	79000U	BENZENE
79000U	CARBON DISULFIDE	79000U	TRANS-1,3-DICHLOROPROPENE
79000U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)	79000U	BROMOFORM
79000U	1,1-DICHLOROETHANE	160000U	METHYL ISOBUTYL KETONE
79000U	1,2-DICHLOROETHENE (TOTAL)	160000UJ	METHYL BUTYL KETONE
79000U	CHLOROFORM	79000U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
79000U	1,2-DICHLOROETHANE	79000U	1,1,2,2-TETRACHLOROETHANE
160000UR	METHYL ETHYL KETONE	79000U	TOLUENE
79000U	1,1,1-TRICHLOROETHANE	79000U	CHLOROBENZENE
79000U	CARBON TETRACHLORIDE	200000	ETHYL BENZENE
160000UJ	VINYL ACETATE	79000U	STYRENE
79000U	BROMODICHLOROMETHANE	1000000	TOTAL XYLENES
		21	PERCENT MOISTURE

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36790 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-04

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1330 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N301

UG/KG	ANALYTICAL RESULTS
25000U	PHENOL
25000U	BIS(2-CHLOROETHYL) ETHER
25000U	2-CHLOROPHENOL
25000U	1,3-DICHLOROBENZENE
12000J	1,4-DICHLOROBENZENE
25000UJ	BENZYL ALCOHOL
25000U	1,2-DICHLOROBENZENE
25000U	2-METHYLPHENOL
25000U	BIS(2-CHLOROISOPROPYL) ETHER
25000U	(3-AND/OR 4-)METHYLPHENOL
25000U	N-NITROSODI-N-PROPYLAMINE
25000U	HEXACHLOROETHANE
25000U	NITROBENZENE
25000U	ISOPHORONE
25000U	2-NITROPHENOL
25000U	2,4-DIMETHYLPHENOL
120000UJ	BENZOIC ACID
25000U	BIS(2-CHLOROETHOXY) METHANE
25000U	2,4-DICHLOROPHENOL
25000U	1,2,4-TRICHLOROBENZENE
35000	NAPHTHALENE
25000U	4-CHLOROANILINE
25000U	HEXACHLOROBUTADIENE
25000U	4-CHLORO-3-METHYLPHENOL
85000J	2-METHYLNAPHTHALENE
25000U	HEXACHLOROCYCLOPENTADIENE (HCCP)
25000U	2,4,6-TRICHLOROPHENOL
120000U	2,4,5-TRICHLOROPHENOL
25000U	2-CHLORONAPHTHALENE
120000U	2-NITROANILINE
25000U	DIMETHYL PHTHALATE
25000U	ACENAPHTHYLENE
25000U	2,6-DINITROTOLUENE

UG/KG	ANALYTICAL RESULTS
120000U	3-NITROANILINE
25000U	ACENAPHTHENE
120000UJ	2,4-DINITROPHENOL
120000U	4-NITROPHENOL
25000U	DIBENZOFURAN
25000U	2,4-DINITROTOLUENE
25000U	DIETHYL PHTHALATE
25000U	4-CHLOROPHENYL PHENYL ETHER
25000U	FLUORENE
120000UJ	4-NITROANILINE
120000U	2-METHYL-4,6-DINITROPHENOL
25000U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
25000U	4-BROMOPHENYL PHENYL ETHER
25000U	HEXACHLOROBENZENE (HCB)
120000UR	PENTACHLOROPHENOL
25000U	PHENANTHRENE
25000U	ANTHRACENE
25000U	DI-N-BUTYLPHTHALATE
25000U	FLUORANTHENE
25000U	PYRENE
25000U	BENZYL BUTYL PHTHALATE
50000U	3,3'-DICHLOROBENZIDINE
25000U	BENZO(A)ANTHRACENE
25000U	CHRYSENE
25000U	BIS(2-ETHYLHEXYL) PHTHALATE
25000U	DI-N-OCTYLPHTHALATE
25000U	BENZO(B AND/OR K)FLUORANTHENE
25000U	BENZO-A-PYRENE
25000U	INDENO (1,2,3-CD) PYRENE
25000U	DIBENZO(A,H)ANTHRACENE
25000U	BENZO(GHI)PERYLENE
21	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36783 SAMPLE TYPE: SOIL PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: SS-01 COLLECTION START: 06/13/89 0755 STOP: 00/00/00
CASE NUMBER: 12126 SAS NUMBER: MD NUMBER: N293

MG/KG	ANALYTICAL RESULTS	MG/KG	ANALYTICAL RESULTS
2200J	ALUMINUM	28J	MANGANESE
0.89U	ANTIMONY	0.12U	MERCURY
2U	ARSENIC	3U	NICKEL
6.9	BARIUM	480U	POTASSIUM
0.22U	BERYLLIUM	0.4U	SELENIUM
0.44UJ	CADMIUM	2UJ	SILVER
200000J	CALCIUM	98	SODIUM
9.1J	CHROMIUM	0.28U	THALLIUM
2.6UJ	COBALT	NA	TIN
7.1	COPPER	6.9	VANADIUM
1200J	IRON	62	ZINC
75	LEAD	26	PERCENT MOISTURE
1500	MAGNESIUM		

REMARKS ***REMARKS***

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36783 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-01
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0755 STOP: 00/00/00
D. NO.: N293 MD NO: N293

RESULTS	UNITS	PARAMETER
4.5U	MG/KG	CYANIDE

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36783 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-01

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0755 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N293

UG/KG	ANALYTICAL RESULTS
14U	CHLOROMETHANE
14U	BROMOMETHANE
14U	VINYL CHLORIDE
14U	CHLOROETHANE
80UJ	METHYLENE CHLORIDE
14U	ACETONE
7U	CARBON DISULFIDE
7U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
7U	1,1-DICHLOROETHANE
7U	1,2-DICHLOROETHENE (TOTAL)
7U	CHLOROFORM
7U	1,2-DICHLOROETHANE
14UR	METHYL ETHYL KETONE
7U	1,1,1-TRICHLOROETHANE
7U	CARBON TETRACHLORIDE
14U	VINYL ACETATE
7U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
7U	1,2-DICHLOROPROPANE
7U	CIS-1,3-DICHLOROPROPENE
7U	TRICHLOROETHENE(TRICHLOROETHYLENE)
7U	DIBROMOCHLOROMETHANE
7U	1,1,2-TRICHLOROETHANE
7U	BENZENE
7U	TRANS-1,3-DICHLOROPROPENE
7U	BROMOFORM
14U	METHYL ISOBUTYL KETONE
14U	METHYL BUTYL KETONE
7U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
7U	1,1,2,2-TETRACHLOROETHANE
7U	TOLUENE
7U	CHLOROBENZENE
7U	ETHYL BENZENE
7U	STYRENE
7U	TOTAL XYLENES
26	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36783 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-01

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0755 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N293

UG/KG	ANALYTICAL RESULTS
450U	PHENOL
450U	BIS(2-CHLOROETHYL) ETHER
450U	2-CHLOROPHENOL
450U	1,3-DICHLOROBENZENE
450U	1,4-DICHLOROBENZENE
450UJ	BENZYL ALCOHOL
450U	1,2-DICHLOROBENZENE
450U	2-METHYLPHENOL
450U	BIS(2-CHLOROISOPROPYL) ETHER
450U	(3-AND/OR 4-)METHYLPHENOL
450U	N-NITROSODI-N-PROPYLAMINE
450U	HEXACHLOROETHANE
450U	NITROBENZENE
450U	ISOPHORONE
450U	2-NITROPHENOL
450U	2,4-DIMETHYLPHENOL
2200U	BENZOIC ACID
450U	BIS(2-CHLOROETHOXY) METHANE
450U	2,4-DICHLOROPHENOL
450U	1,2,4-TRICHLOROBENZENE
450U	NAPHTHALENE
450U	4-CHLOROANILINE
450U	HEXACHLOROBUTADIENE
450U	4-CHLORO-3-METHYLPHENOL
450UR	2-METHYLNAPHTHALENE
450U	HEXACHLOROCYCLOPENTADIENE (HCCP)
450U	2,4,6-TRICHLOROPHENOL
2200U	2,4,5-TRICHLOROPHENOL
450U	2-CHLORONAPHTHALENE
2200U	2-NITROANILINE
450U	DIMETHYL PHTHALATE
450U	ACENAPHTHYLENE
450U	2,6-DINITROTOLUENE

UG/KG	ANALYTICAL RESULTS
2200UJ	3-NITROANILINE
450U	ACENAPHTHENE
2200U	2,4-DINITROPHENOL
2200UJ	4-NITROPHENOL
450U	DIBENZOFURAN
450U	2,4-DINITROTOLUENE
450U	DIETHYL PHTHALATE
450U	4-CHLOROPHENYL PHENYL ETHER
450U	FLUORENE
2200UJ	4-NITROANILINE
2200U	2-METHYL-4,6-DINITROPHENOL
450U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
450U	4-BROMOPHENYL PHENYL ETHER
450U	HEXACHLOROBENZENE (HCB)
2200UR	PENTACHLOROPHENOL
450U	PHENANTHRENE
450U	ANTHRACENE
450U	DI-N-BUTYLPHTHALATE
150J	FLUORANTHENE
120J	PYRENE
450U	BENZYL BUTYL PHTHALATE
890UJ	3,3'-DICHLOROBENZIDINE
450U	BENZO(A)ANTHRACENE
450U	CHRYSENE
450U	BIS(2-ETHYLHEXYL) PHTHALATE
450U	DI-N-OCTYLPHTHALATE
450UJ	BENZO(B AND/OR K)FLUORANTHENE
450U	BENZO-A-PYRENE
450U	INDENO (1,2,3-CD) PYRENE
450U	DIBENZO(A,H)ANTHRACENE
450U	BENZO(GHI)PERYLENE
26	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36783 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-01
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0755 STOP: 00/00/00
D. NO.: N293 MD NO: N293

ANALYTICAL RESULTS UG/KG

2000J 2 UNIDENTIFIED COMPOUNDS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36783 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-01
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0755 STOP: 00/00/00
D. NUMBER: N293

UG/KG	ANALYTICAL RESULTS
11U	ALPHA-BHC
11U	BETA-BHC
11U	DELTA-BHC
11U	GAMMA-BHC (LINDANE)
11U	HEPTACHLOR
11U	ALDRIN
11U	HEPTACHLOR EPOXIDE
11U	ENDOSULFAN I (ALPHA)
22U	DIELDRIN
22U	4,4'-DDE (P,P'-DDE)
22U	ENDRIN
22U	ENDOSULFAN II (BETA)
22U	4,4'-DDD (P,P'-DDD)
22U	ENDOSULFAN SULFATE
22UJ	4,4'-DDT (P,P'-DDT)

UG/KG	ANALYTICAL RESULTS
110U	METHOXYCHLOR
22U	ENDRIN KETONE
--	CHLORDANE (TECH. MIXTURE) /1
110U	GAMMA-CHLORDANE /2
110U	ALPHA-CHLORDANE /2
220U	TOXAPHENE
110U	PCB-1016 (AROCLOR 1016)
110U	PCB-1221 (AROCLOR 1221)
110U	PCB-1232 (AROCLOR 1232)
110U	PCB-1242 (AROCLOR 1242)
110U	PCB-1248 (AROCLOR 1248)
220U	PCB-1254 (AROCLOR 1254)
220U	PCB-1260 (AROCLOR 1260)
26	PERCENT MOISTURE

FOOTNOTES
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*C-CONFIRMED BY GCMS 1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36787 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-02

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 08/13/89 1110 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N299

UG/KG	ANALYTICAL RESULTS
25000U	PHENOL
25000U	BIS(2-CHLOROETHYL) ETHER
25000U	2-CHLOROPHENOL
25000U	1,3-DICHLOROBENZENE
25000U	1,4-DICHLOROBENZENE
25000UJ	BENZYL ALCOHOL
25000U	1,2-DICHLOROBENZENE
25000U	2-METHYLPHENOL
25000U	BIS(2-CHLOROISOPROPYL) ETHER
25000U	(3-AND/OR 4-)METHYLPHENOL
25000U	N-NITROSODI-N-PROPYLAMINE
25000U	HEXACHLOROETHANE
25000U	NITROBENZENE
25000U	ISOPHORONE
25000U	2-NITROPHENOL
25000U	2,4-DIMETHYLPHENOL
120000U	BENZOIC ACID
25000U	BIS(2-CHLOROETHOXY) METHANE
25000U	2,4-DICHLOROPHENOL
25000U	1,2,4-TRICHLOROBENZENE
5900J	NAPHTHALENE
25000U	4-CHLOROANILINE
25000U	HEXACHLOROBUTADIENE
25000U	4-CHLORO-3-METHYLPHENOL
8200J	2-METHYLNAPHTHALENE
25000U	HEXACHLOROCYCLOPENTADIENE (HCCP)
25000U	2,4,6-TRICHLOROPHENOL
120000U	2,4,5-TRICHLOROPHENOL
25000U	2-CHLORONAPHTHALENE
120000U	2-NITROANILINE
25000U	DIMETHYL PHTHALATE
25000U	ACENAPHTHYLENE
25000U	2,6-DINITROTOLUENE

UG/KG	ANALYTICAL RESULTS
120000UJ	3-NITROANILINE
25000U	ACENAPHTHENE
120000U	2,4-DINITROPHENOL
120000UJ	4-NITROPHENOL
25000U	DIBENZOFURAN
25000U	2,4-DINITROTOLUENE
25000U	DIETHYL PHTHALATE
25000U	4-CHLOROPHENYL PHENYL ETHER
25000U	FLUORENE
120000UJ	4-NITROANILINE
120000U	2-METHYL-4,6-DINITROPHENOL
25000U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
25000U	4-BROMOPHENYL PHENYL ETHER
25000U	HEXACHLOROBENZENE (HCB)
120000UR	PENTACHLOROPHENOL
25000U	PHENANTHRENE
25000U	ANTHRACENE
25000U	DI-N-BUTYLPHTHALATE
25000U	FLUORANTHENE
25000U	PYRENE
25000U	BENZYL BUTYL PHTHALATE
50000UJ	3,3'-DICHLOROBENZIDINE
25000U	BENZO(A)ANTHRACENE
25000U	CHRYSENE
25000U	BIS(2-ETHYLHEXYL) PHTHALATE
25000U	DI-N-OCTYLPHTHALATE
25000UJ	BENZO(B AND/OR K)FLUORANTHENE
25000U	BENZO-A-PYRENE
25000U	INDENO (1,2,3-CD) PYRENE
25000U	DIBENZO(A,H)ANTHRACENE
25000U	BENZO(GHI)PERYLENE
20	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36787 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-02
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1110 STOP: 00/00/00
D. NO.: N299 MD NO: N299

ANALYTICAL RESULTS UG/KG

40000JN	ETHYLMETHYLBENZENE
40000JN	TRIMETHYLBENZENE
20000JN	CHLORDENE
50000JN	DDMU
70000JN	NONACHLOR
400000J	12 UNIDENTIFIED COMPOUNDS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36789 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-03

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1140 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N300

UG/KG	ANALYTICAL RESULTS
13U	CHLOROMETHANE
13U	BROMOMETHANE
13U	VINYL CHLORIDE
13U	CHLOROETHANE
70UJ	METHYLENE CHLORIDE
60U	ACETONE
6U	CARBON DISULFIDE
6U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
6U	1,1-DICHLOROETHANE
6U	1,2-DICHLOROETHENE (TOTAL)
6U	CHLOROFORM
6U	1,2-DICHLOROETHANE
13UR	METHYL ETHYL KETONE
6U	1,1,1-TRICHLOROETHANE
6U	CARBON TETRACHLORIDE
13U	VINYL ACETATE
6U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
6U	1,2-DICHLOROPROPANE
6U	CIS-1,3-DICHLOROPROPENE
6U	TRICHLOROETHENE(TRICHLOROETHYLENE)
6U	DIBROMOCHLOROMETHANE
6U	1,1,2-TRICHLOROETHANE
6U	BENZENE
6U	TRANS-1,3-DICHLOROPROPENE
6U	BROMOFORM
13U	METHYL ISOBUTYL KETONE
13UJ	METHYL BUTYL KETONE
6U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
6U	1,1,2,2-TETRACHLOROETHANE
27	TOLUENE
6U	CHLOROBENZENE
6U	ETHYL BENZENE
6U	STYRENE
6U	TOTAL XYLENES
23	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36789 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-03

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1140 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N300

UG/KG	ANALYTICAL RESULTS
430U	PHENOL
430U	BIS(2-CHLOROETHYL) ETHER
430U	2-CHLOROPHENOL
430U	1,3-DICHLOROBENZENE
430U	1,4-DICHLOROBENZENE
430UJ	BENZYL ALCOHOL
430U	1,2-DICHLOROBENZENE
430U	2-METHYLPHENOL
430U	BIS(2-CHLOROISOPROPYL) ETHER
240J	(3-AND/OR 4-)METHYLPHENOL
430U	N-NITROSODI-N-PROPYLAMINE
430U	HEXACHLOROETHANE
430U	NITROBENZENE
430U	ISOPHORONE
430U	2-NITROPHENOL
430U	2,4-DIMETHYLPHENOL
2100U	BENZOIC ACID
430U	BIS(2-CHLOROETHOXY) METHANE
430U	2,4-DICHLOROPHENOL
430U	1,2,4-TRICHLOROBENZENE
430U	NAPHTHALENE
430U	4-CHLOROANILINE
430U	HEXACHLOROBUTADIENE
430U	4-CHLORO-3-METHYLPHENOL
430UR	2-METHYLNAPHTHALENE
430U	HEXACHLOROCYCLOPENTADIENE (HCCP)
430U	2,4,6-TRICHLOROPHENOL
2100U	2,4,5-TRICHLOROPHENOL
430U	2-CHLORONAPHTHALENE
2100U	2-NITROANILINE
430U	DIMETHYL PHTHALATE
430U	ACENAPHTHYLENE
430U	2,6-DINITROTOLUENE

UG/KG	ANALYTICAL RESULTS
2100UJ	3-NITROANILINE
430U	ACENAPHTHENE
2100U	2,4-DINITROPHENOL
2100UJ	4-NITROPHENOL
430U	DIBENZOFURAN
430U	2,4-DINITROTOLUENE
430U	DIETHYL PHTHALATE
430U	4-CHLOROPHENYL PHENYL ETHER
430U	FLUORENE
2100UJ	4-NITROANILINE
2100U	2-METHYL-4,6-DINITROPHENOL
430U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
430U	4-BROMOPHENYL PHENYL ETHER
430U	HEXACHLOROBENZENE (HCB)
2100UR	PENTACHLOROPHENOL
270J	PHENANTHRENE
51J	ANTHRACENE
430U	DI-N-BUTYLPHTHALATE
180J	FLUORANTHENE
250J	PYRENE
430U	BENZYL BUTYL PHTHALATE
860UJ	3,3'-DICHLOROBENZIDINE
130J	BENZO(A)ANTHRACENE
180J	CHRYSENE
430U	BIS(2-ETHYLHEXYL) PHTHALATE
430U	DI-N-OCTYLPHTHALATE
370J	BENZO(B AND/OR K)FLUORANTHENE
430U	BENZO-A-PYRENE
430U	INDENO (1,2,3-CD) PYRENE
430U	DIBENZO(A,H)ANTHRACENE
430U	BENZO(GHI)PERYLENE
23	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36789 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-03
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1140 STOP: 00/00/00
D. NO.: N300 MD NO: N300

ANALYTICAL RESULTS UG/KG

500J 1 UNIDENTIFIED COMPOUND

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36785 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-01 COLLECTION START: 06/13/89 0835 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N295

UG/L	ANALYTICAL RESULTS
10U	CHLOROMETHANE
10U	BROMOMETHANE
10U	VINYL CHLORIDE
10U	CHLOROETHANE
5U	METHYLENE CHLORIDE
20UJ	ACETONE
5U	CARBON DISULFIDE
5U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
5U	1,1-DICHLOROETHANE
5U	1,2-DICHLOROETHENE (TOTAL)
5U	CHLOROFORM
5U	1,2-DICHLOROETHANE
10U	METHYL ETHYL KETONE
5U	1,1,1-TRICHLOROETHANE
5U	CARBON TETRACHLORIDE
10U	VINYL ACETATE
5U	BROMODICHLOROMETHANE

UG/L	ANALYTICAL RESULTS
5U	1,2-DICHLOROPROPANE
5U	CIS-1,3-DICHLOROPROPENE
5U	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	DIBROMOCHLOROMETHANE
5U	1,1,2-TRICHLOROETHANE
5U	BENZENE
5U	TRANS-1,3-DICHLOROPROPENE
5U	BROMOFORM
10U	METHYL ISOBUTYL KETONE
10U	METHYL BUTYL KETONE
5U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
5U	1,1,2,2-TETRACHLOROETHANE
5U	TOLUENE
5U	CHLOROBENZENE
5U	ETHYL BENZENE
5U	STYRENE
5U	TOTAL XYLENES

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36785 SAMPLE TYPE: GROUNDWA
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: TW-01

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0835 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N295

UG/L	ANALYTICAL RESULTS
10U	PHENOL
10U	BIS(2-CHLOROETHYL) ETHER
10U	2-CHLOROPHENOL
10U	1,3-DICHLOROBENZENE
10U	1,4-DICHLOROBENZENE
10U	BENZYL ALCOHOL
10U	1,2-DICHLOROBENZENE
10U	2-METHYLPHENOL
10U	BIS(2-CHLOROISOPROPYL) ETHER
10U	(3-AND/OR 4-)METHYLPHENOL
10U	N-NITROSODI-N-PROPYLAMINE
10U	HEXACHLOROETHANE
10U	NITROBENZENE
10U	ISOPHORONE
10U	2-NITROPHENOL
10U	2,4-DIMETHYLPHENOL
50UJ	BENZOIC ACID
10U	BIS(2-CHLOROETHOXY) METHANE
10U	2,4-DICHLOROPHENOL
10U	1,2,4-TRICHLOROBENZENE
10U	NAPHTHALENE
10UJ	4-CHLOROANILINE
10U	HEXACHLOROBUTADIENE
10U	4-CHLORO-3-METHYLPHENOL
10U	2-METHYLNAPHTHALENE
10U	HEXACHLOROCYCLOPENTADIENE (HCCP)
10U	2,4,6-TRICHLOROPHENOL
50U	2,4,5-TRICHLOROPHENOL
10U	2-CHLORONAPHTHALENE
50U	2-NITROANILINE
10U	DIMETHYL PHTHALATE
10U	ACENAPHTHYLENE
10U	2,6-DINITROTOLUENE

UG/L	ANALYTICAL RESULTS
50UJ	3-NITROANILINE
10U	ACENAPHTHENE
50UJ	2,4-DINITROPHENOL
50U	4-NITROPHENOL
10U	DIBENZOFURAN
10UJ	2,4-DINITROTOLUENE
10U	DIETHYL PHTHALATE
10U	4-CHLOROPHENYL PHENYL ETHER
10U	FLUORENE
50U	4-NITROANILINE
50U	2-METHYL-4,6-DINITROPHENOL
10U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
10U	4-BROMOPHENYL PHENYL ETHER
10U	HEXACHLOROBENZENE (HCB)
50UR	PENTACHLOROPHENOL
10U	PHENANTHRENE
10U	ANTHRACENE
10U	DI-N-BUTYLPHTHALATE
10U	FLUORANTHENE
10U	PYRENE
10U	BENZYL BUTYL PHTHALATE
20U	3,3'-DICHLOROBENZIDINE
10U	BENZO(A)ANTHRACENE
10U	CHRYSENE
10U	BIS(2-ETHYLHEXYL) PHTHALATE
10U	DI-N-OCTYLPHTHALATE
10U	BENZO(B AND/OR K)FLUORANTHENE
10U	BENZO-A-PYRENE
10U	INDENO (1,2,3-CD) PYRENE
10UJ	DIBENZO(A,H)ANTHRACENE
10U	BENZO(GHI)PERYLENE

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36789 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-03
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1140 STOP: 00/00/00
MD NUMBER: N300

MG/KG	ANALYTICAL RESULTS	MG/KG	ANALYTICAL RESULTS
4600J	ALUMINUM	46J	MANGANESE
1U	ANTIMONY	0.12U	MERCURY
7.2	ARSENIC	7U	NICKEL
42	BARIUM	540U	POTASSIUM
0.25U	BERYLLIUM	0.37U	SELENIUM
2.2J	CADMIUM	0.96UJ	SILVER
19000J	CALCIUM	56U	SODIUM
11J	CHROMIUM	0.25U	THALLIUM
2.9UJ	COBALT	NA	TIN
47	COPPER	6.4	VANADIUM
7500J	IRON	110	ZINC
140	LEAD	24	PERCENT MOISTURE
520	MAGNESIUM		

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36787 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-02
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1110 STOP: 00/00/00
D. NO.: N299 MD NO: N299

RESULTS	UNITS	PARAMETER
3.9U	MG/KG	CYANIDE

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NA1-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36789 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SS-03
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1140 STOP: 00/00/00
D. NO.: N300 MD NO: N300

RESULTS	UNITS	PARAMETER
2.9U	MG/KG	CYANIDE

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36785 SAMPLE TYPE: GROUNDWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TW-01 COLLECTION START: 06/13/89 0835 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N295 MD NO: N295

ANALYTICAL RESULTS UG/L

10JN PROMETON

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36790 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-04
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1330 STOP: 00/00/00
D. NO.: N301 MD NO: N301

ANALYTICAL RESULTS UG/KG

2000000J	14 UNIDENTIFIED COMPOUNDS
100000JN	TRIMETHYLBENZENE
60000JN	NONACHLOR
300000JN	ETHION
80000JN	CARBOPHENOTHION

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36790 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: S8-04
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1330 STOP: 00/00/00
D. NUMBER: N301

UG/KG	ANALYTICAL RESULTS
23000C	ALPHA-BHC
4400J	BETA-BHC
15000U	DELTA-BHC
85000C	GAMMA-BHC (LINDANE)
66000C	HEPTACHLOR
15000U	ALDRIN
15000U	HEPTACHLOR EPOXIDE
15000U	ENDOSULFAN I (ALPHA)
72000J	DIELDRIN
71000J	4,4'-DDE (P,P'-DDE)
30000U	ENDRIN
10000U	ENDOSULFAN II (BETA)
350000C	4,4'-DDD (P,P'-DDD)
30000U	ENDOSULFAN SULFATE
170000JC	4,4'-DDT (P,P'-DDT)

UG/KG	ANALYTICAL RESULTS
150000U	METHOXYCHLOR
30000U	ENDRIN KETONE
--	CHLORDANE (TECH. MIXTURE) /1
200000C	GAMMA-CHLORDANE /2
220000C	ALPHA-CHLORDANE /2
300000U	TOXAPHENE
150000U	PCB-1016 (AROCLOR 1016)
150000U	PCB-1221 (AROCLOR 1221)
150000U	PCB-1232 (AROCLOR 1232)
150000U	PCB-1242 (AROCLOR 1242)
150000U	PCB-1248 (AROCLOR 1248)
300000U	PCB-1254 (AROCLOR 1254)
300000U	PCB-1260 (AROCLOR 1260)
21	PERCENT MOISTURE

FOOTNOTES
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*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.
*C-CONFIRMED BY GCMS 1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36792 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-05

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1535 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N303

UG/KG	ANALYTICAL RESULTS
31U	CHLOROMETHANE
31U	BROMOMETHANE
31U	VINYL CHLORIDE
31U	CHLOROETHANE
300UJ	METHYLENE CHLORIDE
60U	ACETONE
16U	CARBON DISULFIDE
16U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
16U	1,1-DICHLOROETHANE
16U	1,2-DICHLOROETHENE (TOTAL)
16U	CHLOROFORM
16U	1,2-DICHLOROETHANE
31UR	METHYL ETHYL KETONE
16U	1,1,1-TRICHLOROETHANE
16U	CARBON TETRACHLORIDE
31U	VINYL ACETATE
16U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
16U	1,2-DICHLOROPROPANE
16U	CIS-1,3-DICHLOROPROPENE
16U	TRICHLOROETHENE(TRICHLOROETHYLENE)
16U	DIBROMOCHLOROMETHANE
16U	1,1,2-TRICHLOROETHANE
16U	BENZENE
16U	TRANS-1,3-DICHLOROPROPENE
16U	BROMOFORM
31U	METHYL ISOBUTYL KETONE
31U	METHYL BUTYL KETONE
16U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
16U	1,1,2,2-TETRACHLOROETHANE
16U	TOLUENE
16U	CHLOROBENZENE
16U	ETHYL BENZENE
16U	STYRENE
78	TOTAL XYLENES
20	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36792 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-05

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1535 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N303

UG/KG	ANALYTICAL RESULTS
410U	PHENOL
410U	BIS(2-CHLOROETHYL) ETHER
410U	2-CHLOROPHENOL
410U	1,3-DICHLOROBENZENE
410U	1,4-DICHLOROBENZENE
410UJ	BENZYL ALCOHOL
410U	1,2-DICHLOROBENZENE
410U	2-METHYLPHENOL
410U	BIS(2-CHLOROISOPROPYL) ETHER
410U	(3-AND/OR 4-)METHYLPHENOL
410U	N-NITROSODI-N-PROPYLAMINE
410U	HEXACHLOROETHANE
410U	NITROBENZENE
410U	ISOPHORONE
410U	2-NITROPHENOL
410U	2,4-DIMETHYLPHENOL
2000U	BENZOIC ACID
410U	BIS(2-CHLOROETHOXY) METHANE
410U	2,4-DICHLOROPHENOL
410U	1,2,4-TRICHLOROBENZENE
410U	NAPHTHALENE
410U	4-CHLOROANILINE
410U	HEXACHLOROBUTADIENE
410U	4-CHLORO-3-METHYLPHENOL
410UR	2-METHYLNAPHTHALENE
410U	HEXACHLOROCYCLOPENTADIENE (HCCP)
410U	2,4,6-TRICHLOROPHENOL
2000U	2,4,5-TRICHLOROPHENOL
410U	2-CHLORONAPHTHALENE
2000U	2-NITROANILINE
410U	DIMETHYL PHTHALATE
410U	ACENAPHTHYLENE
410U	2,6-DINITROTOLUENE

UG/KG	ANALYTICAL RESULTS
2000UJ	3-NITROANILINE
410U	ACENAPHTHENE
2000U	2,4-DINITROPHENOL
2000UJ	4-NITROPHENOL
410U	DIBENZOFURAN
410U	2,4-DINITROTOLUENE
410U	DIETHYL PHTHALATE
410U	4-CHLOROPHENYL PHENYL ETHER
410U	FLUORENE
2000UJ	4-NITROANILINE
2000U	2-METHYL-4,6-DINITROPHENOL
410U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
410U	4-BROMOPHENYL PHENYL ETHER
410U	HEXACHLOROBENZENE (HCB)
2000UR	PENTACHLOROPHENOL
410U	PHENANTHRENE
410U	ANTHRACENE
410U	DI-N-BUTYLPHTHALATE
410U	FLUORANTHENE
410U	PYRENE
410U	BENZYL BUTYL PHTHALATE
820UJ	3,3'-DICHLOROBENZIDINE
410U	BENZO(A)ANTHRACENE
410U	CHRYSENE
410U	BIS(2-ETHYLHEXYL) PHTHALATE
410U	DI-N-OCTYLPHTHALATE
410U	BENZO(B AND/OR K)FLUORANTHENE
410U	BENZO-A-PYRENE
410U	INDENO (1,2,3-CD) PYRENE
410U	DIBENZO(A,H)ANTHRACENE
410U	BENZO(GHI)PERYLENE
20	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36792 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-05
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1535 STOP: 00/00/00
D. NO.: N303 MD NO: N303

ANALYTICAL RESULTS UG/KG

100JN	ETHYLMETHYLBENZENE
300JN	TRIMETHYLBENZENE (2 ISOMERS)
100JN	DIMETHYLNAPHTHALENE
500JN	ASPON
200JN	[redacted]ACHLOR

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36792 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-05
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1535 STOP: 00/00/00
D. NUMBER: N303

UG/KG	ANALYTICAL RESULTS
100U	ALPHA-BHC
100U	BETA-BHC
100U	DELTA-BHC
100U	GAMMA-BHC (LINDANE)
190	HEPTACHLOR
100U	ALDRIN
100U	HEPTACHLOR EPOXIDE
100U	ENDOSULFAN I (ALPHA)
96J	DIELDRIN
200U	4,4'-DDE (P,P'-DDE)
200U	ENDRIN
200U	ENDOSULFAN II (BETA)
93J	4,4'-DDD (P,P'-DDD)
200U	ENDOSULFAN SULFATE
65J	4,4'-DDT (P,P'-DDT)

UG/KG	ANALYTICAL RESULTS
1000U	METHOXYCHLOR
200U	ENDRIN KETONE
--	CHLORDANE (TECH. MIXTURE) /1
1000C	GAMMA-CHLORDANE /2
690JC	ALPHA-CHLORDANE /2
2000U	TOXAPHENE
1000U	PCB-1016 (AROCLOR 1016)
1000U	PCB-1221 (AROCLOR 1221)
1000U	PCB-1232 (AROCLOR 1232)
1000U	PCB-1242 (AROCLOR 1242)
1000U	PCB-1248 (AROCLOR 1248)
2000U	PCB-1254 (AROCLOR 1254)
2000U	PCB-1260 (AROCLOR 1260)
20	PERCENT MOISTURE

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36788 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-06

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1000 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N297

UG/KG	ANALYTICAL RESULTS
1600U	CHLOROMETHANE
1600U	BROMOMETHANE
1600U	VINYL CHLORIDE
1600U	CHLOROETHANE
3000U	METHYLENE CHLORIDE
4000U	ACETONE
780U	CARBON DISULFIDE
780U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
780U	1,1-DICHLOROETHANE
780U	1,2-DICHLOROETHENE (TOTAL)
780U	CHLOROFORM
780U	1,2-DICHLOROETHANE
1600UR	METHYL ETHYL KETONE
780U	1,1,1-TRICHLOROETHANE
780U	CARBON TETRACHLORIDE
1600UJ	VINYL ACETATE
780U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
780U	1,2-DICHLOROPROPANE
780U	CIS-1,3-DICHLOROPROPENE
780U	TRICHLOROETHENE(TRICHLOROETHYLENE)
780U	DIBROMOCHLOROMETHANE
780U	1,1,2-TRICHLOROETHANE
780U	BENZENE
780U	TRANS-1,3-DICHLOROPROPENE
780U	BROMOFORM
1600U	METHYL ISOBUTYL KETONE
1600UJ	METHYL BUTYL KETONE
780U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
780U	1,1,2,2-TETRACHLOROETHANE
780U	TOLUENE
780U	CHLOROBENZENE
1000	ETHYL BENZENE
780U	STYRENE
5200	TOTAL XYLENES
20	PERCENT MOISTURE

REMARKS

REMARKS

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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36786 SAMPLE TYPE: SOIL PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: SB-06 COLLECTION START: 06/13/89 1000 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N297

UG/KG	ANALYTICAL RESULTS
410U	PHENOL
410U	BIS(2-CHLOROETHYL) ETHER
410U	2-CHLOROPHENOL
410U	1,3-DICHLOROBENZENE
510	1,4-DICHLOROBENZENE
410UJ	BENZYL ALCOHOL
220J	1,2-DICHLOROBENZENE
410U	2-METHYLPHENOL
410U	BIS(2-CHLOROISOPROPYL) ETHER
410U	(3-AND/OR 4-)METHYLPHENOL
410U	N-NITROSODI-N-PROPYLAMINE
410U	HEXACHLOROETHANE
410U	NITROBENZENE
410U	ISOPHORONE
410U	2-NITROPHENOL
410U	2,4-DIMETHYLPHENOL
2000UJ	BENZOIC ACID
410U	BIS(2-CHLOROETHOXY) METHANE
410U	2,4-DICHLOROPHENOL
790	1,2,4-TRICHLOROBENZENE
430	NAPHTHALENE
410U	4-CHLOROANILINE
410U	HEXACHLOROBUTADIENE
410U	4-CHLORO-3-METHYLPHENOL
3200J	2-METHYLNAPHTHALENE
410U	HEXACHLOROCYCLOPENTADIENE (HCCP)
410U	2,4,6-TRICHLOROPHENOL
2000U	2,4,5-TRICHLOROPHENOL
410U	2-CHLORONAPHTHALENE
2000U	2-NITROANILINE
410U	DIMETHYL PHTHALATE
410U	ACENAPHTHYLENE
410U	2,6-DINITROTOLUENE

UG/KG	ANALYTICAL RESULTS
2000UJ	3-NITROANILINE
410U	ACENAPHTHENE
2000U	2,4-DINITROPHENOL
2000UJ	4-NITROPHENOL
410U	DIBENZOFURAN
410U	2,4-DINITROTOLUENE
410U	DIETHYL PHTHALATE
410U	4-CHLOROPHENYL PHENYL ETHER
190J	FLUORENE
2000UJ	4-NITROANILINE
2000U	2-METHYL-4,6-DINITROPHENOL
410U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
410U	4-BROMOPHENYL PHENYL ETHER
410U	HEXACHLOROBENZENE (HCB)
2000UR	PENTACHLOROPHENOL
570	PHENANTHRENE
410U	ANTHRACENE
410U	DI-N-BUTYLPHTHALATE
410U	FLUORANTHENE
410U	PYRENE
410U	BENZYL BUTYL PHTHALATE
820UJ	3,3'-DICHLOROBENZIDINE
410U	BENZO(A)ANTHRACENE
200J	CHRYSENE
410U	BIS(2-ETHYLHEXYL) PHTHALATE
410U	DI-N-OCTYLPHTHALATE
410U	BENZO(B AND/OR K)FLUORANTHENE
410U	BENZO-A-PYRENE
410U	INDENO (1,2,3-CD) PYRENE
410U	DIBENZO(A,H)ANTHRACENE
410U	BENZO(GHI)PERYLENE
20	PERCENT MOISTURE

REMARKS ***REMARKS***

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/04/89

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36786 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-06
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1000 STOP: 00/00/00
D. NO.: N297 MD NO: N297

ANALYTICAL RESULTS UG/KG

30000J	18 UNIDENTIFIED COMPOUNDS
800JN	TETRAMETHYLBUTYLPHENOL
3000JN	ETHION
800JN	CARBOPHENOTHION

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36786 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-06
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1000 STOP: 00/00/00
D. NUMBER: N297

UG/KG	ANALYTICAL RESULTS
200U	ALPHA-BHC
230	BETA-BHC
200U	DELTA-BHC
200U	GAMMA-BHC (LINDANE)
200U	HEPTACHLOR
940JN	ALDRIN
200U	HEPTACHLOR EPOXIDE
200U	ENDOSULFAN I (ALPHA)
2000J	DIELDRIN
5100J	4,4'-DDE (P,P'-DDE)
400U	ENDRIN
400U	ENDOSULFAN II (BETA)
8400J	4,4'-DDD (P,P'-DDD)
400U	ENDOSULFAN SULFATE
400UJ	4,4'-DDT (P,P'-DDT)

UG/KG	ANALYTICAL RESULTS
2000U	METHOXYCHLOR
400U	ENDRIN KETONE
—	CHLORDANE (TECH. MIXTURE) /1
6700C	GAMMA-CHLORDANE /2
5800C	ALPHA-CHLORDANE /2
4000U	TOXAPHENE
2000U	PCB-1016 (AROCLOR 1016)
2000U	PCB-1221 (AROCLOR 1221)
2000U	PCB-1232 (AROCLOR 1232)
2000U	PCB-1242 (AROCLOR 1242)
2000U	PCB-1248 (AROCLOR 1248)
4000U	PCB-1254 (AROCLOR 1254)
4000U	PCB-1260 (AROCLOR 1260)
20	PERCENT MOISTURE

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PESTICIDES/PCB'S DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36782 SAMPLE TYPE: SURFACEWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TB-01 COLLECTION START: 06/12/89 0800 STOP: 00/00/00
CASE NUMBER: 12126 SAS NUMBER: D. NUMBER: N292

UG/L	ANALYTICAL RESULTS	UG/L	ANALYTICAL RESULTS
0.050UJ	ALPHA-BHC	0.050UJ	METHOXYCHLOR
0.050UJ	BETA-BHC	0.10UJ	ENDRIN KETONE
0.050UJ	DELTA-BHC	—	CHLORDANE (TECH. MIXTURE) /1
0.050UJ	GAMMA-BHC (LINDANE)	0.050UJ	GAMMA-CHLORDANE /2
0.050UJ	HEPTACHLOR	0.050UJ	ALPHA-CHLORDANE /2
0.050UJ	ALDRIN	1.0UJ	TOXAPHENE
0.050UJ	HEPTACHLOR EPOXIDE	0.50UJ	PCB-1016 (AROCLOR 1016)
0.050UJ	ENDOSULFAN I (ALPHA)	0.50UJ	PCB-1221 (AROCLOR 1221)
0.10UJ	DIELDRIN	0.50UJ	PCB-1232 (AROCLOR 1232)
0.10UJ	4,4'-DDE (P,P'-DDE)	0.50UJ	PCB-1242 (AROCLOR 1242)
0.10UJ	ENDRIN	0.50UJ	PCB-1248 (AROCLOR 1248)
0.10UJ	ENDOSULFAN II (BETA)	1.0UJ	PCB-1254 (AROCLOR 1254)
0.10UJ	4,4'-DDD (P,P'-DDD)	1.0UJ	PCB-1260 (AROCLOR 1260)
0.10UJ	ENDOSULFAN SULFATE		
0.10UJ	4,4'-DDT (P,P'-DDT)		

REMARKS ***REMARKS***
HOLDING TIMES EXCEEDED(40 CFR 136,OCTOBER 26,1984)

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36782 SAMPLE TYPE: SURFACEWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TB-01 COLLECTION START: 06/12/89 0800 STOP: 00/00/00
CASE.NO.: 12126 SAS NO.: D. NO.: N292 MD NO: N292

RESULTS	UNITS	PARAMETER
0.01UJ	MG/L	CYANIDE

REMARKS
HOLDING TIME EXCEEDED-CN

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36782 SAMPLE TYPE: SURFACEWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TB-01 COLLECTION START: 06/12/89 0800 STOP: 00/00/00
CASE NUMBER: 12128 SAS NUMBER: MD NUMBER: N292

UG/L	ANALYTICAL RESULTS	UG/L	ANALYTICAL RESULTS
38U	ALUMINUM	3U	MANGANESE
5U	ANTIMONY	0.20UJ	MERCURY
4UJ	ARSENIC	20U	NICKEL
25U	BARIUM	2600U	POTASSIUM
2U	BERYLLIUM	2U	SELENIUM
3UJ	CADMIUM	5UJ	SILVER
90U	CALCIUM	270U	SODIUM
5U	CHROMIUM	2U	THALLIUM
20U	COBALT	NA	TIN
8U	COPPER	20U	VANADIUM
20U	IRON	20U	ZINC
3UJ	LEAD		
220U	MAGNESIUM		

REMARKS ***REMARKS***

FOOTNOTES
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2

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36784 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: S8-01
CASE NUMBER: 12128 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0810 STOP: 00/00/00
MD NUMBER: N294

MG/KG	ANALYTICAL RESULTS	MG/KG	ANALYTICAL RESULTS
12000J	ALUMINUM	1UJ	MANGANESE
0.92U	ANTIMONY	1U	MERCURY
.57U	ARSENIC	6U	NICKEL
18	BARIUM	500U	POTASSIUM
0.23U	BERYLLIUM	0.34U	SELENIUM
0.46UJ	CADMIUM	0.88UJ	SILVER
1100J	CALCIUM	60U	SODIUM
11J	CHROMIUM	.21U	THALLIUM
2.6UJ	COBALT	NA	TIN
1.5U	COPPER	2.8U	VANADIUM
310J	IRON	3U	ZINC
4.3	LEAD	22	PERCENT MOISTURE
90U	MAGNESIUM		

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36796 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-02
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 1205 STOP: 00/00/00
MD NUMBER: N396

MG/KG	ANALYTICAL RESULTS
18000J	ALUMINUM
0.89U	ANTIMONY
0.67U	ARSENIC
93	BARIUM
.22U	BERYLLIUM
.44UJ	CADMIUM
800J	CALCIUM
11J	CHROMIUM
2.8J	COBALT
2U	COPPER
1200J	IRON
10	LEAD
500U	MAGNESIUM

MG/KG	ANALYTICAL RESULTS
2.8J	MANGANESE
0.13U	MERCURY
5U	NICKEL
500	POTASSIUM
0.40U	SELENIUM
.89UJ	SILVER
71	SODIUM
0.27U	THALLIUM
NA	TIN
6	VANADIUM
5.3	ZINC
24	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36794 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-03
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 0930 STOP: 00/00/00
MD NUMBER: N304

MG/KG	ANALYTICAL RESULTS	MG/KG	ANALYTICAL RESULTS
21000J	ALUMINUM	11J	MANGANESE
0.83U	ANTIMONY	0.12U	MERCURY
1.7	ARSENIC	8U	NICKEL
8.9	BARIUM	710	POTASSIUM
0.21U	BERYLLIUM	0.33U	SELENIUM
0.42UJ	CADMIUM	0.80UJ	SILVER
440J	CALCIUM	660	SODIUM
16J	CHROMIUM	.22U	THALLIUM
2.4UJ	COBALT	NA	TIN
7	COPPER	2.5U	VANADIUM
550J	IRON	42	ZINC
17	LEAD	17	PERCENT MOISTURE
150U	MAGNESIUM		

REMARKS ***REMARKS***

FOOTNOTES
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*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36790 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-04
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1330 STOP: 00/00/00
MD NUMBER: N301

MG/KG	ANALYTICAL RESULTS	MG/KG	ANALYTICAL RESULTS
13000J	ALUMINUM	3.6J	MANGANESE
0.94U	ANTIMONY	1U	MERCURY
2.2	ARSENIC	4U	NICKEL
18	BARIUM	510U	POTASSIUM
0.23U	BERYLLIUM	0.38U	SELENIUM
0.47UJ	CADMIUM	0.90UJ	SILVER
480J	CALCIUM	57	SODIUM
13J	CHROMIUM	0.26U	THALLIUM
2.7UJ	COBALT	NA	TIN
2U	COPPER	2.8U	VANADIUM
390J	IRON	4U	ZINC
19	LEAD	23	PERCENT MOISTURE
170U	MAGNESIUM		

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36792 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-05
CASE NUMBER: 12126 SAS NUMBER:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1535 STOP: 00/00/00
MD NUMBER: N303

MG/KG	ANALYTICAL RESULTS	MG/KG	ANALYTICAL RESULTS
16000J	ALUMINUM	1.6J	MANGANESE
0.92U	ANTIMONY	0.19	MERCURY
1U	ARSENIC	6U	NICKEL
18	BARIUM	500U	POTASSIUM
.23U	BERYLLIUM	0.36U	SELENIUM
.46UJ	CADMIUM	.88UJ	SILVER
250J	CALCIUM	60U	SODIUM
9.4J	CHROMIUM	0.24U	THALLIUM
4UJ	COBALT	NA	TIN
1.5U	COPPER	4U	VANADIUM
320J	IRON	4	ZINC
25	LEAD	23	PERCENT MOISTURE
30U	MAGNESIUM		

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

METALS DATA REPORT 08/30/89

PROJECT NO. 89-437 SAMPLE NO. 36786 SAMPLE TYPE: SOIL PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: S8-06 COLLECTION START: 06/13/89 1000 STOP: 00/00/00
CASE NUMBER: 12126 SAS NUMBER: MD NUMBER: N297

MG/KG	ANALYTICAL RESULTS	MG/KG	ANALYTICAL RESULTS
18000J	ALUMINUM	3.1J	MANGANESE
0.86U	ANTIMONY	0.28	MERCURY
2U	ARSENIC	10U	NICKEL
28	BARIUM	690	POTASSIUM
0.21U	BERYLLIUM	0.35U	SELENIUM
0.43UJ	CADMIUM	0.82UJ	SILVER
3000J	CALCIUM	570	SODIUM
13J	CHROMIUM	.24U	THALLIUM
4.8J	COBALT	NA	TIN
3.8	COPPER	2.6U	VANADIUM
650J	IRON	15	ZINC
13	LEAD	18	PERCENT MOISTURE
190U	MAGNESIUM		

REMARKS ***REMARKS***

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36782 SAMPLE TYPE: SURFACEWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TB-01 COLLECTION START: 06/12/89 0800 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N292

UG/L	ANALYTICAL RESULTS
10U	PHENOL
10U	BIS(2-CHLOROETHYL) ETHER
10U	2-CHLOROPHENOL
10U	1,3-DICHLOROBENZENE
10U	1,4-DICHLOROBENZENE
10U	BENZYL ALCOHOL
10U	1,2-DICHLOROBENZENE
10U	2-METHYLPHENOL
10U	BIS(2-CHLOROISOPROPYL) ETHER
10U	(3-AND/OR 4-)METHYLPHENOL
10U	N-NITROSODI-N-PROPYLAMINE
10U	HEXACHLOROETHANE
10U	NITROBENZENE
10U	ISOPHORONE
10U	2-NITROPHENOL
10U	2,4-DIMETHYLPHENOL
50UJ	BENZOIC ACID
10U	BIS(2-CHLOROETHOXY) METHANE
10U	2,4-DICHLOROPHENOL
10U	1,2,4-TRICHLOROBENZENE
10U	NAPHTHALENE
10UJ	4-CHLOROANILINE
10U	HEXACHLOROBUTADIENE
10U	4-CHLORO-3-METHYLPHENOL
10U	2-METHYLNAPHTHALENE
10U	HEXACHLOROCYCLOPENTADIENE (HCCP)
10U	2,4,6-TRICHLOROPHENOL
50U	2,4,5-TRICHLOROPHENOL
10U	2-CHLORONAPHTHALENE
50U	2-NITROANILINE
10U	DIMETHYL PHTHALATE
10U	ACENAPHTHYLENE
10U	2,6-DINITROTOLUENE

UG/L	ANALYTICAL RESULTS
50UJ	3-NITROANILINE
10U	ACENAPHTHENE
50UJ	2,4-DINITROPHENOL
50U	4-NITROPHENOL
10U	DIBENZOFURAN
10UJ	2,4-DINITROTOLUENE
10U	DIETHYL PHTHALATE
10U	4-CHLOROPHENYL PHENYL ETHER
10U	FLUORENE
50U	4-NITROANILINE
50U	2-METHYL-4,6-DINITROPHENOL
10U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
10U	4-BROMOPHENYL PHENYL ETHER
10U	HEXACHLOROBENZENE (HCB)
50UR	PENTACHLOROPHENOL
10U	PHENANTHRENE
10U	ANTHRACENE
10U	DI-N-BUTYLPHTHALATE
10U	FLUORANTHENE
10U	PYRENE
10U	BENZYL BUTYL PHTHALATE
20U	3,3'-DICHLOROBENZIDINE
10U	BENZO(A)ANTHRACENE
10U	CHRYSENE
10U	BIS(2-ETHYLHEXYL) PHTHALATE
10U	DI-N-OCTYLPHTHALATE
10U	BENZO(B AND/OR K)FLUORANTHENE
10U	BENZO-A-PYRENE
10U	INDENO (1,2,3-CD) PYRENE
10UJ	DIBENZO(A,H)ANTHRACENE
10U	BENZO(GHI)PERYLENE

REMARKS

REMARKS

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 08/04/89

PROJECT NO. 89-437 SAMPLE NO. 36782 SAMPLE TYPE: SURFACEWA PROG ELEM: NSF COLLECTED BY: P HENDERSON
SOURCE: CHEVRON CHEMICAL CO. CITY: ORLANDO ST: FL
STATION ID: TB-01 COLLECTION START: 06/12/89 0800 STOP: 00/00/00

CASE NO.: 12126 SAS NO.: D. NO.: N292

UG/L	ANALYTICAL RESULTS
10UJ	CHLOROMETHANE
10U	BROMOMETHANE
10U	VINYL CHLORIDE
10U	CHLOROETHANE
20U	METHYLENE CHLORIDE
5UJ	ACETONE
5UJ	CARBON DISULFIDE
5U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
5U	1,1-DICHLOROETHANE
5U	1,2-DICHLOROETHENE (TOTAL)
5U	CHLOROFORM
5U	1,2-DICHLOROETHANE
10U	METHYL ETHYL KETONE
5U	1,1,1-TRICHLOROETHANE
5U	CARBON TETRACHLORIDE
10UJ	VINYL ACETATE
5U	BROMODICHLOROMETHANE

UG/L	ANALYTICAL RESULTS
5U	1,2-DICHLOROPROPANE
5U	CIS-1,3-DICHLOROPROPENE
5U	TRICHLOROETHENE(TRICHLOROETHYLENE)
5UJ	DIBROMOCHLOROMETHANE
5U	1,1,2-TRICHLOROETHANE
5U	BENZENE
5UJ	TRANS-1,3-DICHLOROPROPENE
5UJ	BROMOFORM
10U	METHYL ISOBUTYL KETONE
10U	METHYL BUTYL KETONE
5U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
5U	1,1,2,2-TETRACHLOROETHANE
5U	TOLUENE
5U	CHLOROBENZENE
5U	ETHYL BENZENE
5U	STYRENE
5UJ	TOTAL XYLENES

REMARKS

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FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36796 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-02
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 1205 STOP: 00/00/00
D. NO.: N396 MD NO: N396

RESULTS	UNITS	PARAMETER
3.6U	MG/KG	CYANIDE

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36784 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-01
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 0810 STOP: 00/00/00
D. NO.: N294 MD NO: N294

RESULTS	UNITS	PARAMETER
2.7U	MG/KG	CYANIDE

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36794 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-03
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/14/89 0930 STOP: 00/00/00
D. NO.: N304 MD NO: N304

RESULTS	UNITS	PARAMETER
2.1U	MG/KG	CYANIDE

FOOTNOTES
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*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

6

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36790 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-04
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1330 STOP: 00/00/00
D. NO.: N301 MD NO: N301

RESULTS	UNITS	PARAMETER
3.0U	MG/KG	CYANIDE

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36792 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-05
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1535 STOP: 00/00/00
D. NO.: N303 MD NO: N303

RESULTS	UNITS	PARAMETER
5.9U	MG/KG	CYANIDE

FOOTNOTES
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

08/30/89

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 89-437 SAMPLE NO. 36786 SAMPLE TYPE: SOIL
SOURCE: CHEVRON CHEMICAL CO.
STATION ID: SB-06
CASE.NO.: 12126 SAS NO.:

PROG ELEM: NSF COLLECTED BY: P HENDERSON
CITY: ORLANDO ST: FL
COLLECTION START: 06/13/89 1000 STOP: 00/00/00
D. NO.: N297 MD NO: N297

RESULTS	UNITS	PARAMETER
2.2U	MG/KG	CYANIDE

FOOTNOTES
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